Proceedings of the International Conference on Telecommunication Technology and Management (ICTTM-2015)

11–12 April, 2015
Indian Institute of Technology Delhi

Emerald Group Publishing (India) Private Limited
New Delhi

Emerald Offices
Bingley, Cambridge, Sao Paulo, Johannesburg, Dubai, New Delhi, Beijing, Kuala Lumpur, Melbourne

Emerald Group Publishing (India) Private Limited
502-503, Ring Road Mall, Mangalam Place, Sector-3, Rohini, New Delhi – 110085

Title: **Proceedings of the International Conference on Telecommunication Technology and Management (ICTTM-2015)**

Reprints and Permissions service
Contact: Conference Secretariat, C/o Dr. Mahim Sagar, Room Number: 311,
Bharti School of Telecommunication Technology and Management, IIT Delhi

ISBN: 978-0-9926800-5-3

Editorial Board

Review Committee

Contents

THEME 4: MOBILE DATA SECURITY

THEME 5: NEXT GENERATION NETWORKS & ACCESS

THEME 6: NET NEUTRALITY & INTERNET GOVERNANCE

THEME 7: MOBILE VAS, MOBILE COMMERCE & OTT CONTENT SERVICES

THEME 8: DEVELOPMENT OF SMART CITIES & IOTS (INTERNET OF THINGS)

THEME 9: NETWORKS & INTERCONNECTION REGULATIONS

THEME 10: MERGERS & ACQUISITIONS NORMS

THEME 11: MANAGING BUSINESS & HIGH PERFORMING TEAMS IN TELECOM INDUSTRY

THEME 12-13: MOBILE INTERNET & BROADBAND NETWORKS / QUALITY OF SERVICE OF BTS AND CMS

THEME 18: GREEN TELECOMMUNICATIONS & SUSTAINABILITY ISSUES

THEME 19: COMPUTER NETWORKS AND EMBEDDED SYSTEMS

THEME 20: MULTIMEDIA PROCESSING

THEME 21: OTHER RELEVANT AREAS OF STUDY

Editorial

Bharti School of Telecommunication Technology & Management, IIT Delhi along with GSMA, Télécom Ecole de Management is conducting its 1st International Conference on Telecommunication Technology & Management (ICTTM 2015) on April 11–12, 2015. This conference attracted papers from multiple areas as mentioned in the table of contents. The conference paper review committee has reviewed the papers. The conference was based on the emerging issues of Telecommunication Technology & Management. The conference witnessed submission of more than 165 papers.

In this conference, all leading technical institutions across India have contributed their latest work. In this conference, several key stake holders from industry, academia and regulators shared their views on the emerging issues and contextual problems of telecom industry. Multiple research themes have emerged and we hope that participants in this conference will carry forward those research themes.

Bharti School of Telecommunication Technology & Management has entered into a new era of being the leader in the area of Telecom Technology & Management by its cutting-edge research and collaborative activities with several industry and academic institutions. Over the years, the school has emerged as a premier institute in developing 'Young Telecom Leaders' that will make India a telecom superpower.

We hope that these conference proceedings will become an important knowledge repository for the researchers and the practitioners.

The Editorial Board
ICTTM 2015 – IIT Delhi

Survey of Automatic Frequency Planning in GSM Industry for Additional Spectrum

Amit Agrawal[1], Neelesh Gupta[2]

[1]Research Scholar, Mtech EC, TIEIT, Bhopal
[2]Head of the Department, Elec & comm, TIEIT, Bhopal

Abstract

The available radio spectrum for GSM is very limited in India. To meet today's radio communication demand, this resource has to be administered and reused carefully in order to control mutual interference. The problem, therefore, arises to distribute frequencies to links in a "reasonable manner". This is the basic form of the frequency assignment problem. The system performance analysis carried out earlier has shown that the frequency planning with additional frequency can lead to a better performance in the downlink, reducing the bad quality of BCCH carriers TCH carriers. This paper will provide the study and analysis of work done in the past for automatic frequency planning (AFP) in GSM, which will be helpful in assigning the frequency if operator goes for additional spectrum acquisition and implementation on field considering cell's voice traffic and data traffic.

Keywords: *GSM, AFP Tool, BCCH, TCH*

Pragmatic Coded MIMO–OFDM Systems

Garima Singh[1], Arvind Kumar[2]

[1]Master of Technology, Department of ECE, National Institute of Technology Kurukshetra
[2]Assistant Professor, Department of ECE, National Institute of Technology Kurukshetra

Abstract

Orthogonal frequency division multiplexing (OFDM) supports high-data rate for wireless multimedia communication systems. OFDM can be combined with multiple-input multiple-output (MIMO) system to obtain improved system performance. MIMO–OFDM systems suffer from the high peak to average power ratio (PAPR). In this paper, a Pragmatic coded MIMO-OFDM system to reduce the PAPR is proposed. The proposed system performs better in terms of PAPR and bit error rate as compared to the golden-coded and optimum-detection-coded MIMO–OFDM systems.

Keywords: *Diversity, Bit Error Rate, MIMO–OFDM Systems, Peak-to-average Power Ratio, Space–Time Codes*

Spectrum Sensing in Cognitive Radio Networks Using Blind Approach Cyclostationary Detection

Venkatramana P.[1], S. Narayana Reddy[2]

[1]Professor, Department of ECE, Sree Vidyanikethan Engineering College, Tirupati
[2]Professor, Department of ECE, S. V. University College of Engineering, Tirupati

Abstract

The enduring growth of wireless technologies and exponential addition of users in it has raised spectrum shortage. However, surveys show that most of the licensed spectrum is underutilization in fixed spectrum allocation. Federal Communications Commission proposed a novel solution called Cognitive Radio Technology to overcome this problem by allowing an opportunistic utilization of unused licensed spectrum by the unlicensed users when licensed users are absent. Spectrum sensing is the key enabler for the cognitive radio technology. In this paper, we are presenting the cyclostationary detection method under modulation scheme for estimation and spectral autocorrelation function to analyze the spectrum for detection and discriminations of spectrum-related signals from noise at very low SNR without prior knowledge of licensed user in a cognitive radio environment. The detection methods include the calculation of cyclic autocorrelation function for the polyperiodic stationary signals with time and lag parameter. Then, the spectral correlation function is evaluated for the ergodic polyperiodic stationary signals with smoothing in order to eliminate the random effects. Finally, the Spectral Coherence Cycle-frequency Domain Profile or Cyclic Frequency Domain Profile (CDP) is used for signal detection which is a peak detection algorithm. To reduce the noise peaks in the cyclostationary output Absolute threshold, Standard deviation and Filtfilt techniques were used to enhance the performance of signal detection. The Cyclostationary detection technique without prior knowledge of licensed user is the best choice of spectrum sensing. This is the key enabler for dynamic spectrum access in cognitive radio networks. Here, the signal peaks are clearly discriminated from noise peaks using autocorrelation function where modulated signals have cyclostationary features due to periodicities. With limited observations, the detection performance is improved and 90% of detection probability is achieved at –6 dB SNR. Among the noise peak reduction techniques, the Filtfilt outperforms in detection.

Keywords: *Spectrum Sensing, Cyclic Frequency, Spectral Coherence, Cyclostationary, Cyclic Autocorrelation*

Selective Mapping and Partial Transmit Sequence Techniques for PAPR Reduction in OFDM for Spectrum Efficient Multimedia Communication Systems

Shatrughna Prasad Yadav[1], Subhash Chandra Bera[2]

[1]Electrical and Electronics Engineering Department, Indus University, Ahmedabad
[2]Satcom & Navigation Systems Eng. Division, Space Applications Centre, ISRO, Ahmedabad

Abstract

Spectrum efficiency has become a major concern in the modern high data rate multimedia communication systems. Orthogonal frequency division multiplexing (OFDM) has become a popular spectral efficient technique for high data rate transmission in multimedia communication systems. It has gained popularity not only because of spectral efficiency, but also due to robustness to multipath frequency selective fading and high data rate transmission capability. At the same time, it suffers from high peak-to-average power ratio (PAPR). High PAPR value is undesirable for power amplifiers as it causes to operate it in the nonlinear region producing distortions, reduction in battery life and causing power penalty at the transmitter and, therefore, is undesirable for spectrum-efficient multimedia communication systems. In the present work, selective mapping (SLM) method and partial transmit sequence (PTS) as PAPR reduction techniques have been investigated. Mathematical modeling and Matlab simulation have been carried out to analyze its performances. At 0.01 per cent of CCDF, PAPR values for SLM with phase vector, $U = 16$ are 6.1, 6.7, 7.3, 7.8 and 8.3 dB for number of sub-carriers, $N = 64$, 128, 256, 512 and 1,024, respectively. Whereas, for the PTS technique with a number of sub-blocks, $V = 16$, the corresponding values are 6.4, 7.0, 7.6, 8.1 and 8.5 dB for a number of sub-carriers, $N = 64$, 128, 256, 512 and 1,024, respectively. Similar results have been obtained for a different number of phase vector, U and sub-blocks, V. Results indicate that SLM method has 0.3 dB lower PAPR value than PTS technique at the cost of marginal computational complexity.

Keywords: *Orthogonal Frequency Division Multiplexing, Selective Mapping, Partial Transmit Sequence, Peak-to-average Power Ratio, Nonlinear*

Analysis of Rayleigh Multipath Fading Channel for OFDM System

Sarika M.R. [1], Sandesh[2], T.P. Surekha [3], Arjun K.R.[4]

[1,2]Research Scholar, Electronics and Communication, Vidhya Vardhaka College of Engineering, Mysuru
[3]Professor, Electronics and Communication, Vidhya Vardhaka College of Engineering, Mysuru
[4]Assistant Professor, Electronics and Communication, Vidhya Vardhaka College of Engineering, Mysuru

Abstract

The growing demand for wireless communication systems to provide high-data rates has brought with it the need for a flexible and efficient use of the spectrum resources, which is a scarce commodity. Most of the mobile wireless communication channels are multipath and time-varying channels. The reflected waves arrive at the receiver with different path delays, fluctuations in signal amplitude, angle of arrival and change in phases. Wireless mobile channels normally affected by Doppler shift caused by user mobility and the reflected waves have Doppler which is caused mainly by multipath propagation. In this paper, we have considered Orthogonal Frequency Division Multiplexing (OFDM) system, because OFDM emerged as a vital role among all the modulation schemes due to higher data rates in the field of wireless communication. Sensitivity to the frequency offset between the transmitted and received signal is the basic criteria of the OFDM system, which is caused due to the factors like Doppler shift in the channel or the difference between transmitter and receiver local oscillator frequencies. For the performance analysis of the OFDM system, we have calculated the Bit Error Rate (BER) and Signal to Noise Ratio (SNR). This paper deals with the analysis of various parameters of the OFDM system under different wireless channel scenarios. The wireless channel is assumed to include Additive White Gaussian Noise (AWGN) and multipath fading. By varying the parameters of the channel like Doppler frequency, multipath fading at different frequencies, Doppler shift, path delays at the different scenarios of the user, distance of the mobile user from the transmitter and mobility of the user is considered here. BER versus SNR was calculated for all the scenarios. A MATLAB simulation was used to analyze the performance of the OFDM system by varying the parameters which were mentioned above.

Keywords**:** *AWGN, BER, Doppler Shift, OFDM, Rayleigh Fading, SNR*

Channel Assignment and Spectrum Sensing Approach for Cognitive Radio Networks Using a Vatic Model

Mahua Bhowmik[1], P. Malathi[2]

[1]Research Scholar, Department of Electronics Engineering, Padmashree Dr. D.Y. Patil Institute of Engineering and Technology, Pune

[2]Professor, Department of Electronics & Telecommunication Engineering, Dr. D.Y. Patil College of Engineering, Pune

Abstract

The substantial rise in demand for the available wireless spectrum is characterized by the developments in technology of wireless devices. The usable radio spectrum is a limited precious natural resource. Cognitive radio technology shows promise in the respect of using the available spectrum optimally. However, studies and observations have shown that this available wireless spectrum is not being used optimally. The evolution of wireless devices such as mobile phones has led to an ever-increasing demand for the limited wireless spectrum. Cognitive radio is considered to be a promising technology to ad-dress the paradox of spectrum scarcity and spectrum under-utilization. The paper emphasizes on using the cognitive radio technology in existing cellular networks. We propose an algorithm that calculates the amount of prospective users beforehand, thereby making it easier for the spectrum to be allocated to the secondary user. The emphasis of this paper is on a predictive or vatic model that predicts the number of secondary users a particular cell is supposed to serve. This prediction is based on the history of the usage of the spectrum by primary as well as secondary users. The paper explains the collaborative-sensing concept, exploiting the cyclostationary features of received signals. A review of energy-based detection and cyclostationary-based sensing is covered highlighting the advantages and disadvantages of the same. Furthermore; the collaboration of these two methodologies to form a separate algorithm for spectrum sensing is reviewed. It is a hybrid channel assignment strategy that incorporates intelligence in the network in the form of traffic prediction with minimal changes in the existing infra-structure, thereby making a fair and opportunistic usage of the available spectrum. This is coupled with an excellent channel allocation scheme that is expected to achieve a better throughput. Apart from this, features have been added to predict and tackle emergency situations that enhance the reliability of the cellular system.

Keywords: *Spectrum, Cognitive Radio, Spectrum Scarcity, Predictive Model*

Business Model Innovation as a Source of Value Creation: A Case Study of Connect Broadband

Makhmoor Bashir[1], Rajesh Verma[2]

[1]Research Scholar, School of Business, Lovely Professional University, Jalandhar
[2]Associate Dean, School of Business, Lovely Professional University, Jalandhar

Abstract

The Indian telecommunication industry has shown great signs of revival over the last couple of years primarily due to increasing penetration level of Internet users. The Value Added Services display impressive potential as companies like Airtel, Idea cellular derive more than 17 per cent of their revenue alone from them (PWC2011). Driven by technology and innovation, experts believe that VAS industry has even greater possibilities than electronic commerce (Kumar & Kakani, 2012). Thus, in order to capitalize on these advantages, companies need to innovate their business models and thereby focus more on the value proposition which they are providing. A recently published report by economist intelligence unit (2012) wherein a survey of almost 4,000 senior managers was carried throughout the globe found that executives prefer business model innovation rather than new products and services as a source of competitive advantage. A similar type of study conducted by IBM found that companies whose profit margins have grown faster than that of their competitors over the last five years were most likely to emphasize business model innovation as opposed to product or process innovation (IBM2006). In this study, an attempt would be made to clarify how business model innovation can be a great source of value creation in businesses using a case study method for "Connect Broadband" a data service provider headquartered in Mohali, Punjab, India. The company innovated their existing business model by combining antivirus solutions with the data services and as a result their penetration rate increased up to 40 per cent and the revenues also had a huge surge. The company as a result of this innovation in their business model added 45,000–50,000 customers in no time. This Business Model Innovation took the company to a second position in market as per the customer base is concerned lagging behind only "Bharat Sanchar Nigham" limited a government sponsored company.

Keywords: *Business Models, Business Model Innovation, Value Proposition, Competitive Advantage*

Performance Evaluation of MIMO-OFDM Schemes in Presence of Carrier Frequency Offset

Ankita K. Panchal

Assistant Professor, EC department, Sigma Group of Institutes (LITE), Nimeti

Abstract

Wireless designers constantly seek to improve the data rate, spectral efficiency, coverage of wireless networks and link reliability. Orthogonal Frequency Division Multiplexing (OFDM) technique has been widely accepted for the transmission of high rate data. Multiple Input Multiple Output (MIMO) techniques provide strong diversity gain and can increase the link throughput with the use of Adaptive Modulation and Coding (AMC). The idea behind AMC is to dynamically adapt the modulation and coding scheme to the channel conditions so as to achieve the highest spectral efficiency at all times. Further, MIMO schemes can be combined with OFDM as STBC-OFDM or SFBC-OFDM. Combining the advantages of space–time coding and OFDM is attractive in wireless system designs. However, one of the main drawbacks is its high sensitivity to frequency offsets since the orthogonality between sub-carriers is destroyed, thus, leading to considerable system performance degradation. The Carrier Frequency Offset (CFO) arises mainly due to the Doppler shift and/or oscillator mismatch. Hence, the effect, estimation and correction of frequency offsets have been subject of intensive research in the decade. Performance of various MIMO techniques is evaluated with combination of OFDM. The objective is optimum combination of MIMO–OFDM in the presence of CFO. This system is also implemented as per WiMAX standard. The performance is also observed with different modulation techniques and multiple antenna system for multi-users.

Keywords: *Carrier Frequency Offset (CFO), Orthogonal Frequency Division Multiplexing (OFDM), Multiple Input Multiple Output (MIMO), Space–Time Block Code–OFDM (STBC–OFDM), Space Frequency Block Code–OFDM (SFBC–OFDM)*

Cell Range Expansion in Macro-Pico Scenario

Chavada Kalpna B.[1], Gharge Anuradha P.[2]

[1]Research Scholar, Electronics Communication Department, Parul Institute of Engineering and Technology, Vadodara

[2]Professor, Electronics Communication Department, Parul Institute of Engineering and Technology, Vadodara

Abstract

3GPP introduced the Long Term Evolution (LTE) to increase the data rate of users. Deployment of the picocells in macro-network is the easy way to increase the total channel capacity. Because of higher difference in the transmission power of the macrocells and low power nodes, the users will connect to the macrocell as it have more power. So, to increase the offload performance of macrocells and utilization of picocells, increase in the footprint of the picocells is necessary by cell range expansion having different bias values. In this paper, firstly, we have given simulation results of effect of adding picocells in the macrocell network. In the second part, the effect of the cell range expansion after setting bias of different values to all picocells is displayed. So, the advantage of picocells is shown as increase in the total network capacity.

Keywords: *LTE, Heterogeneous Network, Cell Range Expansion, Macro Cells, Pico Cells*

Technological Innovation of Big Data and HR Analytics Transforming Employer Branding Paradigm

Maitri

Assistant Professor, Management Education and Research Institute, GGSIPU College, Delhi

Abstract

Data has penetrated into every functional area of business and industry. "Internet of things" "cloud computing" and "big data" are buzzword of Technology which is driving management. Technology facilitates transformation of HR systems and practices dimension of employer branding. Digital transformation of human resource practices is the need of the hour. Digitization of Human Resource is prompting paradigm shift in employer branding domain. Big Data and People analytics are reinventing HR and driving innovation in an extraordinary manner. Continuous innovation comes from people. Business decisions and innovation are made by the employees, so developing innovators by recruiting great managers is the challenge for companies. People analytics facilitates accurate people management decisions. The most important currency for business decision-making process is data. Google is the world's largest data-driven company. Fortune Magazine and the Great Place to Work Institute named Google the 2014 "Best Company Work For." This marks fifth time at the top of the list. Google People Analytics approach is powerful and breathtaking. Organizations are investing billions of dollars in formulating and implementing strategies. Facebook acquired Whtasapp; Google bought Nest. Data paradigm bringing Radical shift in employer employee relations which influence employer branding. Wise use of big data and analytics can enable HR role as a value driver, competitive player, strategic partner, and Game changer at organizational landscape. This is an exploratory study and the main purpose of the study is to identify the role of big data and HR analytics in Employer Branding from the perspective of human resource systems and practices dimension. Survey reports, research insights of organizations like KPMG, Accenture, PWC, Oracle, Deloitte, McKinsey, Capgemini, IBM, and Google have been referred to. Research articles have also been explored extensively on the topic and sub topics to compile the content and conclude this article.

Keywords: *Big Data, HR Analytics, Employer Branding*

Spanning the Indian Digital Divide

Chavi Asrani[1], Ankush Agrawal[2]

[1]Research Scholar, Department of Humanities and Social Science, Indian Institute of Technology Delhi
[2]Assistant Professor, Department of Humanities and Social Science, Indian Institute of Technology Delhi

Abstract

Benefits of Information and Communications Technology (ICT) are boundless. It positively influences economic growth of countries; it also impacts different aspects of people's lives and is likely to grow in importance as a revenue and information source. However, only those with access to and competent in use of ICT would be able to reap the benefits. Further, the success of various government initiatives such as 'Digital India' and 'National Mission on Education' hinges crucially on the ICT adoption and usage. Thus, it is imperative to examine socioeconomic factors that determine the adoption of digital technology. This study examines various socioeconomic, demographic and geographic factors effecting digital divide pan India. Preliminary results suggest that education, occupation, geography and income levels significantly affect the possession of digital devices. There is also an evidence of gender disparities in ownership of digital devices. These findings can help regulators/policy makers to design policies for narrowing the digital divide.

Keywords: *Digital Divide, ICT, India*

Policies Pertaining to Telecom Regulations in India over the Years: Its Impact

Rasananda Panda[1], Durva Shastri[2]

[1]Professor, MICA, Ahmedabad
[2]Research Assistant, MICA, Ahmedabad

Abstract

Indian Telecom sector has witnessed a phenomenal growth since last few years. The paper will attempt to analyze the process of transformation the sector has undergone from a monopolistic to a competitive environment, with the introduction of the major policies. The policies like the National Telecom Policy of 1994; establishment of the Telecom Regulatory Authority of India (TRAI) in 1997; the re-emphasized New Telecom Policy of 1999 and many more over the period of time, were introduced to bring in a regulatory mechanism in order to sustain the competitive environment in the sector. These policy reforms have helped in addressing the issues pertaining to this sector like quality of service, protection of consumer interests and the growth of telecom services. This paper will attempt to highlight the major policy decisions taken in the field of Telecom sector in India over the years. It will discuss about the rationale behind the policies taken and the benefits that stakeholders of this sector enjoyed. The paper will analyze each major policy and will also explain the perspectives of the companies, government and professionals on the same.

Keywords: *Telecom Policies; National Telecom Policy, 1994; New Telecom Policy, 1999; Telecom Regulatory Authority of India*

Extracting Mass Information from Android-Based Smart Devices

Vipul Agrawal[1], Deepti Vidyarthi[2]

[1]M.Tech Scholar, Department of Computer Engineering, Defence Institute of Advance Technology, Pune
[2]Assistant Professor, Department of Computer Engineering, Defence Institute of Advance Technology, Pune

Abstract

Android's concept of collaboration and collective development has led to the development of a wealth of applications and increased user appeal. While achieving this, the whole concept of information ownership and data security has taken a different form. In this paper, we design an android-based Mobile Bot (mobot) network and demonstrate its capability to extract mass information without exploiting any vulnerability in the android system but by following the authorised ways. In the paper, we have discussed all aspects of the proposed mobot network. The fields deliberated upon include information extraction strategy, mobot command and control system, mobot network communication and ways of giving the mobot network required stealth and resilience. The proposed mobot has been designed in hybrid architecture, employing both centralized and distributed communication. We have for the first time introduced the concept of dynamic code loading in android botnets, i.e. loading additional code from external source at runtime. This provision allows the botmaster to add malicious code to the stripped-down version of bot after it has been accepted as benign by various app verifiers at or before installation time. Thus, our mobot network has demonstrated that the android platform has certain open weaknesses that can be leveraged to extract mass information (and much more) from android devices.

Keywords: *Android, Data Security, Botnet*

An Assessment-based Approach for the Detection of Greyhole Attack in WMNs

C. Gayathri[1], V. Kavitha[2]

[1]PG Scholar, Department of ECE, M. Kumarasamy College of Engineering, Karur
[2]Professor & Head, Department of ECE, M. Kumarasamy College of Engineering, Karur

Abstract

Wireless Mesh Networks (WMNs) have advantage over other wireless networks and emerged as a promising technology because of their wide range of applications. In WMNs, large amount of traffic originates or terminates in gateways which is mostly mesh routers in case of infrastructure WMNS. Routing is the major duty of network layer in WMNs. Security is the major constrain in WMNs, since WMNs are widely adopted in military applications. The network layer is vulnerable to many kinds of routing attacks. One such attack that causes threat to routing is DoS attack. This paper considers a special type of DoS attack called selective forwarding attack or greyhole attack. With such an attack, a misbehaving mesh router just forwards few packets it receives, but drops sensitive data packets. This kind of attack is difficult to detect. Hence, to mitigate the effect of such attack, an approach called FADE (Forward-assessment-based Detection) is adopted. FADE scheme detects the presence of attack inside the network by means of two-hop acknowledgment-based monitoring and forward-assessment-based detection. FADE operates in three phases, and it is analyzed by determining optimal threshold values. FADE offers effective defense against the collaborative internal attackers in WMNs.

Keywords**:** *Collaborative, FADE, Security, Selective Forwarding Attacks, Wireless Mesh Networks (WMNs)*

Performance Evaluation of Selective Communication Technologies for Integration of Protection Devices to SCADA

Gauri G. Keni[1], Ganesh Pushpkumar[2], Suneeta Rayker[3]

[1]Research Scholar, Electrical & Electronics, Goa College of Engineer, Farmagudi–Ponda, Goa
[2]Research Scholar, R&D, Siemens Ltd, Verna-Salcete, Goa
[3]Professor, Electrical & Electronics, Goa College of Engineer. Farmagudi–Ponda, Goa

Abstract

The purpose of this project was to analyze and understand the behavior of selective communication technologies (wireless and wired) for the integration of protection devices to SCADA. Performance factors in each case were studied and analyzed. The project was designed to simulate the real-time faults and inject these fault signals to the protection devices so that they can be monitored on SCADA. These real-time faults (single line to ground, double line to ground and 3 phase) were simulated in MATLAB. The MATLAB files were then converted to COMTRADE format and applied to the protection devices. These devices were integrated through RTU to SCADA system using two modes of communication technologies (e.g. wired, Wireless). Over current protection scheme was considered and the fault was injected on the transmission line. In this set-up, RTU establishes communication with the protection device using Modbus communication protocol at the data layer. At the higher level, i.e. Network layer, IEC 60870 104 enables communication between control station (SCADA) and substation (RTU) via a standard TCP/IP network. The communication between the substation (RTU) and the Control station (SCADA) is established through wireless GPRS protocol. GPRS architecture works on the same procedure like GSM network, but has additional entities that allow packet data transmission. The data throughput and the time delay between packets were observed. Some other factors were also considered. Fault indications and analog values were captured on SCADA. Events were triggered for the same. As per the analysis done, it is found that the communication done using wired and wireless system has its own advantages and disadvantages. The data transfer has to be continuous and faster so that Fault Localization and Restoration takes place faster. It would depend on the requirement of the customer to choose the right technology as the data transmitted is very crucial for smooth supply of electricity.

Keywords: *SCADA (Supervisory Control and Data Acquisition), RTU (Remote Terminal Unit), GPRS (General Packet Radio Service), GSM (Global System for Mobile)*

Comparison of Various Security Mechanisms of Wireless Local Area Network (WLAN)

Manpreet Kaur[1], Kamaljit Singh Saini[2]

[1]Research Scholar, Department of CSE, Chandigarh University, Mohali
[2]Associate Professor, Department of CSE, Chandigarh University, Mohali

Abstract

As Wireless local area (WLAN) enabled mobile devices are increasing rapidly. As WLAN has open access to every client, so there is a need of a fast and secure mechanism or an efficient initial link set-up mechanism. A large number of authentication methods are there like WEP, WPA, EAP/RADIUS/802.11X, WPA2/802.11i. The speed of providing authentication is different for each method. Nowadays, 802.11i is the best method to provide the security, but the authentication delay of 802.11i becomes intolerable under some crowed area. So, a new protocol was proposed in 2014, known as FLAP. The main focus of this paper is to give a comparison of authentication methods used by various security standards of WLAN and to explain various advantages of FLAP protocol over other security methods.

Keywords: *Wireless LAN IEEE 802.11i, Authentication, Encryption, FLAP Protocol*

A Secret Fragment Visible Mosaic Image Created Using CMF with Color Transformation Technique

Asawari Chavan[1], Amrita Manjrekar[2]

[1]Research Scholar, Department of Technology, Shivaji University, Kolhapur
[2]Assistant Professor, Department of Technology, Shivaji University, Kolhapur

Abstract

A novel method is implemented secret fragment visible mosaic image for secure data communication. Secure communication is an important issue in the Internet globe. Creation of secret fragment visible mosaic image is used secret image and target image. The mosaic image is composing by small fragments of a given secret image and selected cover image. In our method, the selection of the cover image is arbitrary and uses this image to the hiding of the secret image. Secret image and target image is split into tiny fragments called tile image and target block, respectively. Color variation process is used for hiding a tile fragment in a similar target block. Color transform algorithm is used for transforming color characteristic of each tile image to corresponding target blocks. The extraction of the secret image may be losslessy image. If the variable size of the secret image and cover image, then resizing the cover image. Customized metafile (CMF) is created to store the required information for retrieving the secret image. Hash value should be calculated to provide integrity of a secret message. The implemented method is possible for big volume and different size of the secret image and cover image. Proposed system provides data confidentiality, authenticity, and integrity, so data can be protected from leakages during transmissions. The proposed method is feasible for secure communication and losslessy data embedding technique.

Keywords: *Information Hiding, Color Transformation, Customized Metafile, Mosaic Image*

Design and Implementation of Vehicle Monitoring and Tracking System Using ARM-7 LPC-2148

Avinash D. Mahule[1], Shrikant R. Bhoyar[2], Nitin Bhomle[3], Snehal P. Jawanjal[4], Rishab Tripathi[5]

[1]Lecturer, ECE Department, Dr. Babasaheb Ambedkar College of Engineering and Research, Nagpur
[2]Lecturer, ETC Department, Rajiv Gandhi College of Engineering and Research, Nagpur
[3]Assitant Professor, EN Department, Shri. Ramdeobaba College of Engineering and Management, Nagpur
[4]Lecturer, ETC Department, Rajiv Gandhi College of Engineering and Research, Nagpur
[5]B.E. Student, ECE Department, Dr. Babasaheb Ambedkar College of Engineering and Research, Nagpur

Abstract

To meet the requirements of some intelligent vehicle monitoring system, our project integrates Global Position System (GPS), Global System for Mobile communications (GSM), Relay and Accelerometer in the whole. A remote monitoring system based on SMS via GSM is implemented. The project is designed for post-accident scenario of two-wheelers. This project will help a victim of an accident by sensing the accident and to reach out to inform hospital, police and relatives with the geographic position and time of the accident. Also, when the accident occurs, a relay circuit has been incorporated to cut off the engine so as to avoid any fire breaking out during the accident. A remote monitoring system based on SMS via GSM is implemented. This device is small enough to be hidden within the chassis of the vehicle**.**

Keywords: *ARM7 LPC-2148, Accelerometer, Relay, GPS, GSM, LPC2148, Wireless Monitoring System*

Statistical Attack Resistant Multi-Bit Steganography Using Mobile Keypad Character Encoding

Uttiya Ghosh[1], Smritikana Maity[2], Imon Mukherjee[3]

[1,2,3]Department of Computer Science and Engineering,
St. Thomas' College of Engineering and Technology, Kolkata

Abstract

Communication over the Internet has resulted in very fast communication over the years, but it has resulted in degradation of reliability and secrecy which brings in the concept of steganography. Many steganographic methods introduced with time have helped in overcoming this disadvantage by increasing the security during data communication. While least significant bit embedding steganographic algorithms in images helps to add security, this also results in low-embedding capacity, multiple bit embedding adds on to the capacity of data that can be hidden. The process proposed in this paper uses a special mobile keypad character code for every character which is embedded in a randomized circular row major format in cover images. This code is based on the mobile keypad structure which not only adds to data security over algorithms using conventional binary code, but also makes the proposed algorithm capable of withstanding visual attacks with almost no perceivable distortion in the stego images. Along with a high-embedding efficiency and embedding capacity, the proposed algorithm can withstand structural attacks as well as statistical attacks, viz. Sample Pair test and chi-square test due to its randomized nature. Finally, the success of this method lies in its compilation with the standards set by Stirmark Benchmark.

Keywords: *Mobile Keypad Character Code, Data Security, Embedding Efficiency, Embedding Capacity, Statistical Attacks*

A Novel Distant E-voting Mechanism Using Dual Layer Security

Soura Dutta[1], Xavier Das[2], Ritam Ganguly[3], Imon Mukherjee[4], S. Bhatacharjee[5]

[1,2,3,4,5]Dept. of Computer Science & Engineering,
St. Thomas' College of Engineering & Technology, Kolkata

Abstract

In modern times, where corruption seems to be on the rise, we see that it requires special and secure measures to make sure that the vote casted is by a genuine voter. It is impossible to achieve this feat by the existing manual schemes of voting. In this paper, we propose a technique using steganography to provide secure distance e-voting facility with the help of just three essential credentials – the Personal Identification Number (PIN), the passport image the fingerprint image from the voter. The process is initiated by hiding the unique PIN in the fingerprint image by using Least Significant Bit (LSB) matching technique. Our algorithm also introduces Minimal Impact Decimal Digit Embedding (MIDDE) technique, by which the fingerprint image is hidden inside the passport image. This enhances the security as without the PIN and the same fingerprint, it is impossible to cast the vote. The stego image that is generated as a result of this technique looks exactly similar to the passport image, thereby reducing any possible chances of intervention in mid stage. It is, therefore, impossible to be visually perceptible due to the two layers of embedding. Statistically, it becomes impossible to pinpoint the precise location of the PIN as it is randomly embedded into the fingerprint image, which again is further embedded into the passport image. This technique is designed to provide authentication to the voting system and reduce manual labour involved in the usual voting methods, thus guarding the democratic right of the voter. Intuitively, this technique is better than other existing state-of-the-art e-voting techniques due to dual layers of security and the randomness of the location of PIN in the fingerprint.

Keywords: *Information Security, E-voting, Steganography, Decimal Digit Embedding, Fingerprint Hiding*

A Privacy Preserving Location Proof Updating System with Collusion Resistance

Neethu Thankappan[1], Shameem Ansar A.[2]

[1]PG Scholar, Department of Computer Science, TKM College of Engineering, Kollam
[2]Assistant Professor, Department of Computer Science, TKM College of Engineering, Kollam

Abstract

Location Based Services (LBS) personalize the service they provide to the resources according to the current location of the user. The primary objective of LBS is to check the authenticity of a device's claim regarding its current location. Location proof of a particular person relies on his/her mobile device position. Location privacy is mandatory for every user to keep their location confidential. In the existing systems, the location that is determined by the device itself is later forwarded to the LBS provider. This can create a security problem that a user can cheat by having his device transmitting a false location to gain access to unauthorized resources. The main challenge here lies in the design of a location proof system. It should possess mechanisms for eliminating colluding attack and should be able to accommodate location requirements of different LBS while preserving location privacy of users. To counter this, the proposed work aims at formulating a location proof updating protocol in which Wi-Fi enabled mobile devices mutually generates location proofs and send updates to a location proof server. The mobile devices use pseudonyms that are periodically changed to preserve the source location privacy. In addition to that, there is a location privacy model in which users can decide whether and when to accept location proof request. Public-key cryptographic methods are used to encrypt the communications, thereby improving the security against colluding attacks so that only the legitimate devices will get access. Also, the simulated results indicate that the computation time of nodes in the proposed system is reduced.

Keywords: *Location Proof, Location Privacy, Pseudonym, Public–Key Certificates*

A Survey on Traffic Anomaly Detection Methods Used to Detect DDoS Attack

Sonia Laskar[1], Dhirendra Mishra[2]

[1]M.Tech. Student, Computer Engineering Department, Mukesh Patel School of Technology Management and Engineering, SVKM's NMIMS University, Mumbai

[2]Associate Professor, Computer Engineering Department, Mukesh Patel School of Technology Management and Engineering, SVKM's NMIMS University, Mumbai

Abstract

Distributed Denial of Service (DDoS) attack caused by flooding forces system to exhibit abnormal traffic behavior called anomaly during attack. Motivations behind DDoS threats are politics, vandalism and online gaming. Server becomes unavailable facing forced downtime causing company's heavy financial losses. Such situations be prevented by detecting anomalies in real time using anomaly detection as first layer of protection. Classification of different traffic anomaly detection methods includes statistical methods like Thresholding, Co-variance, Cumulative Sum (CUSUM), Parametric method, Catastrophe theory, data mining methods like Clustering, Clustering and Association using a priori algorithm combined, neural networks like Mark-aided distributed filtering, Chaos theory, 2-layered multi-modal flow behavior model, aggregate models like Co-operative defense approach, Histogram based Pegasus. Other methods include Principal Component Analysis (PCA), Wavelet and Entropy Collaborative approaches include Distributed Change Point Detection (DCD). 16 different methods studied from different technical papers are discussed, compared and analyzed with advantages and disadvantages. Based on the comparison, suggestions are provided as conclusion to improve performance and design of DDoS traffic anomaly detection. Usage of real-time detection with network-based aggregate traffic anomaly detection like Pegasus iceberg detection is suggested as an effective method to detect DDoS attack with reduced network communication cost. Depending on the type of anomaly detected, the specific attack prevention and mitigation techniques can be selected to defend the attack target. Multi-modal DDoS traffic anomaly detection using score fusion, a novel technique is conceptualized to protect any type of server against previously known or unknown attacks.

Keywords: *DDoS, Traffic Anomaly, Traffic Anomaly Detection Methods, DDoS Detection, Oculi*

Signal Propagation Difference of 900 and 1800 Mhz

Somya Agrawal[1], Neelesh Gupta[2], Meha Shrivastava[3]

[1]M.Tech Research Scholar, TIEIT, Bhopal
[2]Head-EC Dept, TIEIT, Bhopal
[3]Assistant Professor, TIEIT, Bhopal

Abstract

Recently, the Government of India auctioned 2G spectrums in both 900 Mhz and 1,800 Mhz Band for the GSM operators whose spectrum license is getting over shortly. New case can be studied and analysed if an existing 900 Mhz Band operator receives 1,800 Mhz band in the new auction process. And it will be interesting to learn about the impact on signal coverage of sites at the same location working at different GSM Frequency Bands. In order to estimate the signal parameters accurately for mobile system, it is necessary to estimate a system's propagation characteristics through a medium. Propagation analysis provides a good initial estimate of the signal characteristics and path loss. The path loss is associated with the design of base stations as this tells us how much a transmitter has radiated to service a given region. Planning tool is used to assist engineers in designing and optimizing wireless networks by providing an accurate and reliable prediction of coverage. With a database that takes into account data such as terrain, clutter and antenna radiation patterns, as well as an intuitive graphical interface, the planning tool gives RF engineers a state-of-the-art tool to design wireless networks, plan network expansions, optimize network performance and diagnose system problems. This paper gives an overview of the differences in the propagation losses for 900 Mhz and 1,800 Mhz frequency band using the suitable propagation model and ATOLL tools. It presents a description of the practical propagation model, their methodology to plot Coverage predictions.

Keywords: *GSM, Planning Tool, Propagation Losses, Propagation Model*

Radio Network Improvement Using Heterogeneous Networks in India

Priyanka Agarwal[1], Akrati Agarwal[2]

[1]Assistant Professor, MBA (Telecom Management), Amity Institute of Telecom Engineering and Management, Amity University, Noida

[2]Student, B.Tech+MBA (Telecom Management), Amity Institute of Telecom Engineering and Management, Noida

Abstract

As mobile demand for data exceeds all expectations, heterogeneous network architecture with multiple frequency bands, radio access technologies and base stations of varying coverage range is the only way forward. Heterogeneous networks based on the notion of LTE Advanced are in relation to enhancing the efficiency of the spectrum per unit area. A heterogeneous network, by utilizing a blend of macro, femto and pico empowers supple and low-priced deployments and offers a steady broadband understanding to users everywhere in the system. The main objective of this study is to find the ways in which heterogeneous networks can be deployed for different requirements at different locations in order to improve the radio network by providing good coverage and high capacity to the end user and to find issues faced in deployment of the heterogeneous networks. This is an exploratory and descriptive study with a sample size of 3 Telecom Operators, 2 Telecom Vendors selected from different organizations of telecom industry, Delhi/NCR. The study reveals that heterogeneous networks permit for a supple deployment plan with the use of dissimilar power base stations together with femtos, picos, relays and macros to offer coverage and capacity where it is required the most. These methods mainly provide the practical, scalable and lucrative means to appreciably augment the capacity of today's mobile wireless networks by putting in smaller, cheaper, self-configurable base-stations and relays in an incremental way into the present macro-cellular networks.

Keywords: *Heterogeneous Networks, Network Deployment, Capacity, Coverage*

Wi-Vi: Through-the-Wall Envision

Divya Punia[1], Davinder Rathee[2]

[1]PG, Department of Electronics and Communication Engineering, Vaish College of Engineering, Rohtak
[2]Assistant Professor, Department of Electronics and Communication Engineering, Vaish College of Engineering, Rohtak

Abstract

Wi-Fi vision is a new technology that allows envision through the walls using Wi-Fi signals. By it one can perceive human beings moving behind walls and closed doors. Wi-Fi OFDM signals in the ISM band (at 2.4GHz) are enrolled in it. Wi-Vi is built with two Wi-Fi antennas for transmission of signals and only one receiver and employs some form of coding to interpret the signals. The two antennas send out nearly identical signal and both the signals are contrary to each other. Due to this reversibility property of the signals, an identical signal is created when they hit a solid object, and different signals are encountered if hit a mobile object. Simple gestures made behind opaque structural obstructions can also be identified using Wi-Vi and by combining a sequence of gestures a message can be communicated to a wireless receiver without carrying any transmitting device.

Keywords: *WI-VI: Wireless Vision, MIMO: Multi Input Multi Output, ISAR: Inverse Synthetic Aperture Radar, Flash Effect*

Effect of Contention-based Nature of IEEE 802.11 on Throughput in "Wi-Fi as a Solution for Mobile Data Offloading"

Mridul Gupta

M.Tech, Department of Electronics and Communication Engineering, MNNIT Allahabad

Abstract

The rapid growth in the number of smart phone users results in a colossal growth of mobile data traffic. Many options are being considered to reduce the traffic load from the cellular networks. Wi-Fi has come up as a most promising solution to offload mobile data from the scarcely available licensed cellular band, due to less capital and operational expenditure (CAPEX/OPEX). IEEE 802.11 is a standard for wireless LANs (WLAN or Wi-Fi) that deals with physical and link layer of the ISO layering model. 802.11 based Wi-Fi functions on contention-based carrier sense multiple access with collision avoidance (CSMA/CA) scheme. In this paper, a wireless scenario containing four mobile nodes is created and after each 5 seconds, TCP traffic is set up at every node. Network simulator (ns-2.35) is used for performing simulations. We observed the effect of contention-based nature of IEEE 802.11 and found that as the number of active Wi-Fi users is increased, there is a drop in throughput of the network due to increasing collisions after the Wi-Fi network is saturated.

Keywords: *Wi-Fi Offloading, IEEE 802.11, CSMA/CA, Throughput, NS-2*

Performance Evaluation of Routing Protocols for Traffic Light Scenario in an Urban Vehicular Environment

Rishu Chhabra[1], C. Rama Krishna[2], Meenu Khurana[3]

[1]Assistant Professor, School of Computer Sciences, Chitkara University, Punjab
[2]Professor, Computer Science and Engineering, NITTTR, Chandigarh
[3]Associate Professor, School of Computer Sciences, Chitkara University, Punjab

Abstract

The system targeting the improvement of transportation management for enhancing road safety in India and across the world has become a necessity. Vehicular Ad hoc Network (VANET) offers a solution to the Intelligent Transportation Systems (ITS) that focuses on helping the drivers on the roads, avoiding accidents and providing other information. It enables vehicle to infrastructure (V2I) and vehicle to vehicle communication (V2V), thus extending the view of the driver. VANET provides wireless communication among vehicles for comfort, safety and entertainment applications. VANET is a sub-class of MANET. The majority of traditional MANET routing protocols does not perform optimally in VANETs. However, AODV being a developed protocol for MANETs has been implemented by various researchers in a VANET scenario. In this paper, we have compared the performance of MANET routing protocol AODV with VANET routing protocol by considering a partially wired network topology, with Road Side Units (RSUs) installed at the intersections in real-time urban environment. The VANET routing protocol implemented combines geographic routing and carry-and-forward approach to route the packets from source to destination. Thus combines the advantages of geocasting and carry-and-forward approach's buffering feature. Through extensive simulation studies, it has been analyzed that considering partially wired topology, the VANET routing protocol outperforms AODV in urban traffic light scenario, in terms of throughput, packet delivery ratio and packet loss.

Keywords: *VANET, SUMO, MOVE, NS-3, RSU, TLM, Simulation, Wireless, Ad-hoc Networks*

Improving Aggregate Utility and Fairness in IEEE 802.11p Vehicle-to-infrastructure Networks Using TXOP Tuning with Block Acknowledgement Scheme

Athul R.[1], Mohemmed Nifil K.P.[2], G. Mani Kumar[3], S. Subbaiah Paramesh[4], Harigovindan V.P.[5]

[1,2,3,4]UG Students, Department of ECE, National Institute of Technology Puducherry
[5]Assistant Professor, Department of ECE, National Institute of Technology Puducherry

Abstract

In IEEE 802.11p vehicle-to-infrastructure (V2I) networks, there exists an access unfairness problem caused by distinct velocities of the vehicles. A fast moving vehicle has less chance to communicate with its road side unit (RSU), as compared to a slow moving vehicle, owing to their reduced residence time within RSU's coverage. Accordingly, the bits transferred of fast moving vehicle are less as compared to that of vehicles with lower speed. In this paper, our aim is to resolve the unfairness problem by adjusting the transmission opportunity (TXOP) limit of each vehicle according to its mean velocity. Further, a block ACK scheme is introduced in V2I networks to reduce the overhead of ACK transmission by integrating multiple ACKs of data frames in a TXOP limit into a block ACK frame. Considering a single rate, multi-lane, V2I network, we prove that fairness in the sense of equal chance of communicating with RSU can be achieved; simultaneously, aggregate data transferred can be improved by tuning TXOP limit of each vehicle according to its mean velocity along with implementing block ACK scheme. Analytical results are validated using extensive simulation studies.

Keywords**:** *Fairness, IEEE 802.11p, TXOP, Block ACK, Vehicle-to-Infrastructure Networks*

Dynamic Hybrid Cluster and Deflection Feedback Scheme for Contention Resolution in the Optical Burst Switched Network

Dilip Patel[1], Kiritkumar Bhatt[2], Jaymin Bhalani[3]

[1]Research Scholar, Electronics and Communication Department, C.U. Shah University, Wadhwan
[2]Professor, Electronics and Communication Department, Sardar Vallabhbhai Patel Institute of Technology, Vasad
[3] Professor, Electronics and Communication Department, Babariya Institute of Technology, Baroda

Abstract

The Optical Burst Switched (OBS) network is consider as mature all-optical architecture and it has been evolved to make efficient utilization of terabits per second of bandwidth offered by core optical networks to support next-generation networking scenario. The data burst is created by aggregating multiple packets at source node of OBS network, and it is passed through network all optically. The OBS networks suffer from contention due to buffer-less nature of transmission and, therefore, the contention is an important issue to resolve. Contention occurs when more than one data burst try to use a same wavelength channel at an outgoing link. The existing reactive contention resolution schemes may reduce the contention in buffer-less OBS network. However, these proposed schemes attempt to resolve contention without making any efforts to minimize the occurrences of contention in the network. Therefore, we are presenting a new scheme for reducing the occurrence of contention in OBS network, and it is known as Dynamic Hybrid Cluster and Deflection Feedback (DHCF) scheme. In proposed DHCF scheme, entire OBS network is partition into many small clusters. In each cluster, one node acts as cluster head for gathering the information of resources in the network. The contention is minimized using clustering approach, and it can be further improved with the help of deflection feedback scheme. The performance metrics prepared for measuring the benefits associated with the proposed DHCF scheme and its effects on overall network performance. We also compared the performance of the DHCF scheme with limited hybrid deflection and retransmission (LHDR) scheme and dynamic hybrid retransmission in deflection routing (DHRD) scheme. The simulation results show that the proposed scheme gives improvement in burst loss probability (BLP) in the range of 31% to 38% and delay improvement in the range of 64% to 74% on vBSN topology.

Keywords: *Optical Burst Switching, Contention Minimization, Burst Loss Probability (BLP)*

Real-time Project Risk Awareness Using Content Centric Network

Gaurav Tripathi[1], Vipin Kumar Tyagi[2], Sandeep Kumar[3]

[1,2]Member (Research Staff), Central Research Lab, Bharat Electronics Ltd.
[3]Research Scholar, Department of ECE, Delhi Technological University, New Delhi

Abstract

In the current context of dynamic scenarios of user requirements, we need to adopt the agile concept of project management. The project manager in the organization now has a wide range to focus based on the principles of project management of knowledge areas. At each point of time, we have a certain amount of risk which is ratified by project managers and their risk management practices. A deeper understanding of the knowledge areas as discussed particularly in the Telecommunication Project Management Programs needs a stricter scrutiny for mitigation of risk. It is this risk identification and sensing mechanism which needs a strong focus in any organization and iteratively communicated to project stakeholders. Most of the Project Managers follow a formal procedure of formulation of risk practices, but they are unaware of the consequences of the risk in their project. This innovative paper suggests novel practices project managers should use to expand the use of the CCN-based metrics at their disposal to fine-tune the progress of their agile projects. This new approach will help in reducing the latency of communication among the stakeholders of the project. Timely communication will help in improvement in success rate and timely completion of the projects within specified budget constraints.

Keywords: *Innovation, Risk Management, Knowledge Areas, Content Centric Networks, Risk Aware*

A Study of Elliot Wave Theory into Signal Prediction in Next Generation Wireless Networks

R. Kalidoss[1], K. S. Vishavksenan[2], B. Partibane[3]

[1,3]Assistant Professor, Department of ECE, SSN College of Engineering, Chennai
[2]Associate Professor, Department of ECE, SSN College of Engineering, Chennai

Abstract

Time variant signal forecast is difficult in nature, due to random fluctuations in amplitude and phase of the signal. But prediction improves the quality of service for the end users. Elliot wave theory is generally used for predicting financial market trends. In this paper, we investigate applicability and possibility of Elliot Wave Theory in signal strength prediction to mobile communications. Elliot wave theory is independent of fading environment, distance between the user and the base station, and height of the antenna. With the help of prior signal samples from the Elliot wave, it is possible to predict the future samples without any additional overhead. This algorithm is tested in the real-life environment, both for the pedestrian users and for the users moving at an average speed of 60 Km/Hr. The algorithm's performance is evaluated by comparing the predicted result with the practical signal strength at their corresponding time. This result shows that the algorithm provides 62 per cent of successful prediction.

Keywords: *Elliot Wave, Signal Prediction, Handoff, Golden Ratio*

Non-cooperative Static Primary Users Localization in Cognitive Radio Networks

Sabyasachi Chatterjee[1], Prabir Banerjee[2], Mita Nasipuri[3]

[1]Assistant Professor, ECE, Heritage Institute of Technology, Kolkata
[2]Professor (H.O.D), ECE, Heritage Institute of Technology, Kolkata
[3]Professor, CSE, Jadavpur University, Kolkata

Abstract

Theory of Compressive Sensing (CS) has been employed to detect available spectrum holes in Cognitive Radio Networks (CRNs). At the same time, these unlicensed Cognitive Secondary Users (SUs) must reliably detect the presence of licensed users or owners of spectrum holes to avoid interference. Node localization is a complicated and important problem in the field of Cognitive Radio Networks. Localization of non-cooperative objects refers to the process of locating an object which is neither aware of localization nor participates intentionally in localization process, but still affects the radio spectrum in some way. In this paper, we have proposed a hardware scheme to perform precise localization of non-cooperative Primary Users based on the Received Signal Strength Indicator (RSSI) measurement. Among all non-cooperative localization algorithms, here we have considered modified Weighted Centroid Localization (WCL) scheme which uses only RSSI detection technique for precise calculation of Unknown Primary Users' (PUs') coordinate. The main challenge in RSSI-based localization is its high sensitivity to the environmental changes. The oscillatory nature of RSSI measurement limits the accuracy in the estimation. To improve the localization accuracy, a classical propagation model, log-normal shadowing which uses noise analysis techniques and makes it possible to predict the signal strength by considering the presence of trees, buildings and other obstacles has been introduced. Usually to model Cognitive Radio (CR) environments, the shadowing effects cannot be neglected. If the shadowing effect is neglected, the Path Loss is simply a straight line. To add shadowing effect, a zero-mean Gaussian random variable with standard deviation—σ—is added as a correction factor in our modelling. Test bench experiment has been emulated for different environmental scenarios by keeping all the node position fixed and calculation of unknown PUs distance has been plotted with and without the correction factor.

Keywords: *Cognitive Radio Network, Correction Factor, Log-normal shadowing, Non-cooperative Primary User, Localization, Received Signal Strength Indicator, Secondary User, Shadow Fading, Weighted Centroid Localization Algorithm*

Static Traffic Grooming with Grooming Resources at Max-Connectivity nodes of WDM Mesh Networks

Partha Paul

Assistant Professor, Department of Computer Science & Engineering, Birla Institute of Technology, Mesra, Ranchi

Abstract

Wavelength Division Multiplexing (WDM) based Optical Networks can meet the huge bandwidth requirements of the present-day Internet and telecommunications traffic. In WDM, multiple wavelengths are transmitted through a single fiber to achieve transmission capacities of nearly hundreds of terabits-per-second. For effective bandwidth utilization, traffic grooming mechanisms are used to multiplex low-speed traffic into high-speed wavelength channels. It allows one to minimize the network cost by reducing the number of Add-Drop Multiplexer (ADM) devices and wavelengths used in the network. The Routing and Wavelength Assignment (RWA), in optical networks, allows a cost-effective network resource utilization while minimizing blocking probability. Traffic grooming is recently being used in WDM mesh networks for traffic scenarios that are static, dynamic or incremental. To achieve cost-effective operation in a network, it is necessary to ensure that grooming devices are placed at proper positions.

We have proposed Max-Connectivity grooming where grooming devices are placed at the nodes having the maximum connections within a WDM mesh network. There has been several reported work on the use of other grooming policies like Edge-grooming and All-grooming that increases the number of network resources utilized and, hence, the total cost. In the present paper, we have used Integer Linear Programming (ILP) to solve the Grooming and Wavelength Assignment (GRWA) problem in 6-node WDM mesh network using Max-Connectivity grooming. ILP works on a small solution set that makes it easily applicable for small networks. It is also more efficient than other heuristic approaches like Genetic Algorithms (GA), greedy heuristics approach, most contiguous heuristic algorithms, allowing for reduced computational time and complexity. The blocking probability has been investigated under different lightpath connections. The performance of Max-Connectivity grooming has been compared with other grooming policies. Our results indicate the improvement of resource utilization while minimizing blocking probability.

Keywords: *WDM Optical Networks, GRWA, Wavelength Assignment, Traffic Grooming*

Smart City Development Through Smart Distribution of Food Commodities

Rachita Gupta[1], Ravi Shankar[2]

[1]Research Scholar, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

[2]Professor, Department of Management Studies, Indian Institute of Technology Delhi

Abstract

In the current century, increasing globalization, urbanization and industrialization are leading to a situation where 50% of world's population is living in urban areas, and this figure is continuously increasing at a very fast pace. People are becoming smarter globally in almost every field due to their changing lifestyle and priorities. This is resulting into the development of smart cities, which are utilizing information and communication technologies (ICTs) with the aim to increase quality of life of its inhabitants while providing sustainable development. Though almost every aspect has been covered with respect to smart city, in literature, one aspect that has still not been emphasized much is the assurance of adequate distribution of safe and quality food to the people with no or minimum loss/wastage of food commodities within food supply chain (FSC). The demand for food is increasing along with the awareness and consciousness of consumers regarding whatever they consume. The major challenge this leads to is that we cannot restrict the growth; rather the only solution for fulfilling the need of this growing population is the smart management of resources in hand. This smart move necessitates the incorporation of IT/telecom-driven technologies. In smarter cities with more technically aware and economically capable population, it is highly required to adopt innovative telecommunication and information technologies, in order for cities to be competitive while remaining sustainable at the same time. Smart cities must be able to guarantee food security to certain extent for its citizens, either by producing/procuring enough food or by optimal utilization (minimal food wastage) of the existing stock. This paper proposes a conceptual framework for using advanced communication technologies, for smarter distribution of food commodities, in order to ensure food security and safety, thereby contributing towards making a city smarter.

Keywords: *Smart City, Food Supply Chain, Information Communication Technology, Traceability, Food Security*

A Survey for VANET (Vehicular Ad-hoc Network) Platform and Simulation Tools

Anjana[1], Meenakshi Chawla[2]

[1]M.Tech Scholar, Department of CE, TIT&S, Bhiwani
[2]Assistant Professor, Department of CE, TIT&S, Bhiwani

Abstract

Vehicle Ad-Hoc Network (VANET) is an advance wireless technology in the field of wireless communication that communicate for safety and comfort purpose. Many types of technology and application are being developed for VANET. Before deployment in the real environment, the technology and applications should be checked but some time it is feasible or not feasible. VANETs exhibit several unique features such as the high mobility of nodes, short connection time, safety, etc. The simulation tools used for simulating various VANETs protocols working at different layers of the communication networks model. A number of simulation tools have been used and recommended for various research works in VANETs. Different types of networks used different simulator at different platforms. The network simulators are both free open source software (FOSS), as well as paid closed source software (PCSS) used for performing simulation in communication networks. The simulation tools are effective means for evaluating performance of any proposed with more flexible. This paper starts with the basic survey of VANET, then discusses the complexity of different types of platform and simulation tools and ends with the analysis on challenges and future trend of VANETs.

Keywords: *VANET- 1, NS-2 -2, NS3 - 3, OMNET++ –4, SUMO–5, Qualnet–6 , OPNET–7, Network Simulator–8, Traffic Simulation–9*

Coherent Optical OFDM System FOR Long-haul Transmission

Simarjit Singh Saini[1], Ajaybeer Kaur[2]

[1]Student, Department of Electronics and Communication Engineering, Guru Nanak Dev University, Regional Campus, Gurdaspur

[2]Research Scholar, Department of Electronics and Communication Engineering, Punjabi University, Patiala

Abstract

In this paper, we study the coherent optical—orthogonal frequency division modulation (CO–OFDM) technique for transmission of optical signal at high data rate. Optical Orthogonal Frequency Division Multiplexing is considered a prominent technology to satisfy the increased demand for bandwidth in broadband services. This research focuses on the implementation and performance analysis of high data rate coherent optical OFDM for long-haul transmission. In this, we evaluated the CO–OFDM technique using two modulation technique QAM (Quadrature amplitude modulation) and QPSK (Quadrature phase shift keying). Then, we study the use of DCF (dispersion compensation fiber) in various configurations, i.e. pre, post and symmetrical configuration along with SMF (single mode fiber). The overall analysis is done at various input laser power and at various data rates. The effect of variation in input power and single mode fiber (SMF) length and DCF (dispersion compensation fiber) configuration are observed in terms of Q-factor, bit error rate (BER) calculated from the constellation diagram. Overall observation shows that the single transmission distance can be increased by using DCF and the better performance is observed in using DCF in post-configuration in QAM when the input laser power is 5dBm. It is also observed that at 10 Gbps data rate the distance of 120 Km can be covered without using power amplifier, but this distance is reduced to 20 Km when we increased the data rate up to 40 Gbps.

Keywords: *QAM (Quadrature Amplitude Modulation), QPSK (Quadrature Phase Shift Keying), DCF (Dispersion Compensation Fiber), SMF (Single Mode Fiber)*

A Review on Various Handover Approaches in Mobile Wireless Sensor Networks (MWSNs)

Simarpreet Kaur[1], Kamaljit Singh Saini[2], Bhupinder Kaur[3]

[1]Research Scholar, Department of CSE, Chandigarh University, Mohali
[2,3]Associate Professor, Department of CSE, Chandigarh University, Mohali

Abstract

Wireless Sensor Network (WSN) is a group of distributed sensor nodes that has many applications which can vary from simple such as sensing temperature, pressure, humidity from the environment to critical applications that includes traffic monitoring, target tracking, patient monitoring, etc. These critical applications are real-time applications which can be possible with the Mobile Wireless Sensor Network (MWSN). MWSN can support the reliability of real-time applications as mentioned above. The basic of MWSN is handover procedure that can help them to maintain the existence of sensor node within or away from the mobility range. There are various types of handover procedures and techniques to handle the mobility of sensor node with the support of different handover strategies. These handover techniques are somewhat different from each other and can affect more or less the performance of the network in terms of some network parameters such as energy, time and packet delivery ratio. IEEE 802.15.4 is one of the standards from many technologies used in WSN. It can cover limited area. Thus, in IEEE 802.15.4 Wireless Personal Area Network (WPAN) coordinators are used to extend the coverage area that can help to deploy the mobility of sensor nodes in WSN with the help of handover procedures.

Elder Care: An Integrated Intelligent Assistance System for Elderly

Anjali Gavendra

Student, Computer Science and Engineering Department, Indira Gandhi Delhi Technical University for Women, New Delhi

Abstract

As population of elderly is in steady rise throughout the world, diseases directly related to aging are increasingly becoming the focus of technological effort and research. The basic purpose of this paper is to develop a smart in-home elderly care system to address the problems faced by elderly due to age-associated memory impairment and immobility. In this paper, an in-home assistive system is proposed that provides enhanced care and assisted living to elderly through home appliance control, item reminder to bring along the essential items while going outside and early warning of potential dangerous situation (e.g. fire, gas leakage) so that help can be provided before any unforeseen situation happens. The item reminder system uses Radio-Frequency Identification (RFID) technology to remind elderly the items they might left behind while they leave home such as mobile phone, wallet, keys, glasses, etc. A passive RFID tag is attached with each item and then the system provides a list of items, user has forgotten, on LCD. An android application is designed to add and delete the items in the item reminder list of the system and to control the home appliances using wireless Bluetooth technology. Elder care provides assisted living by operating home appliances like lights, fan, air-conditioner, TV, music system, etc. depending on the data transmitted from the android smart-phone/Tablet. The paper presents the proposed system architecture, sequential flow chart, demo implementation and results comprehended with Intel Galileo Gen2 board, diverse sensors, Bluetooth, RFID and android application.

Keywords: *Assistive System, Smart Home, RFID, Elderly Care, Android*

Healthcare: The State-of-the-art and the Role of Technology

Siddharth Srivastava[1], Astha Rai[2], A. S. Cheema[3]

[1,2,3]Centre for Development of Advanced Computing, Noida
[1]Indian Institute of Technology Delhi

This paper discusses various state-of-the-art technologies ranging from hardware to software that are shaping the healthcare industry. The modern healthcare domain involves extensive usage of software in terms of Hospital ManagementInformation Systems, Remote Diagnosis Systems, Picture Archival and Communication Systems and Mobile Information Services. Similarly, specialized machines for MRI, CT Scan, Biochemistry, and Pathology have traditionally been the backbone of this industry. In addition to providing the cutting-edge research driving the development of these domains, the paper also concentrates on recent trend of amalgamation of the information gathered from software and hardware, leading to the evolution of new research paradigms, especially related to machine intelligence and decision support systems.

TOPSIS-based Network Selection Scheme Using Adjacent Pair Priorities in HWNs Environment

Adarsh Kumar Pal[1], N.P. Singh[2]

[1]M.Tech, Electronics and Communication Department, National Institute of Technology Kurukshetra
[2]Associate Professor, Electronics and Communication Department, National Institute of Technology Kurukshetra

Abstract

The deployment of different wireless technologies such as 3G, WLAN and WiMAX simultaneously have laid the foundations of IP-based fourth-generation wireless communication infrastructure in which all technologies are integrated through a single IP-based core. This innovative wireless network solution makes possible to keep mobile user always best connected (ABC) anytime, anywhere. This paper presents a multiple criteria based network selection algorithm in WiMAX–WLAN environment in order to satisfy different service level agreements (SLAs). The proposed methodology combines Adjacent Pair Priority (APP) to determine relative weights of multiple attributes and TOPSIS to rank the available networks. Graphical analysis shows that using APP method for attribute weight calculation over Analytic Hierarchical Process (AHP), the popular weight estimation technique has extensive advantage on the basis of number of comparisons among attributes. Moreover, APP does not have the inconsistency problem like AHP which has been mathematically discussed in the paper.

Keywords: *Heterogeneous Wireless Environment, QoS, Adjacent Pair Priority, TOPSIS, WiMAX–WLAN Environment*

Modelling Distributed Sink Nodes for Vehicle Parking in Multi-floored Building Using Wireless Sensor Network

K. Vinod Kumar[1], Madhuri Rao[2]

[1,2]Assistant Professor, Department of Computer Science & Engineering, Institute of Technical Education & Research, Siksha"O" Anusandhan University, Bhubaneswar

Abstract

Wireless Sensor Network (WSN) has many applications. In most of its applications, data transmission is usually performed by sensors in manner of multi-hop forwarding towards a central static control center (sink). The application of WSN in vehicle parking systems is increasing as finding parking space for four wheeler vehicles is now a challenge in many fast growing cities. These days, building are constructed with parking space being provided in the basement or in the roof as well. This paper suggests a solution for vehicle parking on the roof of a multi-floored building which usually has a central void space by design. For such a topology, multiple sink nodes could be ideal and could be ideally placed at four corners of the grid itself. The four sink nodes could relate and synchronize by a distributed parallel algorithm. However, the nodes closer to the sink nodes will drain faster due to continuous overhead. This is dealt by the sink nodes, which tries to find a new data cluster head in regular number of iterations for forwarding the packets to the respective sink nodes. This process, thus, ensures that network connectivity prolongs. It is proved that the effect of multiple sinks is beneficial than a central sink node. In many developing countries, commuting is one of the top most priorities of its citizens. In India, the number of car owners is increasing day-by-day and, thus, the problem of car parking is also increasing day-by-day and only technology can provide a solution.

Keywords: *Vehicle Parking, Wireless Sensor Network, Multiple Sinks*

M-SPIN with Location Awareness in Wireless Sensor Network

Sama Nasrat[1], Neelesh Gupta[2]

[1]P.G Student, ECE, TIEIT, Bhopal
[2]HOD, ECE, TIEIT, Bhopal

Abstract

The life of a wireless sensor node depends upon its power consumption. Therefore, power saving and enhancement of network life are main challenges of wireless sensor network. Routing protocols are used to save power during transmission in WSN. In this paper, it is presented as to how M-SPIN protocol, efficiently and effectively disseminate information among various sensors in a power constrained WSN. Use of M-SPIN is comparatively better where speeding and reliability matters. In this paper, the proposed method is based on Location Awareness M-SPIN protocol. This will avoid the problem associated with M-SPIN, and it also achieves the aim of this study work to save the power in network. A comparison has been made between two protocols M-SPIN and proposed method via M-SPIN with Location Awareness on the basis of power consumption and dropped-packets in network. The proposed method proves to be a better performer as compared to M-SPIN. The OMNET++ 4 simulator is used for performances analysis.

Keywords: *M-SPIN, Localization, Received Signal Strength Indicator, Triangulation, WSN*

Digital Participation Through Mobile Internet Banking and Its Impact on Financial Inclusion: A Study of *Jan Dhan Yojana*

Khyati Jagani[1], Santosh K. Patra[2]

[1]Research Scholar, Mudra Institute of Communications Ahmedabad, Ahmedabad
[2]Assistant Professor, Mudra Institute of Communications Ahmedabad, Ahmedabad

Abstract

In the past few years, the emerging new media has significantly transformed not only human interactions but also human behaviour. This digital technology is rapidly changing the financial services industry and how people consume the banking services. Along with the various benefits that the digital technology provide, it has also created a gap between the individuals known as "digital divide" with regard to the opportunities of attaining communication and information through the application of internet for a range of activities, such as social networking, online shopping and mobile banking among others. Financial inclusion has gained immense importance and attention in both the private and public spheres not only in India but also globally. In this context, Prime Minister Narendra Modi launched a Jan Dhan Yojana, with the aim of providing banking opportunity and insurance coverage to all the citizens of India including the underprivileged section. According to the Finance Ministry, till September 2014, 40 million bank accounts were opened with zero balance. In order to attract those with low incomes, who either feel that they do not need banking service or they do not have enough funds to create an account and avail certain benefits, the banks developed services such as low-cost payment system, technology determined products, micro ATMs, pre-paid banking cards, internet kioks and mobile banking through both smart phones and normal phones. The present study attempts to examine the Indian Financial Inclusion in the context of Individual participation, through the case of Pradhan Mantri Jan Dhan Yojana. The paper aims to understand the consumer participation and non-participation and its implications as a financial inclusion strategy. The paper would also evaluate the impact of digital divide on digital participation of the consumers in the context of internet and mobile banking service users.

Keywords: *Digital Participation, Financial Inclusion, Digital Divide, Jan Dhan Yojana, Mobile Internet Banking*

Vision on Efficient and Eco-friendly Smart Cities Through Internet of Things (IoTs)

Venkata Sai Kiran Meduri[1], Prakash Vidwan[2]

[1]Student 6th Semester B.E., EC Department, LDRP-ITR, Gandhinagar
[2]Lecturer, EC Department, LDRP-ITR, Gandhinagar

Abstract

This paper depicts crystal clear models and concepts of constructing and building a futuristic smart city involving IoTs with eco-friendly and sustainable use of resources like using solar energy to daily and small scale use of power, installing safety monitoring services, transport facilities and district cooling systems, and to attend the amenities of life and making things paper less through applications of IoTs as these form the basic constituents of a smart city. Creating wealth from waste is the motto of the proposed system in this paper that includes a biogas plant as waste disposal is one of the main issues in urban areas. Also, adulteration of medicines prescribed by a doctor can be easily put on check from the IoT model. Integration of heating and cooling systems required is proposed to increase the efficiency of both the systems. The traffic model in this paper shows as to how to monitor air pollution in crowded roads.

Keywords: *District Cooling System, Domestic Tariff Area, Energy Smart, Biodegradable, Global Positioning System (GPS)*

Telecommunication Networks and Their Role in Universities

Arvind Kumar

Assistant Professor, AITEM, Amity University, Noida

Abstract

The wired digital Electronic Private Automatic Branch Exchange System (EPABX) is a telecommunications network which is capable of handling voice, data, text, facsimile and image communication today. It is used in offices, industries, hostels, hotels, universities and commercial complexes – networking or in transmission. However, during the study of wired digital EPABX system, noise problem is encountered. Therefore, a new design is proposed that reduces the Noise in digital wired EPABX system using the DECT (Digital Enhanced Cordless Telecommunications) cordless technology. DECT is a WLL (Wireless Local Loop) system based on the DECT standard. The DECT offers high-quality access technology recognized by more and more users, regulators, standardization bodies, network operators and equipment manufacturers. It has proven multiple applicability as a network access in residential, offices, business and public environments showing easy mobility, speech quality comparable to wireless telephony. This research paper explains how the Noise can be reduced in wired digital EPABX System.

Keywords: *EPABX, DECT, MDF, NEAX, WLL*

Development of Precision Agriculture System Based on Internet of Things—A Review

Arun M. Patokar[1], Vinaya V. Gohokar[2]

[1]Assistant Professor, Department of Electrical Engineering, Padmashri Dr. V.B. Kolte College of Engineering, Malkapur

[2]Associate Professor, Department of Electronics & Comm Engg, MAEEER's Maharashtra Institute of Technology, Pune

Abstract

This paper focuses on the wireless sensor network and its use in the precision agriculture. In the Vidarbha region, 65% rural population depends on agriculture. Aiming at a multi-parameter monitoring system, using wireless sensor network is proposed based on low power Intel's Galileo platform for monitoring and controlling with decision-making support based on the Internet of things. Real-time collection of field parameters information is using the sensor nodes and transmitted to base station. Collected field parameter information is displayed, saved and processed at the base station to achieve soil moisture, leaf wetness, temperature, humidity and plant growth monitoring. Base station will continuously monitor the data and compare with the reference values; if it exceeds or goes below the desired limit, a message will be sent to the farmer's mobile through GSM for the controlling action. This development has the flexible approach for monitoring equipment, convenience of setup installation, reliable and multi-parameter sensor nodes system with high capacity.

Keywords: *Soil Moisture, WSN, Temperature, Leaf Wetness, Image Sensor, Humidity*

Telecom Conundrum—Revenue Sharing Models Balancing the Two Sides—Future and Past

Sujata Joshi[1], Rohit Dalal[2], Charles Rohan Egbert[3], Akshara Chaudhary[4]

[1]Associate Professor, Symbiosis Institute of Telecom Management, Symbiosis International University, Pune
[2,3,4]Student, Symbiosis Institute of Telecom Management, Symbiosis International University, Pune

Abstract

This paper proposes revenue-sharing models for mobile operators and OTT players in an attempt to seek the solution of the complex challenge of falling voice average revenue per user (ARPU) rates for the operators due to emergence of Over the Top (OTT) players on one hand and the reduced revenues for the OTT players due to competition that has led them to expand into unprecedented boundaries, causing clutter in the OTT market. We quantify this opportunity, concentrating on three partnership models as a suggestive measure to revitalize the revenue growth for both operators and OTT players (1) Service Bundling, (2) Sponsored Data and (3) Collaboration Platform Model. For the purpose of establishing the models, primary data was collected by means of online survey on 250 respondents in the age group of 16–25 in the city of Pune. The purpose of the primary data was to record the usage patterns of data services (quantifying it on monthly basis), to analyze the exact wants and needs of the consumers and to describe the scenarios where partnership models could best be utilized. Furthermore, we use case examples and secondary data for the purpose of our study. We have also made use of qualitative data to study current and emerging market trends. The use of this research paper is two-fold for both the Indian operators and the OTT players. The paper is objective in nature to assess the business potential they could harvest for themselves being in various revenue sharing partnership models. It is also suggestive in nature by explaining as to how these models could be employed in connection with specificity of the OTT service. The study concludes by giving suggestions to business model developers and researchers.

Keywords: *Revenue Sharing Models, Telecom–OTT–Partnership, Sponsored data, Service Bundle, API*

An Exploration of Factors Affecting M-commerce Adoption in India

Khushbu Madan[1], Rajan Yadav[2]

[1]Research Scholar, Delhi School of Management, Delhi Technological University, New Delhi
[2]Associate Professor, Delhi School of Management, Delhi Technological University, New Delhi

Abstract

The increase in overall penetration of mobile phones along with the changing lifestyle of people has given the mobile phone the status of a lifestyle device from being a mere tool to connect. This has led marketers to develop numerous mobile-based applications, enabling consumers to enter into transactions using mobile devices, further giving rise to a new market of mobile commerce popularly known as m-commerce. However, m-commerce is still in its initial stage. Various studies have been conducted around the world to determine the factors that inhibit m-commerce adoption by consumers in different countries but not much has been done in the Indian context. The purpose of this study is to determine and examine the impact of various factors that affect m-commerce adoption intention of Indian consumers. Research model was developed borrowing constructs such as Perceived Usefulness & Perceived Ease of Use from the technology acceptance model (TAM), Social Influence from TAM2 along with Perceived Risk and Variety of Services as additional constructs after reviewing literature on m-commerce adoption in different countries as well as on research related to adoption intention of similar technologies. An online survey was administered on 170 Indian respondents. Multiple regression and factor analysis were then applied to analyze the data. The results indicate that m-commerce adoption intention by Indian consumers is affected by Perceived Usefulness (p value = .000), Perceived Risk (p value = 0.000), Social Influence (p value = 0.000) and Variety of Services (p value = 0.004), whereas, Perceived Ease of Use (p value = 0.905) is found to be insignificant. The results will provide the service providers and the marketers of m-commerce services, a better ground for developing suitable marketing strategies.

Keywords: *M-commerce, Perceived Usefulness, Perceived Ease of Use, Perceived Risk, Social Influence and Variety of Services*

An Empirical Study on Factors Affecting Satisfaction of Customers and Behavioural Intentions in Services Offered by Mobile Telecom Service Providers

Manish Madan[1], Esha Jain[2]

[1]Associate Professor, Rukmini Devi Institute of Advanced Studies, New Delhi
[2]Assistant Professor, School of Management, G. D. Goenka University, Sohna

Abstract

The broad objectives of study are to explore the various services offered by mobile telecom service providers in Delhi and NCR, to establish a relationship between the perceived value, service quality dimensions and marketing mix with that of the satisfaction of customers and to establish a relationship between customer satisfaction and behavioural intentions of customers. This study investigates the factors which affect the satisfaction of customers and the behavioural intentions of customers using mobile telecom services in Delhi and NCR. The study is exploratory in nature. The responses obtained from the respondents, i.e. customers using mobile telecom services in Delhi and NCR using various statistical techniques. The importance of this study is that it focuses on identifying the various factors affecting the overall satisfaction of customers using mobile telecom services in Delhi and NCR. Here, in this study, various independent variables are perceived value, service quality and marketing mix, where the dependent variables are customer satisfaction and behavioural intentions. IBM SPSS 20 (Statistical Package for the Social Sciences), for data analysis which include descriptive statistics, multiple regression analysis for hypothesis testing, and for the reliability the Cronbach's Alpha was calculated and sample adequacy was tested on KMO and Bartlett's Test. Five points Likert's scale is used for measuring responses from strongly disagree to strongly agree. It was concluded that there is a positive association between the perceived value and service quality dimensions with that of satisfaction of customers. It was observed that there is a significant relationship between the marketing mix and customer satisfaction and also there is a significant relationship between the customer satisfaction and behavioural intention of the customers using mobile telecom services in Delhi and NCR.

Keywords: *Behavioural Intentions, Customer Satisfaction, Mobile Telecom Services*

Digitalizing India—The M-commerce way

Shefali Arora[1], Manisha Sharma[2]

[1]Research Scholar, Department of Commerce and Management, The IIS University, Jaipur
[2]Assistant Professor, Department of Commerce and Management, The IIS University, Jaipur

Abstract

In order to sustain and leverage our resources in today's highly competitive world, digitalization is the most liberating force benefiting individuals of a nation and M-commerce being the most interactive communication business channel. Shoppers today are becoming more reliant on their mobile phones and this trend is only growing. The aim of this study is to assess the impact of M-commerce on mobile phone users with reference to age and income. The study focuses on the usage pattern of consumers with reference to M-commerce and how it has evolved within years. It also focuses on issues concerning security and safety of online transactions along with the impact of M-commerce usage on our lifestyles. The study indicated certain crucial insights regarding the impact of M-commerce, with regards to the purpose of M-commerce usage, its benefits, the social influence M-commerce tags along, issues concerning safety and security, etc. The survey was conducted among 230 respondents from the age group of 13–63 with monthly incomes ranging from 50K–150K. The results indicated that 28 per cent users lie in an age group of 23–33 with their major purpose of using M-commerce being online shopping (28%) followed by Banking transactions (26%). With the increasing penetration of mobile phones in India, the M-commerce market size is expected to grow beyond leaps and bounds, thus empowering consumers to replace the conventional channels of economic transactions. M-commerce was earlier viewed as a source of Information only which today has become a medium of business transactions. M-wallets are the new fads. Customer engagement is perhaps one of the major achievements of digitalization.

Keywords: *M-commerce, Digitalization, Customer Engagement, Online Shopping*

Social Media: A New Tool for Communicating Corporate Social Responsibility

Simmi Dhyani[1], Sunaina Kothari[2]

[1,2]Research Scholar, Management Department, Birla Institute of Technology, Mesra, Ranchi

Abstract

Social media today has revolutionized the way marketers communicate with customers. This paper aims to take up how social media is being used for communicating corporate social responsibility effectively. This is an exploratory study based on literature review. The secondary data is critically analyzed and further supported with the help of case studies. The findings reveal that corporate social responsibility efforts are not just driven by ideology that organizations can bring positive change in society but by multifaceted returns that corporations can earn from corporate social responsibility endeavors. Marketers use corporate social responsibility to gain competitive advantage. It helps in enhancing organization's reputation, brand image and product differentiation. The findings further point out that social media is a unique tool that offers transparency and personalization; can be used as a powerful persuasion tool; and for amplification of corporate social responsibility messages. Communication of corporate social responsibility through social media leads to increased fan base, website page reviews, word of mouth and enhanced relationship with customers. With the help of case study analyses of the organizations like Ford, Tata Docomo, Surf Excel and Expedia, it can be further concluded that social media is being used for communicating corporate social responsibility effectively.

Keywords: *Social Media, Communication, Corporate Social Responsibility*

Adoption of M-Commerce by Incubators

Rashmi Tapariya
Research Associate, MICA, Ahmedabad

Abstract

Increasing number of mobile users and technological advancement has led to increasing popularity of mobile commerce (m-commerce). M-commerce is changing the way business model operates and can impact the relationships between customers and the stakeholders. The objective of this paper is to understand the usage of mobile commerce by incubators in their business models. Secondly, identify the obstacles faced by them while implementation. This study also intends to seek the unique benefits of m-commerce to incubators. Data will be collected from incubators through well-structured questionnaire and it will include both open-ended and close-ended questions in 5-point Likert scale. Extensive coverage of target audience as well as one-to-one approach is found to be beneficial to incubators for their business. Technological issues as well as inconvenience faced while using are the major obstacles faced while using m-commerce functions.

Keywords: *M-commerce, Mobile Commerce, Mobile Commerce Applications*

Developing Smart Cities—An Integrated Framework

Sujata Joshi[1], Saksham Saxena[2], Tanvi Godbole[3], Shreya[4]

[1]Associate Professor, Symbiosis Institute of Telecom Management, Symbiosis International University, Pune
[2,3,4]Student, Symbiosis Institute of Telecom Management, Symbiosis International University, Pune

Abstract

With the advent of "smartphones", technology has helped mankind to solve some of its difficulties. On a similar note, "smart city" is a futuristic approach to alleviate obstacles triggered by ever-increasing population and fast urbanization which is going to benefit the governments as well as the masses. Modern-day cities are deprived of vital elements like quality of life and socio-economic development which can be delivered by the smart cities. Smart cities are endeavor to make cities more efficient, sustainable and livable. In other words, a smart city is a city that can monitor and integrate functionality of all the critical infrastructure like roads, tunnels, airways, waterways, railways, communication power supply, etc., control maintenance activities and can help in optimizing the resources while keeping an eye on the security issues as well. This research paper explores various aspects and dimensions of a smart city. To bridge the gap in literature regarding the concept of smart cities and its implementation, a framework has been developed to get better insights about the idea of a smart city. On the basis of extensive and deep research of literature from diverse domains, we have identified six significant pillars for developing the framework as: Social, Management, Economic, Legal, Technology and Sustainability (SMELTS). The paper throws light upon how these factors can make the smart city initiative a successful project. The proposed framework has been used to figure out various agendas for research and traces its practical implications.

Keywords: *Smart City, e-Governance, Internet of Things, Quality of Life*

Telecom and Smart Cities: A View on City Dynamics and Future Housing

Bramh Dev Sharma[1], Mahim Sagar[2]

[1]Professional Architect Practice, BD Sharma Consulting Pvt. Ltd., New Delhi
[2]Associate Professor, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

Abstract

Introduction of telecom and information technology has caused freedom to compartmentalize organization and made possible to distribute organization functions to locations placed across countries. These offshore offices were causing expansion of cities in distant locations, due to demand to new office set-ups resulted building construction, causing demand pressure on cities located on diverse locations. People migrated from nearby smaller towns, to contribute in a group in these offices, connected to far off located organization centers. Further, people working in these offices having substantial paying capacity, resulted tendency to settle permanently needed houses. This house demand caused subsequent 'expansion of housings' resulting change in system dynamics of cities. People see houses and other building assets as alternate option of investment, appreciated real-estate prices and prospecting as interesting phenomena of study. The factors that cause chain of growth/progress are dynamic in nature and are global in presence. We are trying to identify contemporary trends that are influencing city dynamics. Our research is focused on the impact of telecom technology as factor resulting impact on city dynamics. We have found this is one of the most important factors influencing city's dynamics resulting in growth measurable in terms of real estate. People in the city are linked by way of ownership of physical elements like houses, commercial spaces or shops and derive prospects and satisfaction from this. Their possessions are indicator of wellbeing and perceived power structure. The process of buying and selling is a self-adjusting process towards equilibrium of economic flow. The continuous change which rooted in response to external factors causes change towards perceived prosperity, and measurability comes with physicality of assets and valuation derived by owners. Our research is focused to, one, the existing cities are only gainer of this trend where there was already some city structure existing. We contradict this view. Our research suggests that this trend will continue but not only restricted to the existing cities, but also to the creation of a fresh city structures as radical thinking of new cities as a fresh plan. Efficient modern cities will emerge as suitable to this time and technology as smart cities. Second, there is huge scope and potential of fresh thinking to create new cities to ease real end user from house purchase burden. In pressure cities' end user mortgaging his future income to purchase house is not enough for health and hygiene, whereas in new cities, he can buy houses on actual cost, and is thus relieved from burden and can afford life of decency in future housing.

Keywords: *Telecom, Smart Cities , Globalization, Future Housing*

Internet of Things—Architecture and Research Challenges

Mohsen Hallaj Asghar[1], Atul Negi[2]

[1]School of Computer and Information Science, Hyderabad Central University
[2]School of Computer and Information Science, Hyderabad University

Abstract

The Internet of Things (IoT) represents the future vision of applications in computing and communication. IoT introduces the world of information and communication technology (ICT) for connectivity of anything anytime, anywhere. It semantically means a network of interconnected things (objects) with unique addressability and connectedness using a standard communication protocol technology. The term IoT is used as an umbrella keyword covering various aspects in the extension of internet and web application with incorporation and integration of objects in the real life by means of the widespread development of distributing devices through the embedded identification and sensing/actuation capabilities. IoT is a new phenomenon in the domain of network technology. Till now, there were several definitions of IoT, but there isn't a single specific definition or standard architecture of IoT. Recently, scientists, academics and industries have put efforts to find a way for standard communication between physical object and real world, but there are many challenges in this area. In this article, we present a survey of technologies, different design architecture, suggestions and solutions for challenges in the Internet of Things.

Keywords: *Internet of Things (IoT), Radio Frequency Identification (RFID), Electronic Product Code (EPC), Security, Ubiquitous Sensing*

An Investigation into the Factors Affecting the Adoption Intention of eGovernance Services in India—Study of Passport Seva Service

Anoushka Sharma[1], Harsh Agarwal[2], Shashank Kashyap[3], Rajan Yadav[4]

[1,2,3]MBA Student, Delhi School of Management, Delhi Technological University, New Delhi
[4]Associate Professor, Delhi School of Management, Delhi Technological University, New Delhi

Abstract

The aim of this paper is to understand the factors affecting the adoption intention of the eGovernance services in India using the Passport Seva Service as a case study. eGovernance is the new form of governance that is accepted and implemented globally. But, India is far from even accepting the eGovernance model properly. The adoption intention factors will help analyze the reasons for the low acceptance rate of the eGovernance services in India. The paper is a descriptive study based on the data collected from 200 respondents. The data has been collected using an online survey questionnaire technique. The paper uses the UTAUT (Unified Theory of Acceptance and Use of Technology) model to identify the factors responsible for the adoption intention of the respondents towards the eGovernance services. The study finds that social influence, facilitating conditions, performance expectancy and voluntariness of use are the primary factors that govern the adoption intention of eGovernance services in India. The study conducted as a part of the paper will help all stakeholders in the field of eGovernance to develop a fair understanding of some of the many reasons as to why the citizen response to the concept of eGovernance is so mild.

Keywords**:** *eGovernance, Adoption Intention, Passport Seva*

Foreign Direct Investment Inflows, Technological Innovation, Sustainable Development and Skilled Human Behavior: A Multivariate Granger Causality Study – Evidence from France

Bhumika Gupta[1], Jasmeet Kaur[2]

[1]Associate Professor, Telecom Ecole de Management, Paris
[2]Assistant Professor, Symbiosis International University, Pune

Abstract

The world economies have increasingly come to see FDI as a source of economic and sustainable development, income growth and skillful employment. Countries have liberalized their FDI regimes and pursued other policies of attracting investment. France too has shown remarkable growth and development in terms of international trade, globalization, health care services and technology. It has addressed the issue of how to best pursue domestic policies to maximize the benefits of foreign presence in the domestic economy. France's economy has undergone profound changes, most notably globalization, the expansion of the European Union and the development of new information and communication technologies. These regions now operate as a network of ever more numerous businesses, science, technology, culture and tourism partnerships which are seeking to increase their attractiveness, improve their competitiveness and play a full part in France's open and globalized economy. Digital world today is transforming into a digitally empowered society and knowledge economy. This study is very important to macroeconomists, financial analyst, academicians, policy makers and central bankers' officials in understanding the responsiveness of each variable and thus come up with the relevant policies so as to keep up with the changing digital economy and sustained human development that stimulates production. Safeguarding the existing foreign operations in France and drawing in new projects to expand and modernize sites have become major challenges.

Keywords: *Foreign Direct Investment, Human Capital and Skills, Sustainable Development, Technological Innovation*

"Agrimithra" – An Android Application to Mentor Farmers

Shwetha K.S.[1], Pramukh D. Bagur[2], Abhishek D.S.[3], Nandesh S.R.[4]

[1,2,3]Research Scholar, Department of Computer Science and Engineering, Jawaharlal Nehru National College of Engineering, Shimoga

[4]Research Scholar, Department of Electrical and Electronic Engineering, Jawaharlal Nehru National College of Engineering, Shimoga

Abstract

The main aim of this paper is to help the farmers and the people interested in gardening to keep track of their plants by using the android application. This application is developed for the betterment of agriculture and gardening. The application contains different sections for each crop having all the information like amount of water, insecticides, pesticides, and fertilizers required by the crop. The user can opt for any one of the sections. Once a section is selected, it extracts information from the user such as the day of sowing and the area of sowing. The application will advise the secondary crop which can be grown along with the selected crop. The GPS location, date and year will be automatically extracted from the mobile. Once the user selects the sowing day, the user will get an analyzed notification from the weather forecast about the sowing day. Using that notification, the user can decide whether he wants to sow on that day or not. After the sowing date is fixed, the user will get notifications from time to time about the date on which insecticides, pesticides and other elements must be provided. Also, the application will have a section to know about the different diseases the selected crop may get, the crop's predicted yield and also the predicted profit from the yield according to the current market rate. This app can be integrated with a robot for providing water, fertilizer, insecticides, and pesticides so that farming becomes fully automated. Hence, this application can be considered as one of the optimal systems that helps in precision agriculture, thereby increasing productivity.

Keywords: *Agriculture, Android Application, Gardening, Automation*

Research Challenges in Machine-to-Machine Communication

Vimalathithan Rathinasabapathy

Professor, Wireless Laboratory, Department of ECE, Adithya Institute of Technology, Coimbatore

Abstract

Machine-to-Machine (M2M) communications is a new type of communication which endues full automation like the Internet of Things in future. M2M has surmounted the machine to human communication. Recent researches in M2M say that network of 50 billion devices willed worldwide in 2020. Supporting these numbers of devices is a challenging task, thus attracting the researchers from both academia and industry in M2M communication. The interconnection of Machine Type Devices using 3G/4G to form a M2M Area Network which facilitates the M2M applications like smart grid, eHealth, eEnvironmental monitoring, smart city, Smart Home. There are lots of challenging tasks in M2M. In this paper, issues related to access techniques, security were discussed to make the M2M communication come into existence. Also a novel access technique named Low rate Device to Device link is proposed for Machine Type Communication.

Keywords: *Machine Type Devices, Security, M2M, Wireless Access, Outage Probability*

New Methods of Communication at Sea Networks and Interconnection Regulation

Nitilaksh Desai[1], Shubhita Dubey[2]

[1]2nd Year, B.Tech Marine Engineering, Marine Engineering & Research Institute, Indian Maritime University- Mumbai Campus

[2]2nd Year, B.E. Computer Science, Gyan Ganga Institute of Technology & Sciences, Rajiv Gandhi Proudyogiki Vishwavidyalaya, Jabalpur

Abstract

When a ship is sailing in the vast ocean, satellite communication plays a very important role for medium of communication between a handful of people onboard and whole world, but the main concern is when there is an emergency and the distress signals are to be sent to the nearest port for help. If a quick action is not taken, it can lead to heavy economic loss as well as it can pollute the sea to great extent. So, for proper ship and shore-based communication, INMARSAT System (International Maritime Satellite Organization) is used, which works continuously having 11 geostationary satellites working all the time including INMARSAT space segment like L and Earth Stations (LES) and mobile Ship Earth Stations (SES). This INMARSAT is a key player within a system known as GMDSS (Global Maritime Distress and Safety System). It is the mariner's direct high-sea link to shoreside rescue authorities which was developed to both simplify and improve the dependability of communication for all the ships at sea. The Automated Mutual Assistance Vessel Rescue System (AMVER) is also a system to monitor vessel position at sea so that at any high sea, emergency can be coordinated among those nearest and best available help. Moreover, NAVTEX, a radio maritime warning system and Digital Selective Calling are also methods for communicating with the vessel at sea. So, with the help of these systems, easy communication can be established between ship's crew and office staff and quick aid can also be given at the time of emergency and reduce the impact of accident.

Keywords: *IMO Regulations (Rules of Road State), NAVTEX, Maritime Safety System*

Capacity Analysis of UMTS Network under Co-channel Interference using Sectorization

Ramarakula Madhu[1], Gottapu Sasibhushana Rao[2]

[1]Assistant Professor, Electronics & Communications Engineering Department, UCEK (A), JNTUK, Kakinada

[2]Professor, Electronics & Communications Engineering Department, AUCE (A), Andhra University, Vishakhapatnam

Abstract

Universal Mobile Telecommunications System (UMTS) is one of the standards of third generation cellular networks which offer different data rates for voice, video conference and other services. The WCDMA is a well suited multiple access schemes in UMTS. Capacity and coverage are the considerable factors that describe the performance of any cellular network. However, the interference is the main capacity limiting factor. The major source of interference is the Co-Channel Interference (CCI) that results from the frequency reuse channels. The effect of CCI is more in WCDMA systems because the same radio channel can be used in all neighboring cells. In this paper, an evaluation method is proposed to estimate the capacity of a UMTS network under the influence of CCI based on sectorization. Sectorization is the dividing of an Omni-directional view of the cell into non-overlapping slices called sectors. In this the probability of CCI is considered for capacity estimation. UMTS Capacity results are evaluated using MATLAB^{R}2013b software with different numbers of co-channel interferers, data rates, and sectorization. The capacity of a UMTS network can be improved by implementing the sectorization, thereby reducing the co-channel interference. The simulation results show that the capacity of a UMTS network is increased from 130.71 Erlangs to 217.59 Erlangs per cell as the number of sectors of a cell increases from 3 to 5. The proposed method can also be efficiently applied for beyond third generation cellular networks to estimate the capacity.

Keywords: *UMTS, Capacity, WCDMA, CCI, Sectorization*

Investigations into Energy-efficiency Issues for Inter-satellite Communication Links

Kishore Pasi[1], Rama Rao T.[2]

[1]Research Scholar, Dept of Tecommunications Engineering, SRM University, Chennai
[2]Professor & Head, Dept of Tecommunications Engineering, SRM University, Chennai

Abstract

The satellite programme of global space agencies covers a wide variety of areas and caters to the needs of various applications. In order to provide services to larger coverage areas and seamless connectivity to multiple users, inter-satellite communications are deployed by various space agencies. The different types of inter-satellite links deployed by various space agencies include data links between low-earth orbiting satellites to geo-stationary satellites, data links between geo-stationary satellites for uninterrupted connectivity for various users on the ground. The inter-satellites links are also proposed to be used for in-flight connectivity. The DC power is a very scarce resource on the satellite and needs to be optimized for larger life of the satellite in the orbit. The RF amplifiers need to be operated at saturation in order to maintain good link margins. This cumulates into larger DC power consumption which is not a desired scenario. The operation of amplifiers with 3 dB or 2 dB back off is desirable sustaining the same link margins. To achieve the same goal, a comprehensive performance of various coding schemes for different modulation schemes is necessary to be explored. This paper presents the performance of a transponder catering to inter-satellite link for a QPSK modulated signal with a chosen coding scheme.

The frequency of simulation is Q-band with the input signal at 38 GHz and the response signal at 20.7 GHz with the data rate of 1 Gbps. From the results, it is observed that the coding scheme has reduced the EVM significantly. In the simulation, a single channel transponder was considered. The simulations are now being extended to multi-channel transponders. The multi-channel transponder is expected to bring the effect of other RF elements' performance on the EVM of the signal.

Keywords: *Inter-satellite Satellite Links, Error Vector Magnitude, Transponder*

A Case Study on Pre- and Post-Joint Venture Analysis of NTT DoCoMo and Tata Teleservices with Financial and HR Perspective

Chanchal Sharma[1], Swati Shrivastava[2]

[1,2]Assistant Professor, MBA, IEC College of Engineering & Technology, Greater Noida

Abstract

India's Telecommunication industry is the world's second largest industry which contributes a major portion in GDP. This sector has turned up as a substantial performer in the Indian services demesne. Telecom industries have opted for Joint Ventures and Acquisitions as a strategic tool to elevate their performances. This study aims to investigate the impact of "Joint Venture and M&As (Mergers and Acquisitions)" in the Indian Telecom sector by basically comparing the performance of the corporate involved in M&A and joint venture before and after. M&As is the basic tool used for restructuring the corporate financially and strategically and the researchers found it desirable to analyze the affect of M&A and Joint Venture on financial performance as a value creation tool in Indian firms. The objective of the paper is to investigate several dimensions of joint venture by throwing some light on the financial and HR perspective related to Indian telecom sector in particular. To highlight the impact of "joint venture", a case study on NTT DoCoMo with Tata Teleservices has been taken into consideration. In this paper, we basically compared the status of the firm during the pre- and post-joint venture period with the help of financial parameters like ratio analysis such as Return on Total Assets (ROTA), Return on Capital Employed (ROCE), Return on Equity (ROE), Gross Profit Margin, Net Profit Margin, and Debt-Equity Ratio. Several studies have also highlighted that companies pay ample amount of attention to financial and strategic issues during joint ventures and M&As, but they often ignore human resource affairs. The role of personnel is oftentimes stationed in a marginal stance. Therefore, this study will try to address all the financial and HR issues generated out of M&As and joint ventures.

Keywords: *Telecom in India, Merger and Acquisition, Joint Venture, Financial and HR Perspective*

Influence of Smartphones on Shoppers Behaviour—An Empirical Study

Samarth Singh

Research Scholar, Centre for Research Studies, Noida International University, Noida

Abstract

Recognizing the importance of technology like smartphones during shoppers purchase journey, this paper reports results from an empirical study that investigates Smartphones' influence on Shoppers before visiting a store and inside store undertaken in organized retail in Delhi. Two hundred fifty shoppers' data was attained using a survey questionnaire. Study reveals that before visiting a store, majority of shoppers use smartphones to receive discount offers and coupons to redeem them at store followed by barcode scanning to know more about products, receiving promotional SMS, researching products and locating nearby stores. However, while inside the store, a shopper uses a smartphone to access promotional coupons followed by checking product reviews online, scanning barcode for price comparison with other retailers, product knowledge, checking prices on retailer's mobile site, price comparison online, making an online purchase at other retailer. Based on the findings, the research provides retail marketing strategies. Research outcomes encourage retailers to implement technology-driven targeted marketing.

Keywords: *Shopper, Retail, Retail Marketing, Behaviour, Technology*

Role of Social Media Training at Workplace—Motivation vs Cyberbullying

Jaya Ahuja

Assistant Professor, ITM University, Gurgaon

Abstract

Social media has gained popularity in the recent years. There is a massive boost in the number of social media users, today. With the gaining popularity, there are some hindrances created by social media. The positive outcomes like networking, increase in motivation, sharing of ideas and skills; social media has brought a dynamic change in the way organizations function. The organizations use social media as an effective marketing tool, branding, reaching and creating new customers, recruitment and selection and in various other domains. On the contrary, social media has given birth to cyber bullying. Social media users barring any age group experience cyber bullying at least once. There are many studies which examine the effect of social media on mental health, teenage groups; social media at workplace. The present study investigates the role of social media at workplace based on employee perception whether it leads to motivation or cyber bullying and performance decline. "The Work Related Social Media Questionnaire" is used for the study. The main aim of the study is to compare the two groups from different telecom companies (first group is provided social media training by the organizations and the second group is not provided social media training but has the facility of using social media at workplace). *T*-test is conducted to compare the groups. The findings are interesting and build a road map for involving social media at workplace but with caution and training. Some open-ended questions are added to test the reasons for using social media and highlight some individual perceptions.

Keywords: *Social Media, Motivation, Cyberbullying*

Reduction of Procurement Time and Costs for Infrastructure Projects, Based on Micro PPP Format, Using Telecommunication Technology and Management

Naresh Bana

Managing Director, BBV Consultants LLP, Connaught Place, New Delhi

Abstract

Public Private Partnership (PPP) allows financial resources of private sector to be gainfully utilised along with their technical and managerial expertise while at the same time transferring project-related risks to private sector. There is no single definition of PPP. It broadly refers to long-term, contractual partnerships between public and private sector agencies, especially targeted towards financing, designing, implementing, and operating infrastructure facilities and services that were traditionally provided by the public sector. Usually it takes minimum two years for a conventional big PPP project to go through Phase 1 to Phase 3 of the process. There remains scope for optimisation of procurement time for PPP by due application of the latest technology and practices. Government may neither have time or resources to conceive many innovative projects in various sectors. Such infrastructure projects can be taken up using an innovative approach wherein 'Swiss Challenge Method (SCM)' is integrated with the PPP model of project development. The proposed paper seeks to analyse the potential of application of 'Telecommunication Technology and Management' in reduction of project procurement time and implementation costs of Micro-PPP projects. The paper intends to examine the impact of application of Telecommunication Technology on procurement of PPP projects in general and Micro PPP-SCM integrated format in particular. Management. Methodology includes literature review which will basically consist of the published material on the subject, the Innovation: How Time and Cost Reduction may happen and options for Deployment of 'National Optical Fibre Network (NOFN)'. There is definite need to look at 'out of box' and innovative approaches to expeditiously procure and implement infrastructure projects so as to meet the target timelines and aid economic growth.

Keywords: *Micro PPP, SCM, Procurement Time, Procurement Cost, Credibility, Transparency*

Developing and Managing High-performing Teams (HPTs) in Telecom Industry of India

Prachi Ajit Murkute[1], Priya Chadha[2]

[1]Assistant Professor, Bharati Vidyapeeth Institute of Management and Research (BVIMR), New Delhi
[2]Student, Master of Business Administration, Bharati Vidyapeeth Institute of Management and Research (BVIMR), New Delhi

Abstract

Telecom is one of the fastest-growing industries in India. Today, India stands as the second-largest telecommunications market in the world. The mobile phone industry in India has contributed US$ 400 billion in terms of gross domestic product (GDP) of the country in 2014. This sector which is growing exponentially is expected to generate about 4.1 million additional jobs by 2020, as per Groupe Speciale Mobile Association (GSMA). The aim of this paper is to study HPTs, development of high-performing teams, telecom industry and the fundamental key to the success of HPT's in Telecom Industry of India as it's proved that HPTs are regarded as tight-knit, focused on their goal and nothing else along with a fair understanding about HPT is that it is to a group of people with exact roles and opposite talents and skills, aligned with and committed to a common purpose, who consistently show high levels of collaboration and innovation, that produce superior results. This paper will make a clear understanding as to how HPT robust methods of resolving conflict efficiently, so that conflict does not become a roadblock to achieving the team's goals. The approach is to first review and to discuss what high-performance teams are: common characteristics, developing HPT's and their management in organization. At the end, a good representation across the Telecom industry for HPTs and their successful management is discussed. The paper then considers what lies in the way ahead and finally concludes with recommendations for the Telecom industry for developing HPT's and their proper management for long-term survival, growth and profits of the organization.

Keywords: *High Performance Teams (HPT), Telecom Industry*

A Slotted Circular UWB Antenna for Spectrum Sensing in Cognitive Radio

S. Sunil Kumar[1], Sagar Kale[2], K.D. Kulat[3]

[1,2]M.Tech Scholar, Department of Electronics & Communication Engineering, VNIT Nagpur
[3]Professor, Department of Electronics & Communication Engineering, VNIT Nagpur

Abstract

The disadvantage of wireless communication is its limited spectrum. Cognitive radio is an emerging technology for improving the spectrum efficiency in modern wireless communication systems. The difficult task in cognitive radio is spectrum sensing. Basically, an ultra-wideband (UWB) antenna is used for spectrum sensing in cognitive radio. But, the design of small-size UWB antennas is challenging as compared to narrow band antennas. As per FCC regulations, UWB band of 3.1–10.6GHz is unlicensed. In this paper, we present a small-size slotted circular UWB antenna. The proposed antenna is covering frequencies from 2.67GHz to 12GHz with a bandwidth of 9.33 GHz. UWB antennas are used in many applications like WPAN, WBAN, ground penetrating radar, telemetry, etc. But the proposed antenna is mainly designed for spectrum sensing in cognitive radio. The simulated and measured results of the discussed antenna are presented and the antenna is compared with some existing antennas.

Keywords: *Cognitive Radio, UWB Antenna, Wireless Communication, Patch, Spectrum Sensing*

Driving Business Success in Telecom Sector Through Employee Engagement and Efficacy

Sangeeta Sahni Kohli[1], Ritu Bhattacharyya[2], Kamalesh Kohli[3]

[1,2,3]S. K. Somaiya College of Arts Science & Commerce, Mumbai

Abstract

Telecommunication services are globally recognized as the driving force for economic development, as they are the prime source of modernization and growth. In the 90's, the Government of India introduced several facilitating policies and supportive regulatory framework for the Telecom Sector. This resulted in telecom sector being the fastest growing sector in the past decade. Indian Telecom sector ranks third (March 2010) in the world and second largest amongst the emerging economies of Asian region. The exponential growth resulted in strong competition which led to intense price war and severe constraint on the revenues of the market players. The phenomenal growth of the sector also led to high manpower mobility, specifically of those with specialized skills. This challenge made the industry leaders to rethink on strategies to improve manpower efficiency and reduce attrition. It was realized that to improve employee efficacy, it is necessary to increase employee engagement and commitment at job.

Employee engagement is the emotional connect of an employee that can be measured by the level of commitment and involvement of the employee towards the organization and its environment. The paper aims to focus upon employee engagement as an antecedent to business success. This paper proposes to put forward the interlink between employee engagement and efficacy. It will discuss the factors contributing to employee engagement and effective measures that can be implemented to increase engagement. Employee engagement occurs at the intersection of employee motivation, satisfaction and effectiveness. An engaged employee is critical to the performance and success of business, specifically in the globally competitive 21st century. The Human Resource Departments of telecom industry must stress upon understanding the engagement level of employees and introduce measures to enhance it. Several studies have proved that the general level of involvement, loyalty and positive approach of engaged employees is much higher leading to sustained growth of business.

Keywords: *Business Success, Employee Engagement, Efficacy*

Indian Telecom Industry—Pricing Challenges for MNP Operators

Hari Shankar Shyam[1], Deepika Upadhyay[2], D.L.N. Shastri[3]

[1]Head of the Department-Marketing, School of Business Studies, Sharda University, Greater Noida
[2]Assistant Professor, School of Business Studies, Sharda University, Greater Noida
[3]Director, Department of Corporate Affairs, Sharda University, Greater Noida

Abstract

Mobile Number Portability came as a boon for consumers as they can now choose any telecom operator with their same existing mobile number. In India, DoT (Department of Telecommunications) authorized two organizations as an MNP (Mobile Number Portability) Operator for all the telecom service providers. The South and East zones are operated by MNP Interconnection Telecom Solution and North and West zones are operated by Syniverse Technologies. The study problem is the pricing issues of MNP operators. The revenues for these MNP operators come from portability charges mainly, which is paid by Telecom Service Provider on which customer is shifting their connection. The MNP operators are willing to increase the portability charges, but it is controlled and regulated by DoT and TRAI. This has raised the pricing concern for MNP operators as their infrastructure, manpower and other costs are rising significantly. This paper aims to highlight the various pricing challenges faced by these MNP operators. Secondary data were used and in depth interview of experts from the telecom industry were carried out.

We imply from this paper that there is latent need to increase the price of the services of MNP operators, i.e. portability charges to meet out their incremental costs and quality of services.

Keywords: *MNP, TSP, FNP*

Role of High-performing Teams and Business Strategies in Telecom Industry

Vibhor Gaur[1], Sapna Sharma[2]

[1,2]MBA Student, SMU, Gangtok

Abstract

The telecom industry has gone through many phases of growth and diversification. Debuting from telegraphic and telephonic systems to the era of advanced technologies like GSM, CDMA, and 3G Technology. It is one of the industries which is facing tough challenges and competition in today's market. High performance business practice is focused on improving business performance and implementing new initiatives by highly performing teams. The two important considerations for a successful organization are how to manage the business and the team performance. The reasons for them are – Firstly, dependency on mobile devices is continuously increasing which is creating an immense competition, growth and innovation amongst the organizations in the industry. Teamwork is considered to be one of the core elements to enhance delivery of new creative quality products and services. In order to be able to respond to greater and changing demands of the market, an organization needs a team with brighter ideas and solutions. Therefore, high-performing team is considered as the basic building block of a successful organization. Secondly, the margins for telecom industry are shrinking. Therefore, greater financial pressure is forcing enterprises to make their business processes more cost-efficient. There is a greater need for organizations to identify and implement specific initiatives to improve performance in order to sustain in this highly competitive industry. To conclude when the power of managing business is coupled with high-performing teams, the organization will give the best of the deliverables in the industry. The objective of this paper is to give a brief of the telecom industry, challenges faced by it and how managing business and high performance team can lead to a successful organization in telecom industry.

Keywords: *Telecom, High Performance Business, Managing Business, High-performing Teams, SWOT*

Internal Marketing: Does It Really Matter in Indian Telecom Sector?

Anuja Agarwal[1], Arun Kumar Agariya[2]

[1]Research Scholar, Management Department, ABV-Indian Institute of Information Technology & Management, Gwalior

[2]Assistant Professor, Management Department, Birla Institute of Technology & Science, BITS Pilani

Abstract

This study aims at proposing an internal marketing scale for measuring the efforts of Indian telecom organizations in improving employees' performance. Indian telecom sector as a service sector requires efficient and effective manpower. Therefore, improved employees' performance may lead to enhanced customer satisfaction with increase in profitability of the organization. Review of literature has revealed non-availability of any measurement scale for measuring the internal marketing efforts specific to Indian telecom sector. Churchill's standard methodology for scale development was followed which has resulted in internal marketing as a multi-dimensional construct comprising of four factors, namely talent retention, work redesign, organizational commitment and social security. The proposed scale can be utilized by the organizations to measure the effectiveness of their practices to improve employees' productivity and also further can utilize the findings for further formulation of strategies. Enhanced productivity will have positive impact on Indian economy due to the sector-wise contribution in gross domestic product (GDP) of the country. The implementation of the proposed scale will lead to enhanced customer relationship management with better practices in Indian telecom sector. The generalizability and robustness of the proposed internal marketing scale can be judged by testing the same across different business and national contexts.

Keywords: *Internal Marketing, Scale Development, Indian Telecom Sector, Employees' Performance, Profitability*

Progressing from E-commerce to M-commerce

Mahim Sagar[1], Archana Sharma[2], Shiksha Kushwah[3]

[1]Associate Professor, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

[2,3]Research Scholar, DMS, Indian Institute of Technology Delhi

Abstract

As more and more people are accessing the Internet on their mobiles, the traffic coming to e-commerce business from mobile apps has increased considerably. E-commerce players are gradually progressing toward mobile commerce and are investing heavily on dedicated mobile apps that enable seamless mobile access. E-commerce players are left with no choice but to embrace Mobile apps or lose a business opportunity. The successful penetration of mobile commerce is due to dynamic change in Indian shopping behavior, affordable Smartphone, cash-on-delivery options and improved logistics facilities. Mobile apps bridge the gap between the seller and the consumer and provide better experience to customer and opportunities for customer engagement.

Keywords: *E-commerce, M-commerce, Mobile Apps*

Spectrum Auction 2015: Is It a Winner's Curse or Users Dilemma

Akhil Damodaran[1], Ajay Tiwari[2]

[1]Assistant Professor, Department of Strategic Management, University of Petroleum and Energy Studies, Dehradun

[2]HCL Technologies, Engineering and R&D Services, Strategic Deals, Pre Sales, Gurgaon

Abstract

With the 2015, auctions of spectrum have been concluded with aggressive bidding being seen between different operators, and the bidding has generated a whopping approximately 1,10,000 crores for the Government. A windfall gain is even higher than what the Government realised during its most successful spectrum auctions of 2010. There is a peculiar situation created by the way of this auction. The auction for not for obtaining new spectrum but retaining the existing spectrum, and there is no option left before the operators except to get the spectrum at any cost; otherwise, it will perish. Hence, there is an external threat for winning this spectrum. Hence, the price is not a market-determined price. The entire exercise is bad for the operator and the consumers. Our paper examines the current auction mechanism and prove that the current auction mechanism is forced bidding in which the operators are forced to bid creating a situation of winner's curse.

Keywords: *Spectrum, Auction, Competitors, Strategy*

Spectrum Pricing Index: Factor Exploration and Hierarchy

Murali Krishna Medudula[1] , Mahim Sagar[2]

[1]Research Scholar, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

[2]Associate Professor, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

Abstract

Radio spectrum, a scarce resource, refers to the part of the electromagnetic spectrum that corresponds to radio frequencies. These frequencies of up to 300 GHz are known as radio waves and used for radio communications. Telecom and broadcast services industries along with government agencies utilize this spectrum and create infrastructure that allows the emergence of information-driven societies. This makes radio spectrum a crucial resource for any economy. Given its importance in the development of a nation, it is of critical importance to effectively manage this resource. If spectrum policies are formulated carefully, it would not only lead to sustained growth of information broadcasting and communication technology industries, thereby promoting social welfare, but also maximize the revenues generated for the government. This paper explains about three important effects on the scarce radio frequency spectrum. Spectrum management and the need for a valuation framework are being discussed. We looked at three allocation methods (Auction, Beauty Contest and Administrative Allocation) in greater detail. The aim of this study is to develop a spectrum pricing index (SPI). The primary objective of the study is to identify the generic factors influencing Spectrum Pricing and subsequently develop the linkages and hierarchy of factor for Spectrum Pricing by using interpretive structure modelling (ISM) and total interpretive structure modelling (TISM). Spectrum Pricing Index is not available for regulators, Policy Planner and Industry. This study fulfils that gap.

Keywords: *Spectrum Pricing, Index Development, TISM, ISM, Factor Exploration*

Use of ICT and Telecommunication in Enhancing E-governance in Education: Implications and Challenges

Broto Rauth Bhardwaj[1], Parul Pal[2], Savneet Kaur[3]

[1]Head, Entrepreneurship Cell, BVIMR, New Delhi
[2, 3]PhD Scholar, BVIMR, New Delhi

Abstract

This study aims to study the role of Information Communication Technology (ICT) in distance education context. It also aims at identifying the need for changes in distance education and institutes for implementing ICT. Another objective of the study is to evolve a model for ICT outcomes, which can serve as a guiding framework of learning for implementing ICT within the institutes. This research aims to study the antecedents of ICT on enhancing e-governance. It also aims at identifying the need for changes in connectedness index factors for better implementation of e-governance. Another objective of the study is to evolve a model for implementation of e-governance outcomes. The implications are also discussed.

Keywords: *E-governance, ICT, Connectedness Index, Education, Implications*

Direct and Indirect Effects in a Satisfaction–Loyalty Framework: An Intervening Role of Trust and Commitment in Telecom Industry

Neeru Gupta[1], Subodh Kesharwani[2], Nitika Sharma[3]

[1]Assistant Professor, Maharaja Agrasen Institute of Management Studies, Delhi
[2]Assistant Professor, IGNOU, Delhi
[3]Assistant Professor, Maharaja Agrasen Institute of Management Studies, Delhi

Abstract

The paper explores the influences of brand satisfaction and the mediating role of brand trust and brand commitment on brand loyalty in the telecom industry. It proposes four novel constructs, namely brand satisfaction, brand commitment, brand loyalty and brand trust, and explores the positive relationships between brand loyalty and its driver brand satisfaction, brand commitment and brand trust. The research objective of this study focuses on the impact of brand satisfaction on brand loyalty in the telecom industry and proposes an original framework to explore the influence of brand satisfaction on the brand loyalty through brand trust and brand commitment. This research employs an empirical study by means of questionnaire survey to validate the model and explore its managerial implications. The data was analyzed by using structural equation modeling through Amos and SPSS to study the direct and indirect effects of brand satisfaction on brand loyalty through brand trust and brand commitment. This study summarizes the literature of brand satisfaction, brand commitment, brand loyalty and brand trust to develop a new framework. The finding of study elaborates the significance of direct and indirect effects of brand trust and brand commitment on brand loyalty. The outcome provides the important findings to the researchers and practitioners as well as direction to the marketers. The conclusion drawn in this study can be used by the marketers to stimulate brand loyalty by understanding the role of brand satisfaction among telecom consumers. Since branding has become a distinctive and distinguished way of positioning a product or company, firms should exploit brand trust and brand commitment of consumers to magnetize new markets and customers and retain the existing consumers in the telecom industry.

Keywords: *Brand Trust, Brand Satisfaction, Brand Loyalty, Brand Commitment, SEM and Telecom Industry*

Performance Evaluation of Zigbee for Industrial Applications

Akhilesh G. Naik[1], Vijay Magdum[2], Sonia Kuwelkar[3]

[1]Research Scholar, Electronics and Telecommunication Department, Goa College of Engineering, Goa
[2]Research Scholar, Research and Development Department, Siemens Energy and Automation, Goa
[3]Assistant Professor, Electronics and Telecommunication Department, Goa College of Engineering, Goa

Abstract

Zigbee is an emerging wireless technology for low-power, low data rate and short range communications between wireless nodes, which is showing a promising future, especially for industrial point of view. Industries dealing with energy automation products incorporate a wide range of sensors and actuators and, hence, it becomes necessary to wirelessly monitor and control automation issues. Hence, it is significant to evaluate the performance of Zigbee in industries, especially with respect to energy analysis. This performance analysis is important for incorporating Zigbee in particular applications in industries, especially those that deal with energy automation products. In this paper, the results of a feasibility study about Zigbee-based wireless sensor have been presented. The performance of the Zigbee in terms of the data throughput and current and energy consumption has been analyzed. The results state that Zigbee is the best suitable wireless technology suitable in industries for monitoring and transmitting data in automation concepts dealing with sensors, actuators, etc. since it consumes very less current and energy as compared to other wireless standards such as Bluetooth. The paper also shows the data throughput for topology that is widely adopted by industries and the analysis in terms of the data throughput and energy consumption. Also, the energy consumption and throughput in case of a Zigbee router has been analyzed which is usually being used for increasing the distance of communication in the network. Hence, it shows the overall performance analysis of Zigbee network used in industrial environments.

Keywords: *Zigbee, Z-Stack, ZC, ZR, ZED*

Development of Intelligent Routing System Based on Fuzzy-AHP Approach

Anjli Sharma[1], Pankaj Kumar Sharma[2]

[1]M.Tech Research Scholar, Computer Science, ABES Engineering College, Ghaziabad
[2]Assistant Professor, Information Technology, ABES Engineering College, Ghaziabad

Abstract

Selection of protocol for routing of packets from the source to the destination in an effective manner is a challenging task in mobile Ad hoc network. Performance of any routing protocol cannot be measured based on single parameter, more criteria (e.g. mobility, number of nodes, pause time and network size) need to emphasize that plays an important role in multi-criteria decision-making (MCDM). It is very difficult to identify the effective protocol in varying scenarios. So, in this paper, we proposed a model which has the capability to explore those criteria's and take decision using multiple influencing parameters. Our proposed model is based on Fuzzy-AHP approach. AHP (Analytical Hierarchy Process) is hierarchal in nature; represents the decision strategy involving multiple influencing criteria. Fuzzy Decision Map (FDM) generates the weights of attributes involved, handle uncertainty, vagueness and imprecise information of attributes.

Keywords: *Fuzzy Decision Map, MCDM, AHP, Ad hoc Network*

Compressive Sensing with Itinerary Planning for Mobile-agent-based Wireless Sensor Networks

Kavita Meena[1], Brahmjit Singh[2]

[1]M.Tech. Student, ECE Department, National Institute of Technology Kurukshetra
[2]Professor, ECE Department, National Institute of Technology Kurukshetra

Abstract

Mobile-Agent-based Wireless Sensor Networks (MAWSN) have been proven as energy-efficient networks relative to those using conventional data collection techniques. However, there are several open issues related to uniform energy consumption, order of visiting source node and data redundancy in these networks as well. In this paper, we present Compressive Sensing with Itinerary Planning (CSIP) for data collection in Wireless Sensor Networks (WSNs) through mobile agents. The present framework consists of three dimensions—compressive sensing used to reduce data on the basis of sparse and incoherence property, cluster head layer for uniform energy consumption and itinerary planning layer to collect data using mobile agents. In this work, we propose an algorithm to determine an efficient itinerary for cluster heads that improve the scalability of the network. The proposed framework results in reduced data size lead to minimizing the energy consumption and optimizing the mobile agent itinerary. Through comprehensive numerical results, it is shown that the proposed algorithm offers significantly better performance in terms of energy consumption as compared to cluster-formation-based protocols and itinerary planning algorithms.

Keywords**:** *Compressive Sensing, Data Redundancy, Incoherence, Mobile Agent, Sparsity, Wireless Sensor Networks*

GSM-based Airport Automation and Surveillance in Taxi Bay

K. Vinoth[1], S. Vigneshwar[2]

[1]Assistant Professor, ECE Department, Prist University, Puducherry
[2]UG Student, ECE Department, Prist University, Puducherry

Abstract

The runway is used to take off and land the crafts. The taxi bay is the alternate path used to go for parking bay which is used to park the crafts. The present system enhances airport operations and provides airport status visibility into the traffic flow management process. Here, the system is implemented to allocate the runway, taxi bay and parking bay to crafts. These details are sent by the Automated Traffic Information System to the pilot. It is used to verify that the runway, taxi bay and parking bay used by the other craft, vehicles, etc.

Keywords: *Traffic Flow Management, Taxi Bay and Parking Bay, Airport Automation, Response Time, Airport Surveillance, Runway Information*

Telecommunication—Different Landscape of Banking and Financial Inclusion

Ritesh Ravi

ICSSR Doctoral Fellow, Division of Economics, A. N. Sinha Institute of Social Studies, Patna

Abstract

Telecommunication is playing a very important role in financial inclusion. It is going towards a paradigm shift in banking sector. Branchless banking and electronic banking is framing banking to a different horizon rather than brick and mortar banking. Financial inclusion became easier, efficient and effective with the help of telecommunication. But, after all initiatives, financial untouchability and banking outreach problem remains and the social and economic depth of banking sector are interrogated in India. It is also interrogated if the telecommunication is serving the last man of the society? Several new challenges came into existence due to change in financial landscape for bank management, regulatory body and supervisory body. Technological illiteracy, cybercrime, implementation issues are the major concerns considered well. So, this study is trying to assess the role of telecommunication in financial inclusion and how it is framing a different landscape for banking; and other is the challenges ahead in the implementation

Keywords**:** *Telecommunication, Financial Inclusion, Branchless Banking, Electronic Banking*

Client Capacity-based Gateway Discovery for Mobile Ad Hoc Network

Milind Chapekar[1], S.B. Pokle[2]

[1]Research Scholar, VLSI Design, Department of Electronic Engineering, Shri Ramdeobaba college of Engineering & Management, Nagpur

[2]Professor, Department of Electronics & Communication Engineering, Shri Ramdeobaba college of Engineering & Management, Nagpur

Abstract

The Internet access from mobile networks is gaining great interest from the research community. The widely deployed and successful mobile communication standard global system for mobile communication (GSM) has spoiled us by our expecting to reach, and be reached, by everyone at (almost) every place. Mobile Ad-hoc Networks (MANET) consist of mobile nodes without central administration, having no physical links and not follow particular routing topology due to frequent mobility of nodes. Various routing protocols or Gateway Discovery Approaches have been designed to discover proper Internet gateway and to deliver the information to MANET user in an appropriate way. The motto behind this work is to propose a gateway discovery mechanism to discover and dispatch proper Internet gateways based on its position and client capacity in MANET environment and provide services through it. This paper proposes a cloud-assisted gateway discovery mechanism for getting stable connection to the Internet with considering loading parameter of the gateway. The performance of proposed gateway discovery mechanism is analyzed with different number of parameters such as packet delivery ratio, average end-to-end delay and throughput of the system. In order to evaluate routing algorithm, NS2 (Network Simulator 2) which is the mostly used and preferred by most of the researchers for these kinds of simulations, is used. The results in form of simulation graphs indicated that mobile gateways outperform the stationary gateways in various performance parameters for the same simulation environment. The results also suggest that deploying the loading parameter of gateways in the existing routing protocols enhances the overall performance of the MANET which enables the network administrator to find the threshold point for optimum performance.

Keywords: *Gateway discovery Routing Protocol, MANET, AODV, DSDV, DSR, FSR*

Information and Communication Technology in Indian MFIS—A Case Study

Vijeta Singh[1], Puja Padhi[2]

[1]Research Scholar, Department of Humanities and Social Sciences, Indian Institute of Technology Bombay
[2]Assistant Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Bombay

Abstract

An authoritative development that has been experienced in financial sector has been deployment of information and communication technology (ICT) in providing financial services which has facilitated financial services to the existing and potential customers in cost-effective and comfortable way. The advent of ICT in financial system in general and microfinance sector in particular would not only scale up the access to finance but will also attempt to ensure provision of financial services to the remotest and far flung areas of the country along with enhancing efficiency, effectiveness and reducing risks of the MFIs, but the adoption of technology in microfinance sector has been subject to various challenges with respect to different technology-enabled delivery channels adopted. The paper basically aims to assess the impact of information and communication technology in microfinance sector based on the case study of the three microfinance institutions of India (Cashpor microcredit, SKS microfinance limited and Utkarsh microfinance private limited). The paper concludes that though ICT has been instrumental in bringing efficiency and improving productivity, especially in terms of cost and customer management, yet technology adoption in microfinance sector in India needs a policy overhaul in the light of new situation and challenges which takes into account aspirations and problems of the stakeholders to microfinance sector.

Keywords: *Internal Marketing, Scale Development, Indian Telecom Sector, Employees' Performance, Profitability*

Using Internet of Things to Monitor Volcanic Activity

A. Gnana Selva Kumar[1], G. Amirtha Gowri[2], Selvaraaju Murugesan[3]

[1]PG scholar, Electronics & Communication Engineering, Kumaraguru College of Technology, Coimbatore
[2]Associate Professor, Electronics & Communication Engineering, Kumaraguru College of Technology, Coimbatore
[3]Assistant Professor, Electronics Engineering, Kumaraguru College of Technology, Coimbatore

Abstract

Internet of Things technology would connect billions of sensors to the Internet and applications will be developed utilizing all the sensor information to enhance the quality of life. Platforms built using Internet of Things would help us to monitor things remotely and avail different service. In this paper, we propose a flexible volcano monitoring system whereby the Internet of Things technology is implemented to monitor volcanic activities and alert people in case of volcanic eruptions. We use wireless Tmote sky sensor node to monitor the temperature of the volcano and stream the data wirelessly to a gateway. We use the Contiki OS to implement a new mechanism to minimise the power consumption of the wireless sensor node. The new mechanism is based on contikiMAC radio duty cycle. We develop a new application to collect data from the various wireless sensor nodes and display various parameters of the volcano in real time. All the collected data is graphically presented. An automated alert system is also deployed based on the temperature reading from the various sensor nodes.

Keywords**:** *Internet of Things, ConikiMAC RDC, Tmote sky sensor, Volcano monitoring, Power consumption*

A 2.4GHz Inductor-less Common Source Broadband Low Noise Amplifier with 1.6dB Noise Figure

Sunil N. Pandey

Research Scholar, VLSI Design, Department of Electronics Engineering, Shri Ramdeobaba College of Engineering and Management, Nagpur

Abstract

High-linearity inductor-less broadband low-noise amplifiers (LNA) employing noise and distortion cancellation techniques are presented in this work. The core design employs an inductor-less, cross-coupled CS–CMOS LNA. Smartphone architecture has need of many standards in a single platform. The challenge is to find a way to integrate all these standards in these multi-radio platforms for cost-effective solutions; a reduction in the number of front end receivers per device is the way to go. A low-noise amplifier (LNA) is a key block in the design of broadband receivers for multiband wireless communication. The proposed LNA utilizes a composite NMOS/PMOS cross-coupled transistor pair to increase the amplification and for maintaining low-noise level. Undesired harmonics generated due to device nonlinear characteristics have negative impacts on performance of RF circuits. Thus, high-linearity performance is achieved by targeting the intrinsic 2^{nd} and 3^{rd} order nonlinear device trans-conductance *gm* using the noise distortion cancellation and post-distortion method. The proposed circuit does not rely on the matching between the devices making the new architecture more tolerant to process variation. Proposed LNA covers different wireless applications such as GSM, PCS, DECT, DCS and GPS, covering 0.8 to 2.4 GHz frequency, designed and simulated in 180 nm CMOS technology. Simulation results show that LNA delivers a maximum voltage gain of 13.66 dB, a minimum NF of 1.6 dB, a third-order input intercept point IIP3 of –7.56 dBm with quality input matching. 1-dB compression point has a value of –22.3 dBm, which is high enough to handle a strong signal.

Keywords: *Composite Transistor Pair, Common Source (CS), Low-noise Amplifier (LNA), Noise Cancelation*

User Perspective in Adoption of Near Field Communication Technology for Mobile-based Payments in India—An Exploratory Study

Praveen Sathyanarayan[1], Rahul Sharma[2], Shishir Kumar Sinha[3], Shweta Singh[4], Supriya Vadakkeveetil[5], Parijat Upadhay[6]

[1,2,3,4,5]Students, PGDM Executive (Full Time), Institute of Management Technology, Ghaziabad
[6]Faculty, Information Technology & Supply Chain Management Area, Institute of Management Technology, Ghaziabad

Abstract

Near Field Communication (NFC) is a short range wireless communication technology wherein machine to machine data transfer is facilitated up to a distance of 10 cm. What this essentially means for the banking customers is that with one tap of their phone, the phone will transmit, at the same time, multiple cards information from a chip in the phone to a merchant's point of sale system using Subscriber Identification Module (SIM). This would eliminate the need for customers to carry around multiple credit, debit, loyalty, coupons and gift cards. A disruptive technological advancement in the domain of mobile-based cashless transactions, Near Field Communication technology is at a very nascent stage in India but holds tremendous potential to grow. The proliferation of the use of this technology for mobile-based cashless payments is evident in countries like Japan, Canada, US and Western Europe. This paper focuses on identifying the benefits and challenges of NFC payment mode as perceived by the Indian banking customers and exploring if this mode of cashless payment will be accepted and used by them. NFC being a new and unfamiliar technology for the Indian banking customers and to better understand the current scene in cashless transaction in India, we adopted an exploratory research technique for the paper in the form of a Focus Group Discussion with participants from different walks of life.

Keywords: *Near Field Communication, Mobile Payments, Contactless Transactions, Radio Frequency Identification*

Data Transfer and System Monitoring Using Power Line Communication (PLC)

Vaishali Tripathi[1], Pankaj Rndhawa[2], Manish Rathod[3], Swati Jagtap[4]

[1,2,3]Student, Electronics and Telecommunication Department,
Pimpri Chinchwad College of Engineering, Pune
[4]Jr. Professor, Electronics and Telecommunication Department,
Pimpri Chinchwad College of Engineering, Pune

Abstract

This paper gives an insight about the concept of Power Line Communication technology. By using this technique, we have tried to communicate between two different locations in an industrial area by sending some data from source location to destination over Power Lines or AC mains (250V, 50Hz). This means no extra hardwiring or networking is required. This is made possible with the use of PLC (Power Line Communication) modems. These modems are capable of carrying out half duplex communication in bi-directional manner. A set of data to be transmitted is given to a PLC module using microcontroller through its UART pins. The data is modulated by the same using PLC modem and transmitted serially over the power lines. This data would be received at a destination location by another PLC module, which then demodulates the data and makes it available to a microcontroller (interfaced with the same PLC). This received data can be displayed using a display device. As an application, we have installed temperature and humidity sensors at the testing and overhauling section of a mechanical domain industrial workshop; these sensors will monitor the ambient temperature and humidity conditions of the machinery present at this section and the acquired readings would be communicated to the control room located within the same industry. The PLC Modems would be installed at transmission as well as reception section. The readings so received at the receiver side (the control room) would be displayed on an LCD. The same readings, just for verification purpose, will also be displayed at the transmitter section on an LCD. Also, an alarming system using buzzers is provided that triggers in case the readings recorded by sensors exceed their specified limit. More details regarding this system are properly elaborated in the paper.

Keywords: *Power Lines, PLC Communication, PIC, Modem, NTC*

A New Energy-efficient Approach for Transmitting Data from a Wireless Sensor Network to the Mobile Devices

P. Ganesh Kumar[1], E. Srie Vidhya Janani[2], A. Jaya Lakshmi[3]

[1]Professor, Information Technology, K.L.N College of Engineering, Madurai
[2]Assistant Professor, Computer Science and Engineering, Anna University Regional Office, Madurai
[3]PG Student, Computer Science and Engineering, Anna University Regional Office, Madurai

Abstract

In the past decade, Wireless Sensor Networks have gained a significant attention from the research and industry community. A real-time Wireless Sensor Network excels to be one among the developing technologies that supports large-scale applications across the Internet. Recently, with the dissemination of mobile devices with Internet connectivity, mobile users can interact with sensor networks to collect environmental data, anytime, anywhere using user-friendly mobile applications. The utility of sensor networks nowadays are, however, far restricted by many theoretical or practical obstacles. Most sensor nodes adopt un-rechargeable batteries with limited power supply. The wireless links among the sensor nodes appear to be unreliable and easily affected by various environmental factors. Nevertheless, there are hardly any fundamental results on the network capacity of a duty-cycled Wireless Sensor Networks with unreliable wireless links. Our work addresses energy-efficient and light-weighted encoding technique called Lineage Encoding that overcomes the technical barriers of the large-scale sustainable wireless sensor networks. Our research is driven by the practice of autonomous interrogation of mobile data collected remotely for mobile environment. The Lineage Encoding scheme represents the parent–child relationships among XML elements as a sequence of bit-strings called Lineage Code (V, H) and employs effective twig pattern query processing at the mobile clients. Experimentations have been carried out, which ensure minimum query processing time and maximum network lifetime with Lineage Encoding. The simulation results prove the asymptotic network capacity of large-scale wireless sensor networks to support an infinite number of mobile clients under various network conditions.

Keyword: *Lineage Encoding, G-node, Query Processing Time, Residual Energy, Network Lifetime Maximization*

Average BIT Error Rate of BPSK Subcarrier Intensity Modulated Multi-Hop Free Space Optical Communication System

Manish Sharma[1], D. Chadha[2], Vinod Chandra[3]

[1]Research Scholar, Electrical Engineering Department, Indian Institute of Technology Delhi
[2,3]Professor, Electrical Engineering Department and Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

Abstract

In this paper, the analytical closed form expression for the average bit error rate of Binary Phase Shift Keying (BPSK) subcarrier intensity modulated multi-hop-Free Space Optical (FSO) communication system has been derived. FSO is the transmission of modulated optical signal into the atmosphere to obtain communication, having advantages of low cost, easy deployment, license-free operation and high security. Multi-hop transmission is a serial relaying technique, which is used to enhance the performance of a free space optical link. The channel model considered in the analysis is a composite channel model, which consists of the degrading effects of atmospheric attenuation, turbulence and pointing errors. The atmospheric turbulence is modeled as Gamma–Gamma distribution, since it works satisfactorily for weak to strong turbulence regime. Decode and forward relaying is used, as it provides better performance than amplify and forward relaying. The performance of the system under consideration has been evaluated in terms of the variation of the average bit error rate with atmospheric turbulence, fading and for different normalized beam width. The result shows that the average bit error rate of the system at an average electrical SNR of 25 dB improves from 3.33×10^{-1} to 1.18×10^{-5} as hop counts are increased from 2 to 4. The performance of the system degrades as the turbulence is increased from weak to high. The effect of weather is also evaluated with very clear air, clear air and hazy atmospheric conditions. The performance of the system deteriorates as the weather effects become worse, but the percentage degradation in the average bit error rate becomes less with the hop count. The results also show that the effect of the normalized beam waist is very pronounced on the performance of the system.

Keywords: *BPSK, Decode and Forward Relaying, Free Space Optical Communication, Multi-Hop, Turbulence*

Detection of Failure Transmission Nodes through SDN-based Centralized Controller

Vaishnavi Moorthy[1], Revathi Venkataraman[2]

[1]Assistant Professor & Research Scholar, Department of Computer Science & Engineering, SRM University, Kattankuluthur

[2] Professor, Department of Department of Computer Science & Engineering, SRM University, Kattankuluthur

Abstract

Today, there is a widespread adoption of distributed control and transport network protocols running inside the routers and switches. However, these traditional IP networks are complex and hard to manage. Automatic reconfiguration and response mechanisms are virtually non-existent in current IP networks. Therefore, enforcement of the required policies in such a dynamic environment is highly challenging. Software Defined Networking (SDN) is an emerging paradigm, which tries to change these states by breaking the vertical integration that separate the network's control logic from the underlying routers and switches that forward the network traffic. With this separation of the control and data planes, network switches become simple forwarding devices. The centralized controller implements control logic for simplifying policy enforcement and network reconfiguration. The objective of this paper is to have a centralized Software Defined control over the distributed heterogeneous networks like wireless sensor and wireless ad hoc networks. This provides the flexibility and agility of data transmission in the Data plane according to the user's requirements at any point of time. The proposed SDN architecture's implementation is over the Open-Flow SDN standard. The controller will do the maintenance of the data transmission logs between the nodes at the physical level according to the rules implemented in the open flow tables. In case of failure or malfunctioning of any one of the transmitting nodes, the lower data plane detects and intimates the controller immediately regarding the discrepancies met at that point of time. The authenticated user can change the path of data transmission between the other existing nodes and continue the data transmission through the controller. In this way, the controller can redefine the data transmission path during the untoward networking situations.

Keywords: *Software Defined Networking (SDN), Centralized Controller, Failure, Intimate, Transmission Node*

M-commerce—Technology for Untapped Business Opportunity

Preshni Shrivastava

Assistant Professor, OM & IT, Institute Of Marketing & Management, Delhi

Abstract

Mobile commerce or m-commerce is growing incredibly fast in many nooks and corners of the economy. It is buying and paying for goods or services via mobile phones. These were routed through m-wallets, mobile banking and interbank mobile payment services. The objective of the study is to determine the practices of m-commerce and the extent to which it is being accepted by Indian organizations and Indian consumers. The study finds out the percentage of urban population that has adopted m-commerce in their day-to-day transaction. It identifies the shortcomings as well as the constraints experienced by the organizations and the customers. Future strategies devised by the companies to keep pace with rapid rise of mobile commerce have been discussed. This study also seeks to determine the customers' anticipated needs of m-commerce.

The study is empirical in nature. The research was conducted in Delhi and its periphery. This micro-study has a macro-implication. The findings of this study have brought to light facts which may guide government, industry and service providers in their policy formulation and operations. It is expected that this study may help further research in the area and the scholars may find this study helpful in their academic endeavor.

Keywords: *m-Commerce, Mobile Banking, m-Wallets*

MAHT: Multi-agent-based Data Dissemination Protocol for the Applications of Wireless Sensor Networks in Hard-to-Reach Territories

Rajendra Kumar Dwivedi[1], Manoj Misra[2]

[1]Student, Department of CSE, Indian Institute of Technology Roorkee
[2]Professor, Department of CSE, Indian Institute of Technology Roorkee

Abstract

Sensor networks are used in several environmental monitoring applications and military applications to detect the ambient conditions like temperature, light, sound and movement or the presence of the certain objects, etc. Examples of these applications are traffic monitoring, disaster management, fire detection, weather monitoring, underwater monitoring, underground monitoring for agricultural surveillance, security surveillance, battlefield surveillance and chemical biological radiological and nuclear attack detection, etc. In such networks, nodes can be deployed in two ways. The first method is manual deployment which is generally done in easy-to-reach territories and the second method is randomized deployment which is normally done in hard-to-reach territories. Sensors are operated on batteries. To overcome the energy-related issues, many data dissemination protocols of wireless sensor networks have been developed. Some of them are mobile-agent based and some are non-agent based. Mobile agent is a software program and that can implement data aggregation (removal of redundant data) while migration. Researches show that under certain conditions, agent-based protocols may perform better than non-agent-based protocols and multi-agent-based protocols may perform better than single-agent-based protocols. Some authors have also shown that if nodes are uniformly distributed in a circular-monitoring region and sink is positioned at the center of this region, then using the multi-agent-based protocol energy efficiency can be improved. On basis of the literature survey, some research gaps are identified which are listed below:

During random deployment of the nodes in hard-to-reach territories, it is difficult to position the sink at a fixed place like at the center of the circular monitoring area.

To save the energy of the sensor nodes, only source sensor nodes should be present in the itinerary.

During agent migration, the nodes should not be traversed more than once to save the energy of the nodes.

To remove these identified gaps, a new fault tolerant and energy aware multi-agent-based data dissemination protocol of wireless sensor network for hard-to-reach territories is proposed in this paper. The proposed scheme consists of four algorithms. We can get fault tolerance and energy efficiency using these algorithms. Fault tolerance is achieved by the first algorithm, i.e. 1-hop neighbor discovery algorithm which derives the dynamic itineraries for the agents. Second algorithm of the proposed scheme identifies the Central Node (CN) among the deployed nodes, using the concept of impact factor. Thus, we have a monitoring region of only source sensor nodes which would be almost circular and centered at CN. This CN communicates to the sink which may be positioned at any place. This monitoring area is divided into different groups using third

algorithm and agents can be dispatched in each group in parallel to derive the itineraries using fourth algorithm. Thus, using multiple agents, task completion time can be reduced and bandwidth can be conserved. This results in better energy efficiency. Simulation results show that the proposed protocol is fault tolerant and energy aware. Network lifetime is also improved using this protocol. This protocol is suitable for the applications of hard-to-reach territories.

Keywords: *Data Dissemination, Data Aggregation, Mobile Agent, Impact Factor, Itinerary*

An Energy-efficient Wireless Sensor Networks with Spatial Correlation Method Using Various Topologies

P. T. Kalaivaani[1], A. Rajeswari[2]

[1]Assistant Professor, Department of ECE, MNM Jain Engineering College, Chennai
[2]Professor & Head, Department of ECE, Coimbatore Institute of Technology, Coimbatore

Abstract

In Wireless Sensor Networks (WSNs), a large number of nodes are randomly deployed to perform a common task such as sensing, communication and computation. In WSNs field, once an event is detected, spatially correlated information is sensed by surrounding nodes and it is intimated to representative nodes available in the region. Thus, Spatial Correlation (SC) carries significant merits in the energy efficiency analysis of WSNs and to filter out the redundant information, to achieve network lifetime. Communication link between the sensor nodes has experienced cyclic detachment and attachment to save the energy. This leads to a problem when a packet of information is transferred from sensor node to representative node and representative nodes to sink node level. Therefore, developing an energy-efficient WSNs is the primary task. From the previous studies, we identified that SC between the sensor nodes in WSNs field is one of the deciding factors to investigate energy efficiency. The proposed work is more essential than the previous work because it concentrates on various topologies with different ranges of correlation radius values with a better level of parameter selection. Various topologies considered for the performance analysis are Tree, Star, Mesh, Grid, Cross and Chain. The correlation radius between the sensor nodes is started from the range 10m, 20m, 30m, 40m and 50m. Real Zigbee node is considered as a sensor node and the analysis is carried out. The outcome of the proposed work is not only to improve energy efficiency, but also to achieve better values of throughput and packet delivery ratio, end-to-end delay, packet drop. Graphical results show that Tree topology gives best result towards energy efficiency as compared to other topologies for different values of correlation radius. In future, we can implement the same concept on hardware platform with real sensor node specifications to analyze the behaviour of WSNs.

Keywords: *Correlation Radius, Energy Efficiency, Spatial Correlation (SC), Topology, Wireless Sensor Networks (WSNs)*

Performance Analysis of Various Network Applications Using High Speed Packet Processing

Hitenkumar Patel[1], Saumya Hegde[2]

[1]M.Tech. Computer Science, Computer Science & Engineering, NIT-K Surathkal
[2]Assistant Professor, Computer Science & Engineering, NIT-K Surathkal

Abstract

Performance analysis has always been an important task to perform on any platform under various circumstances. In the context of networking, it actually helps to achieve till expected throughput/ linerate by benchmarking on various use cases. To process network packets at very high rate is the current need of the industry to cater the cutting edge technology. Intel® DPDK, a library is one of the solution for it which can process the packets at a very high rate. Various network applications can be created and run by using its library. In this paper, performance analysis of packet processing on various cases like simple Rx–Tx, Rx–Tx with packet puncture, l3fwd with and without range and LwIP stack gives the overall idea of throughput for the same. Results were taken after generating the traffic through pktgen on 10 Gig linerate which shows the throughput as well as millions of packets per second for different packet size of 64 and 128 Bytes. Irrespective of the application nature all follows the basic pipeline model which receives the packet on one logical core of CPU and enqueue those received packets to the shared resources, i.e. ring from which the other core(s) again dequeue it and then enqueue the processed packets to the transmit ring which followed by dequeue from transmit ring on tx core and forwarded to the corresponding interface in case of l3fwd and LwIP. The initial part of the paper shows the detail mechanism of the whole modularisation which gives the clear idea to any reader who wants to start with any network application, whereas later part gives the captured results, the actual interpretation out of the implementation, and performance analysis and comparison for various scenarios.

Keywords: *Intel® DPDK, pktgen, Packet Processing, Rx–Tx, Packet Puncture, l3fwd, LwIP, Range, Linerate, Ring, Enqueue, Dequeue*

Performance of CMA Blind Equalizer for Mobile-WiMAX over Multipath Fading Channels

B. Siva Kumar Reddy[1], B. Lakshmi[2]

[1]Research Scholar, Department of Electronics and Communication Engineering, National Institute of Technology Warangal

[2]Associate Professor, Department of Electronics and Communication Engineering, National Institute of Technology Warangal

Abstract

Present and future communication standards demand high quality of services with higher data rates. In order to reduce noise in communications and to equalize channels, new equalization algorithms are being developed, namely Blind Channel Equalization. In this paper, WiMAX end-to-end physical layer is modeled with blind equalization and space-time block coding (STBC) using Simulink. Results analyzed the performance of WiMAX physical layer in terms of scatter plots over AWGN and multipath faded channels separately. This paper concluded that constant modulus algorithm (CMA) blind equalizer offers good synchronization between the transmitted and received symbols with improved spectral efficiency.

Keywords: *BER, CMA, FER, OFDM/OFDMA, WiMAX*

Women Safety Device

Ayushi Singh[1], Gurmeet Singh[2], Anukriti Singh[3], Akashdeep Sharma[4], Sanjay Kumar[5]

[1,2,3,4] 4th Year Students, Electronics and communication Department, Moradabad Institute of Technology, Moradabad

[5]Professor, Electronics and Communication Department, Moradabad Institute of Technology, Moradabad

Abstract

In India, every single day, single women, young girls, mothers and women from all walks of life are being assaulted, molested, and violated. The fatal 'Nirbhaya' gang-rape saw an outpouring on the streets of Delhi – protests decrying the fragile status of women in India. The wickedness against the women can be now brought to an end with the help of a device called women safety device. This paper explained the basic idea of 'safety device' which is to give instant location of victim in the form of latitudes and longitudes to the relatives, friends, and women helpline number so that the incident could be prevented and the culprit can be caught. The device, named as "WomenSafety Device" is a security system specially designed for women in trouble. This device is simple to carry as it can be easily installed in women's handbags. All working ladies carry bags to work; hence, this device can be of great use. It can be activated by three ways that is by applying force like throwing the bag on the ground, voice activation, and switch activation. Now, after triggering of the circuit GPS starts tracking the location of victim in the form of longitude and latitude. This location traced by GPS is then sent to the respective mobile numbers which are stored in the microcontroller with the help of GSM module. We are using very general electronic components like clap switch, force sensor which are not very costly. The potential of this device can be of more use if the circuitry is minimized, then it could be embedded in wrist bands, watches, etc. Women safety device is a gift for our society as it is very economical and convenient.

Keywords: *Safety Device, Microcontroller 89s52,LCD, GSM, GPS*

Financial Inclusion Through Mobile Phones—Case studies of Kenya, Nigeria, Brazil and Bangladesh

Deepak Sundrani

Associate Professor, School of General Management, NICMAR, Pune

Abstract

A vast majority of the population in developing countries, especially in rural areas, has no access to financial services. The main reason is that most of them do not have any bank accounts, they are called the 'unbanked'. The other reason is that although some of them may have bank accounts, it becomes very expensive for them to physically visit the bank/ATM for the transactions, because of the distance or the time taken to go to the bank. However, in the very same population, most of the people have mobile phones. Thus, mobile phones present an excellent opportunity for financial inclusion. In the beginning, the paper describes an ingenious method which was used by people for transferring money with the use of mobile phones, without the intervention of the mobile service providers, whereby if a person wanted money, he would phone his friend who would buy a scratch-card of a prepaid mobile and inform the person about the scratch-card number by sending an SMS, and then the person would sell the airtime at a small discount. Taking a cue from them, the mobile operators found an excellent idea of win–win situation: On one hand, to grow their businesses and, on the other hand, to help in financial inclusion. The paper attempts to explore the various methods used by the various mobile service providers of Kenya, Nigeria, Brazil and Bangladesh, by going through secondary data, to understand how the financial inclusion was attempted through mobile phones in those countries, where it was successful and where it was not, and the pitfalls so that the other countries can learn from them.

Keywords: *Financial Inclusion, Mobile Money, Mobile Payment, M-Pesa*

Leveraging Technology for Financial Inclusion: A Case of Rashtriya Swasthya Bima Yojana (RSBY)

Deepshikha Kalra[1] Vinod Kumar Bishnoi[2]

[1]Assistant Professor, Department of Management, Management Education & Research Institute, New Delhi
[2]Professor, Haryana School of Business, Guru Jambheswar University of Science & Technology, Hisar

Abstract

Financial inclusion is prerequisite for poverty alleviation and economic growth of any nation. It has always been one of the major agenda of policy makers but the development process so far has not brought balanced economic growth across the country. Government of India has launched thousands of policies for inclusion of below poverty line (BPL), but their success rate is poor, the major challenge being lack of awareness among the masses. Rashtriya Swasthya Bima Yojana (RSBY) launched by Govt. of India on 1 April 2008 to improve access of BPL population towards quality health care, is one such policy which has a very low enrolment and utilisation. Various studies on the issue have proven that awareness programmes launched by government in accordance with NGOs, State nodal agencies (SNA), etc., have failed to achieve their targets. This paper is a conceptual paper which explores the various avenues created by digital India project which will reduce the digital divide in the country and help in improving awareness among the beneficiaries. Research highlights cost effectiveness of technology in implementation of such schemes, it further suggests various measures for effective implementation of the scheme.

Keywords: *Financial Inclusion, Rashtriya Swasthya Bima Yojana (RSBY), Digital Divide, Digital India, Technology*

Modeling Synergetic Relationship Between Financial Inclusion and Telecom Services in India

Taufeeque Ahmad Siddiqui[1], Yusuf Abdullah[2]

[1]Assistant Professor, Center for Management Studies, Jamia Millia Islamia, New Delhi
[2]Research Scholar, Center for Management Studies, Jamia Millia Islamia, New Delhi

Abstract

Vision of NTP 2012 and purpose of assorted steps taken by RBI for financial inclusion is inclusive growth. Moreover, the telecom and the banking industry in India is intricately linked due to the similarities in both sectors. The banks have to follow resource appropriation in the form of CRR and SLR. Similarly, telecom companies pay fairly exorbitant spectrum charges and license fee. Both the industries have high initial infrastructural capital requirement. The RBI is also contemplating to allow telecom companies to set up banks. Hence, both are interlinked and need to be studied for mutual relationship. The study is based on panel data. 28 variables have been used. The variables include three indicators which are proxy for financial inclusion, i.e. bank branches, deposits and credit; and two variables for Telecom, i.e. Teledensity and Total number of Subscribers. The data further includes dummy variables for time, i.e. 5 years from 2010 to 2014. Apart from this, the researchers have also used dummies for telecom circles or states, after smoothening the data. This study proposes to explore causal relation between both (telecom and financial inclusion) in India. The researchers have made an earnest attempt to model the causal relation using artificial neural networks (ANNs) with multilayered perceptron architecture. In the study, two models have been proposed. The first model keeps telecom variables as dependent variables and all the other variables as independent variables, using MLP. In the second model, telecom variables have been replaced by financial inclusion and all the other variables including telecom have been used as independent variables. It has been found that predictive power of these models is more than 87 per cent. Independent variable importance analysis depicted that both the variables are extremely vital in their respective models. The preliminary results are very encouraging for policy makers, as precise effect of both the variables on each other can be measured.

Keywords: *Artificial Neural Networks, Telecom, Financial Inclusion, Banking*

Mobile as A Means of Financial Inclusion in India

Smita Kashiramka[1], Noor Ulain Rizvi[2], P.K. Jain[3]

[1]Assistant Professor, Department of Management Studies, Indian Institute of Technology Delhi
[2]Research Scholar, Department of Management Studies, Indian Institute of Technology Delhi
[3]Professor, Department of Management Studies, Indian Institute of Technology Delhi

Abstract

Financial inclusion has become one of the primary objectives for inclusive growth for the Government of India. It forms a part of the wider objectives of economic development in the country. The Reserve Bank of India (RBI) defines it as the process of ensuring access to financial services on a timely manner as well as providing adequate credit wherever needed by vulnerable groups such as weaker sections and low income groups at an affordable cost. However, the penetration of formal banking system and financial services in India is low, specifically in the rural areas due to several reasons.

With increasing affordability of the mobile handsets and better tariffs, the digital divide has been blurred, created initially by computers and the internet. Out of the total mobile subscription base in India, nearly 40 per cent belongs to rural areas. This figure urges us to have a look at the mobile banking as a tool for India's much talked goal of financial inclusion. Products such as Easy-paisa and M-Pesa have been quite successful in developing countries such as Pakistan and Kenya.

This paper attempts to explore the dimensions of using mobile banking as a means of financial inclusion in India and the areas that call for further investigation and policy implementation. The paper employs a conceptual approach to use of mobile phones for financial inclusion through benchmarking global practices in this area using case-based approach. The results are expected to give a comprehensive understanding of the scope as well as the roadblocks in implementing a mobile-based financial inclusion framework in India, and it is expected to have policy implications in this direction.

Keywords: *Financial Inclusion, Mobile Banking, Policy Framework, India*

Branding of Green IT for Sustainable IT Companies In India

Anamica Singh[1], Meenakshi Sharma[2]

[1]Research Scholar, Department of Management, Birla Institute of Technology, Mesra, Ranchi
[2]Associate Professor, Department of Management, Birla Institute of Technology, Mesra, Ranchi

Abstract

The purpose of writing this paper is to explore the power and necessity of Green IT in today's time. Green IT in a nutshell is the way of making use of technology to solve environmental issues and minimise the impact of IT on the environment. IT sectors worldwide are increasingly becoming aware of the strategic role that IT can play in both greening the IT infrastructure and supporting a business's overall green initiative. Hence, it becomes very important to know as to how ready are IT companies in India to acquit these roles. In order to attain better understanding of Green IT and its impact on IT is a research priority, which will give an idea how Green IT Ready are we. The inclination headed for green information technology (IT) over the decades is a result of an acknowledgement of both the environmental issues related to IT and the crucial role IT plays as a potential cause of solutions to environmental concerns. Firstly, exploratory method is used for getting an in-depth knowledge of current technology upcoming transition of IT to environmentally safe IT as Green IT. Secondly, to explore the factors of branding to promote Green IT for sustainable development of IT companies in India. Various branding models and sustainability issues have been studied for this research. With the help of exploratory study, various essential sub-factors of major three factors – Green IT, Branding and Sustainability – have been summarized to build a questionnaire. With the help of data collected through questionnaire, results will be analysed by performing factor analysis.

Keywords: *Green IT, Information Technology, Sustainability, Branding*

Greening of Telecommunications—A Way Forward for Developing Countries

Molshree Aggarwal[1], Vijita S. Aggarwal[2]

[1]Student, Lady Shri Ram College for Women, New Delhi
[2]Associate Professor, USMS, GGS IP University, New Delhi

Abstract

The high-growth rate of a developing country such as India implies fast paced growth of the telecommunication sector. This burgeoning industry is necessary for sustaining the economic growth as it provides essential infrastructural support. However, climate change and excessive pollution have necessitated a re-evaluation of the patterns of conventional growth within the telecommunications sector. The resource crunch has added to this problem. Greening of telecommunications is both a necessity and a strategy to overcome environmental and sector-specific problems. This research paper studies the opportunities for greening of telecommunications in developing countries with focus on India evaluating it beside the success (or the lack there of) achieved by the developed countries. This study is conducted by extensive literature survey of the developed and developing countries and secondary data available in the public domain. The primary data is collected through the conduction of interviews of "C" level executives within the sector. The paper identifies the gap between the greening efforts of developed and developing countries and discusses the opportunities available in a systematic manner. Due to the limited literature available on this particular matter, especially in the context of developing countries, there is a restriction in the understanding of the level of green technology currently existing and utilized within these countries. A study of this nature, inclusive of collection and analysis of primary data, has not been conducted in India or/and is not available in the public domain.

Keywords: *Telecommunication Sector, Green Technology, Developing Countries*

Green Telecommunication—A Review

Amitava Aditya[1], Ankan Kumar Chakraborty[2], Asmita Chakraborty[3], Angshuman Khan[4], Chiradeep Mukherjee[5], Surajit Sur[6]

[1,2,3]Student, Department of Electronics & Communication Engineering, University of Engineering & Management, Jaipur

[4,5,6]Assistant Professor, Department of Electronics & Communication Engineering, University of Engineering & Management, Jaipur

Abstract

In the field of science, electricity drives each and every node of technical applications, especially if telecommunication field is concerned. Burning of coke or fossil fuel emanates sufficient electricity but a scientist cannot disregard the detrimental effect of green house gas (GHG) generated from this process. Every year, India loses major portion of power in this field which can be reduced if green technology in this field is adopted. The optimization of power consumption independent of any application is "greening of telecommunication" which considers not only the fuel efficient equipment and eco-friendly designs of telecommunication networks, but also the disposal of tele-waste. It also involves the renewable and eco-friendly energy sources, energy saving and eco-friendly manufacturing components and optimization of thermal energy. IP-based network of cloud computation consumes enormous energy which violets main motivation of the greening of environment. Green taken common with the every word like electronics, codes, power amplifiers and antennas will show the roads toward green telecom. In this paper, an effort has been made to present the review of green telecom which associates the disadvantages of 'state of the art' telecommunication technology. This paper includes the comparative study of conventional technology and recent green technologies in telecom sector which offer an idea to choose the best technology to make our environment green.

Keywords: *Green Telecommunication, Green House Gases, Green Networks, Green Manufacturing*

A Study of Challenges to Successful Implementation of Green Building Strategy in India for Sustainable Development

Meenakshi Sharma[1], Pooja Rai[2]

[1]Associate Professor, Management, Birla Institute of Technology, Mesra, Ranchi
[2]Project Fellow, Management, Birla Institute of Technology, Mesra, Ranchi

Abstract

Green buildings are eco-friendly in nature and have several advantages to the mankind. However, there are many challenges in their successful implementation**.** The aim of this paper is to focus on the challenges of the green building development in India and to investigate the main obstacles in the process of implementing green buildings. Descriptive research design has been used and on the basis of exhaustive literature review of theoretically rich research papers, articles, consultancy reports, unstructured interviews with consultants and developers, a questionnaire is prepared wherein 18 challenges are listed. The questionnaire has been filled by 600 respondents from three metro cities of India, namely Delhi, Mumbai and Kolkata with 200 respondents from each city. The survey has been collected from 3 December 2014 to 4 February 2015. The collected data has been tested for reliability using Cronbach's Alpha which is .848 for the study, and it indicates that data is reliable for further analysis. It is further reduced using factor analysis to identify the most important challenges influencing successful implementation of green building strategy in India. Though India has the largest number of green buildings in the world after US, it still has a long way to go. Six major challenges have been identified after applying exploratory factor analysis on 18 items. They are increase in cost because of green building features, lack of knowledge and awareness of green buildings, lack of integrated strategy, insufficient policy implementation, lack of motivated demand from customer and technical difficulty. Awareness campaigns, incentive instruments and technology assistance can go a long way in eliminating these challenges. The findings of the study can be used by future researchers and policy makers to formulate effective and integrated green strategy in Indian construction sector.

Keywords: *Green Buildings, Sustainable Development, Global Warming, Challenges*

Design and FPGA Implementation of Digital FM Receiver Using PLL

Adesh Kumar[1], Vijya Kumari[2], Yashik Gulati[3]

[1]Department of Electronics, Instrumentation and Control Engineering, University of Petroleum & Energy Studies, Dehradun

[2]Graduate Student, Department of Electronics, Instrumentation and Control Engineering, University of Petroleum and Energy Studies, Dehradun

[3]Graduate Student, Department of Electronics, Instrumentation and Control Engineering, University of Petroleum and Energy Studies, Dehradun

Abstract

Recent advancement in the chip technology is integrating several sequential elements in System on Chip (SoC). But most of the circuits are using traditional clock distribution networks and facing the problem of skew and jitter problems. The clock signal generated by the oscillators and the flip flops and registers are not receiving the clock pulse at the accurate time. The problem can be solved using Network of Phase-Locked Loop (PLL) oscillators coupled in phase. A phase-locked loop ensures that the clock frequencies seen at the clock inputs of various registers and flip-flops match the frequency generated by the oscillator. The popular technique to demodulate FM signal is Phase Locked Loop (PLL). The design approach is based on digital components rather than analog components such as phase detector, loop filter and Voltage Controlled Oscillator (VCO). The signal is presented using digital words instead of analog voltages. In digital FM receiver, PLL is the main part to capture and lock the signals at different frequency and phase. The main purpose of PLL is to maintain the coherence between the modulated signal frequency (fi) and the respective frequency (fo), with the concept of phase comparison. PLL permits to track the frequency changes of applied input signals, as it is locked once. The paper focuses on the design, FPGA implementation of FM receiver integrated with digital PLL. There is a use of 8 bit analog to digital conversion (ADC) circuit, which is accepting frequency-modulated signal as a series of digital numerical values. The same signals are demodulated by the receiver on every clock cycle. The paper proposed the optimization of the number of multiplication and addition operations used in phase detector, with the existing work. The design is developed in Xilinx 14.2 ISE software and simulated in Modelsim 10.1b software with the help of VHDL programming language and the targeted onVirtex-5 FPGA.

Keywords: *Frequency Modulation (FM), Phase-locked Loop (PLL), Field Programmable Gate Array (FPGA), System on Chip (SoC)*

On-Performance Analysis of Irregular Augmented Shuffle Exchange Network-4

Sony Bansal[1], Harsh Sadawarti[2], Kanwarpreet Kaur[3]

[1]Research Scholar, Department of Computer Science and Engineering, RIMT-IET, Mandi Gobindgarh
[2]Director, RIMT-IET, Mandi Gobindgarh
[3]Assistant Professor, Department of Computer Science and Engineering, RIMT-MAEC, Mandi Gobindgarh

Abstract

The Multistage Interconnection Networks (MINs) are basically a class of high-speed computer networks that usually consist of processing elements (PEs) at one end and memory elements (MEs) at the other end of the network. These PEs and MEs are connected by switching elements (SEs) which are themselves usually connected to each other in stages, hence the name. MINs are typically used as a low-latency interconnection as opposed to traditional packet switching networks because interconnecting processors and linking them efficiently to memory module is not an easy task. Hence, an interconnection network which can provide a desired connectivity and optimum performance is required. This paper presents a new type of such Irregular Multi-Stage Interconnection Network (MIN) named as Irregular Augmented Shuffle Exchange Network-4 (IASEN-4). The study of the existing regular and irregular multistage interconnection networks was carried out and their performance parameters were analyzed followed by the designing of IASEN-4 and computation of its respective performance factors. This proposed network is compared with the existing networks, viz. IASEN-3, IAON and IASEN-2 in terms of Bandwidth, Probability of Acceptance, Processor Utilization, Processing Power and Throughput. In this paper, we have proved that IASEN-4 is much better than the above-mentioned networks by comparing their aforesaid parameters.

Keywords: *Multistage Interconnection Networks, Irregular Augmented Shuffle Exchange Network, Irregular Advance Omega Network, Performance Parameters*

Design of Router for Time-relaxed Network-on-chip

Shubham Bhansali[1], A.A. Khurshid[2]

[1]Research Scholar, VLSI Design, Department of Electronics Engineering, Shri Ramdeobaba College of Engineering and Management, Nagpur

[2]Professor, Department of Electronics Engineering, Shri Ramdeobaba College of Engineering and Management, Nagpur

Abstract

Interconnects have become an influencing factor in determining the global quality of a chip as the feature size is continuously decreasing and the integration density is increasing. Design problems, such as noise coupling, routing congestion and difficult timing closure are caused by long global wires or interconnect. Using a packet-based communication network, Network-on-Chip (NoC) architectures have been proposed to be an alternative to solve the above problems. The cores or processing elements (PEs) communicate with each other by exchanging messages over the proposed network architecture and these messages go through buffers in each router. The wormhole routing is proposed which illustrates the division of whole data in different small flits, to avoid the Head of Line blocking. In virtual channel flow control, buffers are one of the major resources used by the routers. The large numbers of transistors available today enable the development of chip multiprocessors that include many cores or PEs on one die communicating through an on-chip interconnect. The data packet having bit size in powers of 2 (8, 16, 32, 64, and so on) results in unnecessary zero padding in MSBs. Also, instead of connecting the cores in single topology, connecting them in different small topologies is advantageous. In this paper, an efficiently working Virtual Channel Router with random number of bits in data packet for typical topology having 16 nodes (one node for changing the topology with Mesh) is designed. These approaches aim to reduce overall Area, Dynamic Power Consumption and Critical Path Delay. The minimum input data rate must be 4–5 cycles. The minimum output data rate is 10–11 cycles. A considerable and major reduction in overall Area and Power is seen and 12.28% of saving in Dynamic Power Consumption is acquired.

Keywords: *Router, Network-on-Chip (NoC), Route Calculate (Routing Algorithm), Virtual Channel Allocator, Data Packet Bit Size*

Generating Parallel CRC Using VHDL Methodology

Payal S. Hajare[1], Kanchan Mankar[2]

[1,2]Department of Electronics and Telecommunication Engineering, GHRIETW, Nagpur

Abstract

Cyclic Redundancy Check (CRC) is playing the main role in the networking environment to detect the errors. With challenging the speed of transmitting data to synchronize with speed, it is necessary to increase the speed of CRC generation. Most electrical and computer engineers are familiar with the CRC. In the era of high speed data transmission, it requires a lot of accuracy for the message to be sent correctly to the receiver. And to check whether the message is correctly sent or not, an error detection technique called "CRC generation and check" is used. This method informs the sender if any error is occurred. Many know that it is used in communication protocols to detect bit errors and that it is essentially a remainder of the modulo-2long division operation. As a vital method for dealing with data errors, usually the hardware implementation of CRC computations is based on the linear feedback shift registers (LFSRs), which handle the data in a serial way. Though, the serial calculation of the CRC codes cannot achieve a high throughput. In constant parallel, CRC calculation can significantly increase the throughput of CRC computations. Variants of CRCs are used in applications like CRC-16BISYNC protocols, CRC32 in Ethernet for error detection, CRC8 in ATM, CRC-CCITT in X-25 protocols, disk storage, SDLC, and XMODEM. This paper presents 64 bits parallel CRC architecture. The whole design is functionally verified using Xilinx ISE Simulator. For the detection of the error in the received message, the CRC-bits are appended to the received message and then the "Exclusive-OR'ing" is performed by the polynomial. This gives us the generated CRC number, which is later used in the "CRC check method", to verify the accuracy of data transmission**.**

Keywords: *Cyclic Redundancy Check, Parallel CRC Calculation, Shift Register, Error Control Coding*

Prevention of Stretch Attack in Wireless Sensor Networks—A Game Theoretic Approach

P. Balaji Srikaanth[1], S.K. Revathy[2], V. Nagarajan[3]

[1]Research Scholar, Department CSE, Dr. Pauls Engineering College, Puducherry
[2]PG Scholar, Department ECE, Adhiparasakthi Engineering College, Melmaruvathur
[3]Professor, Department ECE, Adhiparasakthi Engineering College, Melmaruvathur

Abstract

Emerging Wireless Sensor Networks (WSN) are expected to form network-centric communications. Forwarding of packets in the presence of attack is a difficult task and mitigating is necessary for securing the communication systems. There are various routing protocols available to confront the attack on the network; however, the attackers intelligently find out the weaknesses and disrupt the network. In this paper, we try to mitigate stretch attack. The key challenge is to overcome the threat with high packet delivery ratio, low communication delay and with minimal energy expense. An attempt is made to provide a total game theoretic solution for the stretch attack.

Keywords: *Game Theory, Security Routing Protocols, Stretch Attack, Pricing Theory*

2-Hop Neighbour Knowledge-based Clustering in CRN under Opportunistic Channel Access

Rajiv Mishra[1], Ram Narayan Yadav[2], Sourabh Bhagat[3], Vinod Dosapati[4]

[1]Asst Professor, Department of CSE, Indian Institute of Technology Patna
[2]Research Scholar, Department of CSE, Indian Institute of Technology Patna
[3,4]Undergraduate, Department of CSE, Indian Institute of Technology Patna

Abstract

Cognitive radio networks (CRNs) enable cognitive users (CUs equipped with spectrum sensing) to access the under-utilized spectrum licensed to primary users (PUs) without causing unacceptable interference to the PUs' activities. On appearance of PUs, the available channel of CUs at different positions may have different available channels which changes dynamically over time. A pair of communicating CUs has to switch to other available channel, when a PU reclaims the channel in use with CUs. This can sometimes lead to partition of CRNs if there is no alternative channel. Due to temporal and spatial variations of opportunistically channel, the availability among CUs poses research challenges for ensuring connectivity and robustness of CRN. Reported works have shown effective use of clustering technique for cooperative spectrum sensing and a coordinated channel switching in CRN. Connectivity within the CRN is guaranteed as long as there is at least one channel available within each cluster and also between neighbouring clusters. Most of the existing clustering schemes divide CRN into the least number of clusters based on the available channel common to the largest set of 1-hop neighbours. The drawbacks of these schemes are that they do not provide robustness and require frequent re-clustering to maintain connectivity in CRN because of small number of common channels in each cluster. We have proposed a heuristic of 2-hop neighbour knowledge-based clustering to provide robustness in CRN. Our proposed algorithm converges in O(), where is the number of CUs and is the number of clusters in CRN. We have evaluated the performance of proposed scheme through simulation and observed that 2-hop neighbour knowledge-based clustering algorithm achieves 40–50% more common channels as compared to other competitive approaches and improves robustness to 40%. On keeping the complexity same, our approach achieves better robustness.

Keywords: *Cognitive Radio Networks, Connectivity, Clustering*

Birefringence—A Major Consideration in Fiber Optic Current Sensor

Sonali Wagh[1], Srushti Soni[2]

[1,2]Department of Electronics and Communication, Parul Institute of Engineering & Technology, Vadodara

Abstract

Due to immense advantages, the application area of fiber is very extensive. Primarily, they were used in telecommunication applications. But due to their physical qualities, single mode fiber has been used for fiber optic current sensor. Two most popular sensors are presented: Sagnac loop interferometer current sensor and in-line interferometer current sensor. Both the sensors work on the principle of Faraday Effect. It states that when two circularly polarized waves one right handed and one left handed pass through the medium like glass, they travel with different velocities when the external magnetic field is applied. The phase shift produced by the two waves is the direct measure of current. These sensors give many advantages over conventional sensors like light weight. Low power consumption, immunity to EMI and can be used to sense both AC and DC. One major issue we have to take into account is the birefringence which is present in non-ideal fiber. Birefringence is of two types, linear and circular. Both inherent and induced linear birefringence are non-desirable effects and have a great impact on sensitivity performance of sensor. This paper presents the basic principle of fiber optic current sensor, undesirable effects in fiber, their effects on performance of sensor and some methods to suppress birefringence.

Keywords: *Fiber Optic Current Sensor, Faraday Effect, Linear Birefringence, Phase Shift, PM Fiber, Polarization*

Comparative Analysis of Congestion Control Algorithm

Lal Pratap Verma[1], Mahesh Kumar[2]

[1]Research Scholar, Department of Computer Science and Engineering, Jaypee University of Engineering and Technology, Guna

[2]Assistant Professor, Department of Computer Science and Engineering, Jaypee University of Engineering and Technology, Guna

Abstract

Internet applications are increasing network traffic exponentially these days due to remarkable growth of the Internet. To handle the traffic, the Transport Layer provides the most reliable, connection-oriented, end-to-end packet delivery protocol that is Transmission Control Protocol (TCP). There are many problems available in congestion control algorithms, i.e. transfer size of the packet, initialization of Congestion Window, cross traffic, congestion along the path, size of the router buffer, intra protocol and inter protocol fairness. There are many variants of the protocol available to control the congestion. This paper presents a comparative analysis of commonly used TCP flavors. We present the analysis of TCP protocol named TCP Reno, TCP New Reno, HS-TCP, CUBIC-TCP and FAST-FIT followed by experiment results.

Keywords: *TCP, CWND, RTT, RTO*

Analyzing the Outcome of Route Maintenance Parameters with VBR Traffic on Stability of AODV Routing for a Realistic Scenario in MANET Using QualNet

Sachin Kumar Gupta[1], R.K. Saket[2]

[1]Rseearch Scholar, Systems Engineering Lab, Department of Electrical Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi

[2]Associate Professor, Department of Electrical Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi

Abstract

Mobile Ad-hoc Network (MANET) is the special kind of wireless network that is often deployed for a short period of time and special purpose. This kind of network is a collection of wireless mobile nodes that is self-configurable, self-administered and self-controllable. Numbers of the routing protocols have been proposed by the researchers and scientist for the various applications, but in this paper our main concern would be the only reactive type of routing protocol: Ad-hoc On-Demand Distance Vector (AODV). The often random change in network topology and multiple hopping at an unpredictable time affects the connectivity between nodes. Due to the frequent changes in highly dynamic network, it is seriously needed to study the route maintenance parameters which can enhance the stability of the routing. So, in this research paper basically, the effect of route maintenance parameters such as Active_Route_Timeout (ART), Delete_Period_Constant (DPC), Node_Traversal_Time, Net_Traversal_Time, etc. with Variable Bit Rate (VBR) on the stability of the AODV routing for a realistic scenario or highly dynamic network in MANET has been analyzed based on their Quality of Service (QoS) metric such as: Throughput, Average Jitter and Average End-to-End Delay. Simulation tool QualNet 7.1 and D-plot has been used to carry out the results and prepared the graphs, respectively. Along with the variable ART also variable NLD and a variable SD pair have been observed by changing the DPC values from a range of 3 Sec. to 7 Sec. in the regular interval of 1 Sec., in order to get the optimal solutions. As per this research work, IP network gives his best at ART = 1 Sec for VBR traffic so in this way memory overheads are less by 2 Sec. from its default values. And, also according to results which have been shown by a graph, the network gives its excellent performance at NLD = 60 and SD pair = 8.

Keywords: *MANET, AODV, ART, DPC, NLD, SD pair, VBR, QoS, Route Maintenance Parameter, Stability, QualNet*

Light Fidelity (LI-FI) Using Visible Light Communication: Practical Approach and Analysis as a Complementary to Wi-Fi

Piyush Kumar[1], Kunal Srivastava[2], Sandeep Kumar[3]

[1,2] 3rd Year, B.Tech,CSE Department Babu Banarasi Das University, Lucknow

[3] 3rd Year, B.Tech, Electrical & Electronics Department Babu Banarasi Das National Institute of Technology and Management , Lucknow

Abstract

Presently, all our gadgets use Wi-Fi, which uses radio waves. Now, the problems faced by these wireless networks are: interference, absorption and reflection, Multipath fading, Hidden node problem and the biggest of all, "The Capacity Problem". By 2020, 26 billion devices will be connected through the Internet of Things which would eventually give rise to the congestion problem or spectrum crisis and the US Federal Communications Commission has already warned about it. Now, the Visible Light Communication approach is being deeply considered, which simply uses light for data transmission through the LED bulbs. The working principle can be simply understood through our daily household items such as a TV remote. While pressing the button, the transmitter in the remote control handset sends out a stream of pulses of infrared light. A transmitter is often a Light Emitting Diode (LED) which is built into the pointing end of the remote control handset. The infrared light pulses form a pattern unique to that button. The receiver in the device recognizes the pattern and causes the device to respond accordingly. Same is the working principle of VLC approach in Li-Fi. The only difference is that it uses light transmitted through the transmitter LED bulb to the receiver led bulb flickering at a very high speed. Visible light is license free unlike the radio waves spectrum. Li-Fi has many advantages such as dimming the light bulb up to such an extent that it won't be a problem for human eye at night, no interference from natural and artificial resources using optical filters. Line of sight is an advantage too as the signal will be stronger. Visible light can be reflected but generally does not penetrate materials which can be a security benefit. This technology will provide not only illumination but also communication.

Keywords: *Radio Waves, Capacity Problem, VLC, Li-Fi, Radio Wave Spectrum*

A Self-adaptive Beaconing Strategy for Geographic Routing in Manets

B. Neeththi Aadithiya[1], P. T. Sivagurunathan[2]

[1]PG student, ECE Department, M. Kumarasamy College of Engineering, Karur
[2]Assistant Professor, ECE Department, M. Kumarasamy College of Engineering, Karur

Abstract

Geographic routing has become one of the most suitable routing strategies in wireless mobile ad hoc network mainly due to its scalability. Position information of nodes is a primary requirement in geographic routing. Forwarding nodes are selected among neighbors based on their location. Each node should be aware of its neighbor's location to maintain the local topology accuracy. Hence, each node should update its location information through a message called beacon. The existing mechanisms invoke periodic beacon update scheme which consumes the network resources such as energy and bandwidth specifically when the network traffic is high, it creates packet loss and leads to retransmission of data packet, causing additional delay and energy consumption. In this work, adaptive position update is proposed which dynamically adjusts the beacon updation frequency according to the varying network conditions. APU is based on two simple principles (i) nodes which move faster will update their positions more frequently (and vice versa) and (ii) nodes closer to forwarding paths update their positions more frequently (and vice versa). APU makes use of mobility prediction rule and on demand learning rule for beacon updation.

Keywords**:** *Beacon Information, Routing, Node Mobility, Energy Consumption, and Local Topology*

High-speed FIR Filter with Area Efficient on FPGA by Using DA Algorithm

Amol Navalagire[1], Smita G. Daware[2]

[1]Research Scholar, VLSI Design, Department of Electronic Engineering, Shri Ramdeobaba College of Engineering & Management, Nagpur

[2]Assistant Professor, Department of Electronics Engineering, Shri Ramdeobaba College of Engineering & Management, Nagpur

Abstract

Piece of document represents a different and simple methodology for design and implementation of digital signal processing (DSP) filters. We present design for finite-impulse response (FIR) in terms of area, delay, and throughput, also power optimization of finite-impulse response filter by using distributed arithmetic (DA). DA is basically a bit-serial computation operation that performs for vector–vector multiplication for inner dot products in single step, which make it different from normal multiply accumulate (MLA) logic for inner(dot) product computation. DA technique is a multiplier less circuit. Taking optimal advantage of the look-up table (LUT) based structure of field programmable gate array (FPGA). The performance of the bit-serial and bit-parallel DA technique for FIR filter design is synthesized and the results are compared to the conventional FIR filter design techniques. The manuscript presents less latency and less area with exiting FIR filter stricture. Motivation about the design achieves computational efficiency, high speed, and low area.

Keywords: *Sum of Product (SOP), Lookup Table (LUT), Multiply Accumulate (MAC), Distributed Arithmetic (DA), FPGA*

Design and Analysis of a High Q-Spiral MEMS Inductor

Radhika R. Rathi[1], V. R. Rathee[2]

[1]Research Scholar, Department of Electronics Engineering, Ramdeobaba College of Engineering and Management, Nagpur

[2]Professor, Department of Electronics Engineering, Ramdeobaba College of Engineering and Management, Nagpur

Abstract

This paper investigates the design of a high Q-factor on-chip spiral inductor. The spiral inductor is designed on silicon substrate using MEMS (Micro-Electro-Mechanical-System) technology. To obtain high Q-factor, the width, spacing, number of turns and thickness of the inductor coil are appropriately selected. And the substrate losses of inductor further reduced by making it suspended above the oxide layer. The CoventorWare designing software is used to design and measure the substrate losses of inductor, and Agilent EEs of EDA is used to measure the performance parameters, i.e. S-parameter of spiral inductor. Experimental result indicates that the planer spiral inductor has a Q-factor of 19.418 at 6 GHz for an inductance of 0.7638 nH and a SRF is obtained at 10 GHz. When the inductor is suspended by 4 um, the Q-factor is increased to 28.091 at 6 GHz and maximum Q-factor of 37.767 is obtained at 10 GHz. The dimension of designed inductor is 280 um × 245 um which is very less as compared to inductor design using conventional technology.

Keywords: *Q-factor, Impedance Matching, RF – Radio Frequency, SRF – Self-resonance Frequency, MEMS – Micro-Electro-Mechanical-System*

Comparison of Transport Performance of Externally Modulated and Directly Modulated Signals over SMF-28 and MetroCor Fiber in 2.5 Gb/s WDM Ring Network

Paramjot Kaur Dhanju[1], Anu Sheetal[2], Harjit Singh[3]

[1]M.Tech. Student, Electronics and Communication Engineering, Guru Nanak Dev University, Regional campus, Gurdaspur

[2,3]Asstt. Professor, Electronics and Communication Engineering, Guru Nanak Dev University, Regional campus, Gurdaspur

Abstract

In this paper, the transport performance of metropolitan area Wavelength Division Multiplexing (WDM) transparent ring network consisting of three access nodes separated by 40km fiber spans has been studied. The network node feeds all the access nodes with two channels at 193.1THz and 193.2THz that are accessed by the number of end stations for different applications. The performance of WDM ring has been analyzed using Q-factor, bit error rate (BER), eye diagram, and optical spectrums. Here, WDM ring is evaluated by varying the gain of in-line optical amplifier for Directly Modulated Laser (DML) transmitter using SMF-28 and MetroCor fiber. Further, the network has been considered using externally modulated (EM) transmitter and SMF-28 along with various dispersion compensation schemes. It is observed that EM transmitters using post-compensation scheme can even be used to provide greater flexibility and scalability by increasing the number of end stations. The Q-factor is measured to be 25.44 for post-compensated SMF-28 ring. Also, it has been found that DML using MetroCor fiber gives the best performance (Q-factor: 65.29) followed by SMF-28 (Q-factor: 52.06), giving the cost-effective solution. The optimum performance of the network has been achieved for optical amplifier gain of 5dB. The WDM ring network has been modeled using optical communication system design software OptiSystem.

Keywords: *Metro Network, Externally Modulated (EM), Directly Modulated (DM), SMF-28, MetroCor*

VoIP Performance over WiMAX Access Network Using Opnet

Priyanka Grover[1], Meenakshi Chawla[2]

[1]M.Tech Scholar, (CE), T.I.T&S College, Bhiwani
[2]Assistant Professor, (IT), T.I.T&S College, Bhiwani

Abstract

In this paper, WiMAX is set-up and used for voice-over-IP (VoIP) performance studies. WiMAX stands for worldwide interoperability for microwave access. WiMAX is an 802.16 wireless communication standard that provides high-speed data rates, throughput and cover larger area. Voice-over Internet protocol is a technology which enables the transport of voice data over Internet-protocol-based networks. VoIP through WiMAX is the most prominent service and is growing rapidly in the world of tele-comunication. One of the advantages of VoIP is its ability to reduce costs, it becomes an alternative to public switched telephone. In this paper, the performance of VoIP over WiMAX networks is analyzed. The performance is analyzed using opnet modeler, which provides a real-life simulation environment. So, we have opted opnet for all performance studies. The objective is to analyze the performance of VoIP codecs over WiMAX in terms of various QoS-related parameters like throughput, delay, etc. By examing the QoS-related parameters, the exhaustive simulation results show the impact of VoIP over WiMAX and a better choice of its voice codecs.

Keywords: *WiMAX, VoIP Codecs, Opnet Modeler 14.5*

A Review OF EDA Tools for Designing Network on Chip

A.K. Kaushik[1], R.P. Sharma[2]

[1]Research Scholar, Computer Science and System Studies, Mewar University, Gangrar, Chittorgarh
[2]Associate Professor, Department of Physics, B. K. Birla Institute of Engineering and Technology, Pilani

Abstract

EDA tools are playing a key role in designing interconnection architectures for various chips like network-on-chip (NoC). It has reduced the cost of planning prototype. It provides the designer to view the major drawbacks of communication and networking on the screen without being physical design phase. As the complexity of NoC and other reasons, it is crucial to have seamless synthesis, analysis, verification environment where the important quality aspects of the design can be monitored and optimized across the various levels of the design abstraction. EDA tools allow the designer to accurate prediction and estimation during design phase. In this paper, we deal with the various computer-aided tools as to how they are overcoming from the major problems which occur while designing for communication and network module or circuits design. EDA tools have to face deep submicron (DSM) design problems like crosstalk's, reliability, power consumption and interconnect dominated delay. We discuss about the most suitable EDA tool to allow early and reliable planning, estimation, analysis and optimization. The tools are surveyed on the basis of their interaction with important design quality, between physical, logical and functional design abstraction, system level interconnect prediction and planning, integrated and incremental synthesis, interoperability and standardization. The limitations like entry level, simulation types, noise tracing and delay point tracing are also discussed for a verity of EDA tools in this course of study.

Keywords: *EDA Tools, Network-on-chip (NoC), Design Phase, Design Problems, System Level Interconnect*

Design of Micro-strip Antenna Array for Dual Polarization with Double Band Characteristic

Naresh Kumar Darimireddy[1], R. Ramana Reddy[2], A. Mallikarjuna Prasad[3]

[1]Department of ECE, Lendi Institute of Engineering & Technology, Vizianagaram
[2]Department of ECE, MVGR College of Engineering, Vizianagaram
[3]Department of ECE, UCOE (A), JNTUK, Kakinada

Abstract

Micro-strip patch antennas are most widely used for wireless communication applications because of their low profile, light weight and low power handling capability. A compact double band and dual polarized micro-strip patch with single element and two element array antennas are proposed in this paper. The dual polarized and double band antenna provides improved bandwidth by inserting three rectangular slots in the radiating patch edge, two attached L patches on both sides of radiating patch and a plus (+) shaped slot in the center of radiating patch. It is also extended to a two element array. The proposed antennas with single and two elements are simulated using HFSS, and the results of return loss, radiation pattern and axial ratio (AR) are presented. The proposed antennas are fabricated and tested. The Simulation and Experimental results are compared.

Keywords: *Double Band, Dual Polarization, Printed Antenna, Two Element Array*

An Enhanced Trusted Anonymous Routing in MANETS

Jaisooraj J.[1], M.K. Sulaiman[2]

[1]Research Scholar, Computer Science and Engineering, TKMCE, Kollam
[2]Professor, Computer Science and Engineering, TKMCE, Kollam

Abstract

The openness and cooperative nature of Mobile Ad hoc Networks (MANETs) make them a likely candidate for a wide range of threats. Therefore, anonymity of mobile devices and data, coupled with unlinkability of data packets is a prerequisite that a MANET routing protocol should satisfy. The research has progressed substantially leading to the development of a Trusted Anonymous Routing (TARo) protocol which provides a much higher level of anonymity and unlinkability. The major drawback of TARo is that the best route selection is based on factors like priority of data and load balancing which are not so significant in a highly dynamic topology as in the case of MANETs. In addition to that the route maintenance phase is highly incomplete and is confined to the initiation of a route rediscovery whenever an active route fails; this can create a significant overhead. The proposed work aims at overcoming the above two limitations. Here, the best route is selected based on a factor called Link Stability Factor (LSF) which in turn is based on signal strength, mobility of nodes and the energy consumption of nodes that are far more important in a dynamic networking environment. Also, the multiple routes established are maintained by a periodic transmission of control packets. Finally, the deployment of node disjoint routing in proposed system ensures that the life time of the nodes and hence the life time of the whole network is prolonged considerably. The proposed method has been simulated and tested and the results indicate that the proposed system shows a higher packet delivery ratio and a lower control overhead.

Keywords: *MANET, Anonymous Routing, Node Disjoint Routing, Link Stability Factor*

400 Gbps Coherent PON Downstream Transmission Using DP 16-QAM and DSP

Gaurav Pandey[1], Aditya Goel[2]

[1]Research Scholar, Department of Electronics & Communication Engineering, MANIT, Bhopal
[2]Professor, Department of Electronics & Communication Engineering, MANIT, Bhopal

Abstract

In this paper, 400Gbps Coherent Passive Optical Network (CPON) downstream transmission is demonstrated over 80 km of Standard Single Mode Fiber (SSMF) using dual polarization 16 quadrature amplitude modulation (DP-16QAM) with digital signal processing (DSP) and 1:16 power split. Adaptive DSP is utilized at ONU to compensate the dispersion caused by 80 km SSMF. The Adaptive DSP carries out the following five functions: analog to digital conversion (ADC), chromatic dispersion (CD) compensation using a simple transversal digital filter, polarization de-multiplexing using radius directed equalization algorithm, carrier phase estimation using decision directed carrier phase recovery algorithm and digital to analog conversion (DAC). The algorithms used for DSP implementation are realized by using MATLAB software. An erbium doped fiber amplifier (EDFA) with gain = 16 dB and noise figure = 4 dB is employed with fiber link to increase the reach. As the launched optical power is increased in fiber link, the receiver sensitivity decreases and for 10 dBm launched power, we get a maximum power budget of 33 dBm. By accounting the fiber non-linearity, the optimal launched power for the highest power budget is found to be 10 dBm and the corresponding receiver sensitivity is –23 dBm for BER = 10^{-9} with 80 km fiber link and EDFA. For back-to-back case, the received optical power is –23.24 dBm for BER = 10^{-9}. The receiver sensitivity penalty caused by EDFA is 0.24 dBm. Simulation studies show that this 400Gbps CPON downstream transmission over 80 km SSMF and 1:16 power split provides acceptable performance and can be proved as a feasible solution for long reach, high speed and high capacity PONs. Further, coherent PON is also a strong nominee technology for next-generation high-speed PONs.

Keywords: *Digital Signal Processing (DSP), Optical Network Unit (ONU), Passive Optical Network (PON), Coherent Detection*

Minimization of Average Paging Delay in UMTS Networks Using Bulk Paging Mechanism

Esha Dutta[1], Avratanu Ghosh[2], P. Venkateswaran[3], Samir K. Sadhukhan[4]

[1,2]Student, B.E. 3rd Year, Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata

[3]Professor, Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata

[4]SSA, Indian Institute of Management Calcutta

Abstract

A universal mobile telecommunications system (UMTS) network consists of a core network (CN) part, and access network (AN), where AN comprises Node Bs and Radio Network Controllers (RNCs). When an incoming call comes for a mobile terminal (MT) in a UMTS network, as per IS-41 standard, the network performs parallel paging within a specific Location Area (LA) to determine the exact cell in which the called MT is currently present. LAs are contiguous collection of regions dividing the whole service area of the network. The network identifies the exact LA to be paged with the help of information maintained in home location register and visitor location register, which together form the location database of the network. Paging delay (PD) is the sum of queuing delay (QD), paging transmission delay (PTD) and response delay (RD). QD is the time spent in the queue by a paging message. PTD refers to the time interval during which one paging message is occupying the paging channel. RD is the system's wait time for an acknowledgement from the MT after the paging message is broadcast by RNC. Since LA comprises several cells, each paging in IS-41 involves large PD and a high-signaling overhead. To alleviate this problem, we propose a Bulk Paging Scheme which involves packing of multiple paging messages within a single Paging Pack broadcast by RNC. For the sake of simplicity, we assume that one RNC belongs to only one LA and vice versa. Our queuing-theory-based analysis, supported by extensive simulation results, indicates that the proposed scheme effectively reduces: (i) average QD and PTD, thereby minimizing average PD which enhances the quality of service for MTs, and (ii) number of paging broadcast, thereby decreasing the overall signaling cost incurred by UMTS network operators.

Keywords: *Paging, Paging Delay, Queuing Delay, Paging Transmission Delay, Group Paging, Bulk Paging*

HIS-based Koch Fractal Boundary Microstrip Patch Antenna

Suman Nelaturi[1], NVSN Sarma[2]

[1]Research Scholar, Electronics and Communications Engineering Department, National Institute of Technology Warangal

[2]Professor, Electronics and Communications Engineering Department, National Institute of Technology Warangal

Abstract

In this paper, a circularly polarized wideband microstrip patch antenna is proposed for wireless applications. It consists of Koch fractal boundary microstrip patch antenna on High Impedance Surface (HIS) substrate. To get circular polarization over wide band, the sides of square patch antenna are replaced with Koch fractal curves along x- and y-axes, respectively. To the best of author's knowledge, this is the first attempt in this line. The 10-dB return loss bandwidth and 3-dB axial ratio bandwidth for proposed antenna are observed to be 56.18 per cent and 14 per cent, respectively from simulations.

Keywords: *Koch Fractal, High Impedance Surface Substrate, Circular Polarization*

Teddy-shaped Microstrip Patch Antenna for C And X Band Applications

Anukaushar[1], Jaideep Bansal[2], Arun Gangwar[3]

[1]B.Tech., J.S.S.I.E.T Kauli, Patiala
[2]B.Tech, U.C.O.E. Punjabi University, Patiala
[3]M.E., NITTTR, Chandigarh

Abstract

This paper presents a new circular teddy-shaped microstrip patch antenna. Slots are cut on the circular patch which provides multiband and wideband. The antenna is simulated on high frequency structure simulated (HFSS). This antenna has been designed on FR4 proxy material having thickness 1.5676mm. The antenna resonates at frequencies 5.4848 Ghz, 8.3333 Ghz, 9.3636 Ghz, 9.8484 Ghz and 11.1818 Ghz, and its respective gain at the above stated resonating frequencies are 6.7399dBi, 6.8779dBi, 4.3753dBi, 2.8643dBi, 2.7966dBi, and the bandwidh of this antenna is 2Ghz.

Keywords: *Microstrip Antenna, Slot, Multiband, Reduced Size, Wideband*

A 3.35 GHz Down-Conversion Mixer in 0.18µm CMOS Technology for Ultra Wideband Applications

Uttam Kumar Sharma[1], Abhay Chaturvedi[2]

[1]M.Tech Student, Department of ECE, IET, GLA University, Mathura
[2]Associate Professor, Department of ECE, IET, GLA University, Mathura

Abstract

In this paper, a CMOS down-conversion mixer for ultra wideband (UWB) applications is presented. The mixer circuit is implemented in CMOS 0.18µm technology. The core mixer uses the conventional Gilbert cell along with inductive source degeneration in the RF trans-conductance stage. A novel LC input impedance matching network at the RF trans-conductance stage is used to improve the linearity and conversion gain of the core mixer. The proposed mixer operates at a Radio Frequency (RF) signal of 3.35 GHz with a fixed Intermediate Frequency (IF) of 250 MHz. The proposed mixer is simulated using Advanced Design System (ADS) software in a 0.18µm CMOS process technology at the DC supply of 3.5 V. Simulation results show that the mixer achieves a maximum conversion gain of 9.745dB, third order Input Intercept point (IIP3) of +1.083 dBm, 1dB gain compression point of –11.556 dBm and a minimum single sideband noise figure of 0dB. The proposed mixer shows considerable gain with acceptable linearity in the UWB frequency range.

Keywords: *Gilbert Cell; UWB; LC Matching Network; Trans-conductance Stage*

Proactive Strategy for Reducing Packet Loss in Software-defined Networking

Sminesh C.N.[1], Ranjitha K.[2]

[1]Associate Professor, Department of Computer Science and Engineering, Government Engineering College, Thrissur

[2]M.Tech Student, Department of Computer Science and Engineering, Government Engineering College, Thrissur

Abstract

Software-defined networking is a new approach in network architecture which decouples the control plane from the data plane. SDN controller communicates with the data plane by the standard programming interface provided by OpenFlow protocol. Sang Min et al. proposed a new routing architecture named Automatic Rerouting with Loss Detection (ARLD) in SDN to minimize packet loss and ensure network traffic fairness. ARLD detects packets dropped due to queue overflow using OpenFlow rx_errors status message. Once packet loss is detected, SDN controller's re-routing module finds an alternate route for the congested link and applies the new route to flow tables. Further traffic uses this newly applied flow, reducing further congestion and packet loss. But by the time the controller computes and installs an alternate route a good amount of packets would have been already dropped. To further minimize packet loss, we propose a proactive strategy that detects bottleneck ports that have the potential to cause packet drop. A port is identified as a bottleneck port if its utilization increases above a fixed threshold. Once bottleneck port is detected the SDN controller invokes its re-routing module for alternate route computation. Re-routing module updates network's virtual topology by setting the weight of the identified bottleneck ports link as infinity. New alternate route is computed from this updated topology and newly computed route is applied to flow tables. Further, traffic uses this newly applied flow decreasing packet loss and congestion. The proposed proactive congestion detection technique further reduces average packet loss and avoids congestion propagation since it removes all the bottleneck links in the modified virtual topology for the SDN controller leading to overall network efficiency. However, periodic update of the bottleneck link information with the help of OpenFlow ofp_port_stat message is an overhead for the SDN controller.

Keywords: *SDN, OpenFlow Protocol, Re-routng, ARLD*

Design and Enhancement of Image Encryption Algorithm and Implementation Using NIOS II Soft Core Processor

Sneha V. Trivedi[1], M.A. Hasamnis[2]

[1]Research Scholar, Electronics Department, Shri Ramdeobaba College of Engineering and Management, Nagpur

[2]Associate Professor, Electronics Department, Shri Ramdeobaba College of Engineering and Management, Nagpur

Abstract

Due to burgeoning use of digital data exchange and tremendous development in communication network, now it is very easy for anyone to get any kind of information from the Internet. With this, ever-increasing use of digital data exchange security of information has become important in data storage and transmission. Today, we are frequently using images in industrial processes, so it becomes essential to protect the confidential image data from unauthorized access. Various encryption algorithms are used to protect the confidentiality of image. In this paper, Advanced Encryption Standard (AES) algorithm is used for image encryption and decryption. To further enhance the encryption performance and add security, a new AES algorithm is proposed which is the modification of AES algorithm by adding a key stream generator W7. W7 stream cipher is included for enhancing the security of image to be encrypted and also statistical attack on the encrypted image is prevented. Implementation of encryption algorithm is performed using 32 bit NIOS II soft core RISC processor. Using NIOS II soft core processor, a single core system is designed with the help of SOPC (system on programmable chip) builder tool which is available in QUARTUS II (Version 10.1) environment. Single core system is designed by using NIOS II processor, SRAM memory, JTAG UART and performance counter. Altera DE2 FPGA board (Cyclone II EP2C35F672) is used for the implementation of the developed system. Firstly, the image is read using MATLAB. Then, the image is given as input to proposed AES encryption algorithm. The implementation of which is done on the developed platform using NIOS II processor. Output of encryption algorithm is given as input to decryption algorithm in order to get back the original image. Total time taken for encryption and decryption is calculated using performance counter. Finally, PSNR value is calculated for the decrypted image.

Keywords: *Advanced Encryption Standard (AES)**,** Key Stream Generator, QUARTUS II**,** MATLAB**,** Cyclone II FPGA*

Advanced Power Management Re-clustering Protocol in Cognitive Radio Ad Hoc Network

Ashwini Dakare[1], D.G. Khairnar[2], Manish Sharma[3]

[1]Post Graduate Student, Department of E&TC, D.Y. Patil College of Engineering Akurdi, Pune
[2]HOD, Department of E&TC, D.Y. Patil College of Engineering Akurdi, Pune
[3]Professor, Department of E&TC, D Y Patil College of Engineering Akurdi, Pune

Abstract

The word "cognitive" is concerned with the process of knowing. At present, the demand for radio spectrum is augmenting day-by-day due to various ISM (industrial, scientific and medical), telecommunication, military, cultural, aeronautical and other services. Increasing needs of the radio chromatic spectrum and absence of legitimate network infrastructure prompt spectrum dearth problem. Cognitive radio (CR) is a promising technique for efficient spectrum utilization in wireless systems. In this paper, clustering algorithm for ad hoc network is stipulated. Enumerated scheme is the best method to build and maintain hierarchical addresses in ad hoc networks where the spatial variations of spectrum opportunities are considered for clustering. Each cluster consists with a set of free common channels, which benefits smooth shift between the control channels. Nodes in cognitive radio are grouped into the same cluster if they sense similar free channels and are within the communication range of the leader node called cluster head. Whenever cluster head move out of cluster, the secondary cluster head takes the charge of the cluster head. Proposed clusters adapt themselves dynamically with respect to spectrum availability and the high mobility of the nodes. If power level for transmission of data packet is increased about the threshold level, then the transmission will be sustained so that network will be more efficient.

Keywords: *Cluster-based Architecture, Cognitive Radio, Dynamic Network, Re-clustering, Power Management*

A Novel Congestion Aware Routing Metric 'RCR' for WMN

Nitya N. Kulkarni[1], Jayalakshmi G. Naragund[2], R. M. Banakar[3]

[1]PG Scholar, Department of Computer Science and Engineering, B.V.B College of Engineering and Technology, Hubli

[2]Professor, Department of Computer Science and Engineering, B.V.B College of Engineering and Technology, Hubli

[3]Professor, Department of Electronics and Communication Engineering, B.V.B College of Engineering and Technology, Hubli

Abstract

Wireless Networks have become ubiquitous with the advent of new wireless technologies and services. A variation of Wireless networks, Wireless Mesh Networks (WMN) have gained popularity and are widely used because of their benefits such as low upfront cost, easy network maintenance, robustness, and reliable service coverage. WMN provides communication to its clients through mesh routers which act as both access point and packet forwarding entities. These mesh routers identify the best path to route the data packets from source to destination in the network using efficient routing protocols and metrics. The IEEE 802.11s standard of WMN supports Peer Link Management Protocol (PMP) and Hybrid Wireless Mesh Protocol (HWMP) with the aid of Air Time Link cost Metric (ALM) for the purpose of routing at layer 2. The ALM metric is radio aware, measuring the resources consumed by the link between nodes in the network. Although the ALM metric performs efficiently in sparse networks, it degrades in dense networks due to congestion. To overcome this issue, the authors propose a new congestion aware routing metric, RCR (RTS-CTS Re-transmission), which detects the congestion in the network through RTS/CTS handshake mechanism at MAC layer. The RTS and CTS control packets are transmitted by the nodes to handle the hidden terminal problem in-turn avoiding collisions in the network. The RCR metric utilizes the number of re-transmissions of RTS packets to select the path in HWMP protocol. An issue of RCR metric to identify inactive nodes in the network can be overcome by the proposition offered. The performance analysis of the RCR metric is conducted by comparing it with the default routing metric ALM using NS-3.20 network simulator. The analysis shows that RCR achieves significant improvement in throughput and average packet loss rate in reactive mode of HWMP by 13.5 per cent and 10.5 per cent, respectively.

Keywords: *WMN, RTS/CTS Handshake, NS-3*

Implementation of Wireless Sensor Network for Structural Health Monitoring

Mounish P.[1], Praveen B.[2], Navaneeth M.[3], Manoj R.[4], Vimalathithan[5]

[1,2,3,4]U.G. Students, B.E. ECE, Adithya Institute of Technology, Coimbatore
[5]Professor, ECE. Department, Adithya Institute of Technology, Coimbatore

Abstract

The massive development in the field of integrated, low power, CMOS communication device and sensor made network sensor feasible. These devices can be embedded in the physical world completely. It is a small device which works on tiny, event-driven operating system. The goal of our research is to design a wireless sensor network (WSN). Following an exploration of Personal Area Networks, a system was implemented to detect the problems related to outdoor areas, and without cables and power source, this can be implemented where no wiring is possible. WSN is also especially suitable for temporary or problem-solving deployments and to gather numerous and more consistent data. Jointly with the use of Machine-to-Machine (M2M) technologies, by forming a wireless sensor networks using Tmotes to implement in structural health monitoring (SHM). Structural health monitoring is an innovative research for monitoring structural safety, integrity and performance of the building without affecting the structure itself. To monitor Structural Health (SH), accelerometer along with the system is carefully calibrated against tilt. In this research, Tmotes with external sensors, real-time information is measured to monitor SH. Reliable wireless SHM systems are designed which can predict failures in structures through non-destructive diagnosis procedures. This can have substantial social and economic benefits.

Keywords: *WSN, Sensor, Structural monitoring, NesC, TinyOS*

A Novice Approach to a Methodology Using Pixel-level Image Fusion Algorithms for Image-Processing-Based Applications

Anamika Maurya[1], Rajinder Tiwari[2]

[1]M.Tech, Department of Electronics & Communication Engineering, Amity University, Noida

[2]Assistant Professor, Department of Electronics & Communication Engineering, Amity University, Noida

Abstract

Image fusion is important in several respects. It is the process of combining information from multiple images of the same scene, while retaining important features of each image with extended information content. Fusion approaches can improve the quality and increase the application of these data in the field of medical imaging, microscopic imaging, computer vision, remote sensing and robotics. Comparison of these techniques concludes the better approach for its future research. In this paper, an algorithm which is the combination of the existing techniques is proposed. We break our algorithm in simple steps, first we perform the discrete wavelet transformation of the images, then we fused the approximate and detail version together using criteria of alpha factor, follows with the inverse discrete wavelet transformation, alpha is the variable whose value changes and so is the contribution of background and foreground image. The proposed method is also compared with different methods. It is observed that the proposed method preserves more information compared to earlier methods. Two fusion metrics peak signal to noise ratio and entropy are used. All the experiment showed that the proposed algorithm is an enhanced version to fuse image when compared with other existing fusion methods.

Keywords**:** *DWT, Image Fusion, PCA, Pixel level Transform*

Color Marks Removal from Document Images to Improve OCR Accuracy

Shreya Vyas[1], Anup Shah[2], Hetal Patel[3]

[1]Research Scholar, Electronics and Communication Engg. Department, A.D. Patel Institute of Technology, Anand

[2]Owner, Insignex, Anand

[3]Professor, Electronics and Communication Engineering Department, A.D. Patel Institute of Technology, Anand

Abstract

This paper presents the technique to remove the stamp or blue color marks from document images and recover the overlapped characters as preprocessing step to improve OCR accuracy. Given a document image, the background irregularities are eliminated using Sauvola's binarization method [J. Sauvola and M. Pietikainen, 2000]. The region of interest, i.e. the color marks region is detected. The region is segmented into two parts: region having only unwanted marks and region having the characters overlapped by these marks. This is done by estimating a threshold value. This threshold adapts to the value that helps preserve textual information even in varying background illumination conditions. Appropriate values to the segmented regions are assigned. Various research papers for object removal techniques are reviewed and conclusion is presented based on the performance analysis of various algorithms. After extensive experiments, our method demonstrated improved OCR performance, i.e. the correctness ratio is increased from 95.33% to 98.38% and false positive detection error rate is reduced from 4.00% to 1.11% when tested on images having different illumination condition and color marks.

Keywords: *Optical Character Recognition (OCR), Image Inpainting, Binarization*

Distributed Block-based Hysteresis Thresholding Technique for Edge Detection Using Non-uniform Gradient Magnitude Histogram

Jayasree M.[1], N.K. Narayanan[2]

[1]Assistant Professor, Computer Science & Engineering Department, Government Engineering College, Thrissur

[2]Professor, Department of Information Technology, Kannur University, Kannur

Abstract

Since edges in images characterize boundaries, they are of prime importance in image processing. Edge detection preserves important structural properties in an image and filters out useless data, noise and frequencies. Though canny edge detection algorithm exhibits high performance, it is computationally more intensive compared to other edge detection algorithms. A distributed block-based approach to edge detection is presented, which exhibits remarkably high edge detection performance and significantly reduced computational time. The image is partitioned into a number of blocks and the proposed algorithm is applied to each block in parallel. Applying original canny algorithm directly to each block fails since it causes excessive edges in smooth regions where edges need not be marked, and loss of important edges in high detailed regions. To solve this problem, the proposed algorithm adaptively computes edge detection thresholds based on the block type and the local distribution of gradients in the image block. A non-uniform gradient magnitude histogram is used to compute block-based hysteresis thresholds. Since the computational time is now a function of the bock size instead of frame size, the proposed method supports fast edge detection of high-resolution images and videos. Pratt's Figure of Merit quantifies the results of edge detectors. Experimental results proved that the proposed algorithm provides significant improvement over Canny edge detection Technique. The novel distributed edge detection algorithm meets real-time requirements, has very high detection performance and is scalable. The algorithm detected all psycho-visually important edges in the image for various block sizes.

Keywords: *Noise, Edge Detection, Thresholds, Computational Time, Block Size*

Automatic Speech and Face Recognition from Music Video Clips Using SVM

Stephy Joseph[1], Jincy B. Chrystal[2]

[1,2]Research Scholar, Computer Science, Indian Institute of Information Technology and Management Kerala

Abstract

With the rapid evolution of digital media, multimedia content analysis has now become one of the prominent and challenging research areas in the field of Telecommunication and Technology. In this work, multimedia content analysis is performed for the automatic recognition of speech and face from music video clips. Furthermore, various machine learning techniques and algorithms are applied in the proposed work for the efficient retrieval and analysis of multimedia contents. This paper proposes a system that automatically recognizes the speech and face from music video clips using a supervised learning method. The database used for this work consists of a collection of Hindi movie songs stored in MP4 format. The automatic speech recognition process keeps all the training utterances as a reference pattern and performs the recognition using pattern matching. The training data is subjected to feature extraction using perceptual linear predictive approach for creating reference patterns. Meanwhile, the video processing includes tasks such as denoising and filtering which completes the preprocessing stage. After the preprocessing step, the segmentation process is performed to separate a digital image into multiple segments in terms of pixels. Foreground segmentation and background subtraction are the main steps involved in object segmentation from a video sequence which results in the extraction of image features. The learning phase of the system is performed by 'Support Vector Machines', which is one of the most efficient supervised learning algorithms. The reference patterns of speech and extracted image features are used for training the SVM to construct a model for speech and face recognition. For the testing phase, the system is provided with a set of music videos and the system automatically recognizes the speech and face with good accuracy and performance based on the degree of training and learning.

Keywords**:** *Multimedia, Feature Extraction, Pattern Matching, Speech Recognition, Support Vector, Machine*

Study of Cryptographic Properties of Boolean Function for Cryptosystems

Renu Rawal[1], Dheeraj Kumar Sharma[2]

[1]M.Tech Student, Department of Electronics & Communication Engineering, National Institute of Technology Kurukshetra

[2]Assistant Professor, Department of Electronics & Communication Engineering, National Institute of Technology Kurukshetra

Abstract

Cryptography plays an important role in the network environment and wireless applications. Most of the time, the information in wireless and network environment is encrypted by stream ciphers which must resist many kinds of attacks. Boolean functions (BFs) used in symmetric key cryptosystems (block and stream ciphers) required to have various cryptographic properties such as balancedness, nonlinearity, algebraic degree, algebraic immunity, fast algebraic resistance, correlation immunity, resiliency and propagation criteria. These properties of BFs give information about the security of the system and immunity to various kinds of cryptanalytic attack. However, the choice of these properties depends on the applications. It is difficult to construct Boolean function with good values of all properties as there is tradeoff between the properties. A BF is strong cryptographic BF if it has good values of properties to some optimum value. But it is a difficult task to get optimal trade-off among the properties. So, the design of strong cryptographic Boolean functions is a multi-objective problem. In this paper, we analyze the properties of BFs and various bounds on them and tradeoff between the properties.

Keywords: *Boolean Functions, Correlation Immunity, Algebraic Immunity, Nonlinearity, Resiliency, Stream Ciphers*

Efficient Accessing Methods of the Big Data in Cloud Environment: A Review

Vamshi Krishna[1], Dhirendra S. Mishra[2], Shubha Puthran[3]

[1]Research Scholar, Computer Engineering Department, MPSTME, SVKM's NMIMS, Mumbai
[2]Associate Professor, Computer Engineering Department, MPSTME, SVKM's NMIMS, Mumbai
[3]Assistant Professor, Computer Engineering Department, MPSTME, SVKM's NMIMS, Mumbai

Abstract

Big data usually includes datasets with sizes beyond the ability of commonly used software tools to capture, manage, and process data within a tolerable elapsed time. It consists of data both structured and unstructured, in the field of genomics, meteorology, biology, environmental research and many others. It has become difficult to process, manage and analyze patterns using traditional databases and architectures. So, a proper architecture should be understood to gain knowledge about the Big Data. This paper compares various algorithms necessary for handling such large datasets. All approaches are being reviewed based on the time complexity, parallelism and distributed environment. These algorithms define various structures and methods implemented to handle Big Data. Based on the parallel processing and Distributed Environment support, it has been found that MapReduce is the effective algorithm for accessing big data over Cloud environment. This paper also discusses MapReduce Technique for efficient accessing of Large Data, and the selection of Join strategy, Hadoop and Hadoop-A is used for the implementation of MapReduce Technique. In this paper, we suggest an algorithm for the Hadoop Single point of failure at Both Task tracker and Name node problem.

Keywords: *Big Data, MapReduce Technique, Hadoop, Cloud Environment,Hadoop Distributed File System*

SNR-based Master–slave Dynamic Device to Device Communication in Underlay Cellular Networks

Giriraja C.V.[1], T.K. Ramesh[2]

[1]*Assistant Professor, Department of ECE, Amrita Vishwa Vidyapeetham, Bengaluru Campus*
[2]*Associate Professor, Department of ECE, Amrita Vishwa Vidyapeetham, Bengaluru Campus*

Abstract

In cellular networks, Device to Device (D2D) communication is used to improve the resource utilization and the throughput. SNR-based Master–Slave Dynamic D2D Communication Algorithm (SMSDCA) is proposed to improve the resource utilization of the cellular network and improved Quality of Service. It is achieved by allocating some User Equipment (UE) as master in that cluster based on SNR and energy, who communicates with base station and the other UE's by using D2D. Other UE's requesting for data in that cluster are made as slaves. SMSDCA uses dynamic management of clusters and devices. In this, we are handling both static and dynamic users' need. For non-data requests, it allocates the channel as per existence, but for data requests SMSDCA will be used. In this algorithm, D2D channel will be allocated by base station. Energy of the device is computed based on the activities of the user, i.e. calls, duration and number of data packets transferred. The master can be changed dynamically based on SNR, energy and movement of device in cluster limit. By using this, the new users requesting for data and users moving from neighboring clusters are taken care of accordingly. In this paper, MATLAB simulation results show that by using this algorithm, the throughput and number of users served will be increased in comparison with interference aware graph based resource sharing scheme for D2D communication.

Keywords: *Device-to-Device, Master-Slave, Underlay Networks, SNR*

A Novel High Payload Video Steganography with Improved Security

T.V.S. Gowtham Prasad[1], S. Varadarajan[2]

[1]Assistant Professor, Department of ECE, Sree Vidyanikethan Engineering College, Tirupati
[2]Professor, Department of ECE, SVU College of Engineering, S.V. University, Tirupati

Abstract

In recent years, extensive efforts have been placed in the field of data hiding due to far reaching utilization of hacking technology by the intruders to steal the valuable information through the Internet. Many data-hiding methods, including cryptography, watermarking and steganography, have been proposed. Cryptography and watermarking conceal the secret information inside the host media, whereas steganography has its significance in the data hiding since it conceals the very existence of secret information inside the host media (text, image, audio and video). In this paper, a novel approach of video steganography is proposed that improves the payload capacity without compromising the quality of the Stego file and the security of the hidden information. An uncompressed video sequence is considered as cover data, and set of images and text is used as secret information. In the proposed method, a lossless compression is used for text and lossy compression is used for image to reduce the data size before crypting the secret data. The cipher text so obtained is embedded into selected frames of the video sequence using optimal LSB polynomial expression. Further, the amount of payload embeds into cover video. The performance of the proposed method and the quality of Stego video is tested using objective quality metrics for image and text data at multiple payload capacities.

Keywords: *Optimal LSB, Lossy and Lossless Compression, AES System, video steganography*

Educational Cloud Computing with Data Mining (EC^{2}DM)

Amanpreet Kaur Sara[1], Archana Singh[2]

[1]Department of Computer Science, Amity School of Engineering and Technology, Noida
[2]Associate Professor, Department of Information Technology, Amity School of Engineering and Technology, Noida

Abstract

Primary objective of the paper is to outline a framework supporting effective data mining of cloud-based applications, storage and data in e-learning environment. E-learning can be brought to the next level with the help of cloud computing and data mining. Introduction of new point of view on trends of cloud computing and data mining in learning and teaching paradigm will make it beneficial and more cost-effective. Cloud computing and data mining are both promising technologies of e-learning and can also provide a base for researchers. With the help of cloud computing, we can share the resources like software, storages, applications and many other materials which ultimately reduces the cost of infrastructure. Cloud and data mining learning are continuously attracting the various universities and institutions to adopt it over traditional learning system. Alongside quick advancement of IT, e-learning altogether enhanced from numerous points of view in various dimensions. The advancement of technology includes learning and organizations need to assume the liability for creating and dealing with the IT framework to help e-learning. The cloud computing can enhance the nature of web and learning, and altogether decrease the expense of IT foundation improvement and support. We can access information anywhere at any time with the help of new technologies like Internet, cloud and data mining. EC^{2}DM (educational cloud computing with data mining) has a great potential to enhance the strength of e-learning and education. Support reducing the total cost to ownership on infrastructure overall. Use of cloud computing and data mining are at early stages in the area of education there is a lot more work that has to be done. Education industry can use benefits of these two advance technologies and give fruitful results to the society. Researchers can also contribute in the development of our country by using EC^{2}DM.

Keywords: *Cloud Computing, E-learning, Data Mining, Educational Data Mining*

A Fraud Detection Tool—Data Mining

Bhavya[1], Pooja Mittal[2]

[1]Research Scholar, DCSA, Maharishi Dayanand University, Rohtak
[2]Professor, DCSA, Maharishi Dayanand University, Rohtak

Abstract

Data mining has been expanding as one of the chief features of numerous security activities. It is frequently utilized as method for identification of frauds, accessing risk as well. Data mining strategies has increased in fighting Credit Card extortion due to its effectiveness in artificial intelligence procedures and calculations that can be actualized to identify or foresee misrepresentation through knowledge discovery from unordinary examples got from accumulated information. Fraud detection includes observing the conduct of client with a specific end goal to gauge, identify or stay away from undesirable conduct in peculiarity. Recent decades have seen a huge development in the utilization of credit cards as a value-based medium as they offer a number of secondary benefits unavailable from cash; likewise, credits cards are more secure from robbery than is money. Nowadays, credit cards turn into the most overall mode of installment for online purchases, and frauds related with it are likewise quickening. Therefore, there should be guarantee of security for credit card owners. Data mining is used to battle cheats because of its proficiency in finding or perceiving irregular examples in gathered dataset. Neural network, an information digging procedure was utilized for this study. The outline of neural system structural engineering for credit card extortion discovery was taking into account unsupervised strategy, which was connected to the exchanges information to create four clusters of low, high, risky and very risky clusters. To see how credit card frauds (CCF) are committed, firstly one has to study distinctive sort of fraud techniques through which fraudsters bring out credit card fraud. This paper is about different methods of data mining included in credit card fraud detection.

Keywords: *Data Mining, Neural Network, Credit Card Fraud*

High Density Compression of Medical Diagnostic Information for Telemedicine Communication

T. Somasoundaram[1], N. P. Subramaniam[2]

[1]Research Scholar, Dept of Electronics and Communication Engineering, Sathyabama University, Chennai,
[2]Assistant Professor, Dept of EEE, Pondicherry Engineering College, Puducherry

Abstract

Communication of information with minimal bandwidth is a big challenge for today's researchers. Either bandwidth or information needs to be sacrificed in order to communicate the entire information at minimal cost. Compressing the information prior to communication will help to communicate the entire information with minimal bandwidth. This paper concentrates on compressing the multimedia information prior to communication using Multi wavelet transform and Hybrid SPECK-deflate algorithm. An example of medical diagnostic information such as angiogram DICOM images from the standard test dataset GRUSELAMBIX has been taken to prove the efficiency of the algorithm. First, the angiogram DICOM file is converted into frames to apply 2D Bi-orthogonal Multiwavelet transform and the resulting coefficients are encoded using the SPECK encoder and then the encoded output is compressed using deflate algorithm. The motion estimation and compensation cannot be performed while encoding the medical videos since it may distract the original diagnostic information. The compression algorithm is tested with coronary angiogram DICOM file. The qualitative performance of this algorithm is evaluated by using compression ratio, peak signal to noise ratio, mean square error, structural similarity index model and universal image quality index. Subjective quality is also studied by obtaining the mean opinion score through the questionnaire from the experts. The proposed algorithm revealed a better compression ratio than the traditional compression algorithm and also achieves better mean opinion score from the experts.

Keywords: *Compression, Multimedia Processing, Telemedicine*

An Emotion-based Music Player

Dharmarao Priyanka[1], Kshirsagar Sneha[2], Lashkare Shilpa[3], Gyankamal J. Chhajed[4], Priyanka Madane[5]

[1,2,3]B.E. Student, Department of Computer Engineering, VPCOE, Baramati
[4,5]Assistant Professor, Computer Department, VPCOE, Baramati

Abstract

In the fast growing competitive world, everyone is busy and they expect everything to be automated and as per their current emotions. The study shows that as a person is loaded with lots of responsibilities, it is frequent that they undergo through the stressed situations. It has been proved by science that music plays a vital role to change the state of mind. To play music, it is required to have human interaction with the system to select playlist relevant to current mood which may be sometimes avoided because of tiredness. So, here we are proposing a project which will automatically capture the real-time image and detect the emotion of the user and play the relevant music for them. Music players for personal computers are featured with music visualization and are not enough intelligent to determine facial expressions to interpret the human emotion(s). This system is "An Emotion-Based Music Player" which synchronizes real-time images with music based on the emotion(s) of human being. This system contains mainly three steps. First step deals with the face detection from set of image and labeling them as per the emotions which is implemented using EMGU CV class of OPEN CV and it will be considered as a training dataset. In second step, features are extracted and KNN is applied to form cluster of images belonging to different emotions using PCA algorithm. Last step is to connect relevant play list to various classified expression. During testing, real-time images are captured and relevant playlist is played as per the classified emotion.

Keywords: *PCA, EMGU CV, KNN, Face Detection, Emotion Classification, Expression Detection*

Digital Image Watermarking for Protecting Rightful Ownership and Resolving False Positiveness Through the Use of Singular Value Decomposition

Samreet Kaur[1], Sarabjit Kaur[2]

[1]Research Scholar, MTech (Computer Science and Engineering),CTITR, Maqsudan, Jalandhar
[2]Professor, Computer Science and Engineering, CTITR, Maqsudan, Jalandhar

Abstract

Digital Image Watermarking hides information in the original image without affecting much quality of the image. Copyright protection or rightful ownership is the main purpose of performing digital image watermarking. Many watermarking techniques mainly focus on the robustness of image which simply means to improve imperceptibility. But resolving the rightful ownership is the main issue which can be solved by the singular value decomposition technique. For resolving the false positive problem that mainly occurred in many watermarking techniques, the principle components of watermark are embedded into singular values of the host image which gives positive results in the given method. The quality of the image is measured by using the acceptable values of various performance metrics. The results have proved that the quality of the image depends upon the quantity of principle components or scaling factor used for embedding. The experimental work concluded that the rightful ownership and the false positive problem can be resolved and invisibility of the watermark can be maintained by using small values of scaling factor.

Keywords: *Rightful Ownership, False Positive Problem, SVD, PSNR, MSE, BER*

Functional Architectural Design of Negotiation Service Component in NGN ITU Architecture

Priya R.L.[1], Nupur Giri[2]

[1]Assistant Professor, Department of Computer Engineering, VES Institute of Technology, Mumbai
[2]Professor, Department of Computer Engineering, VES Institute of Technology, Mumbai

Abstract

The paper presents a service model for defining new negotiation service component for service stratum of NGN architecture defined by ITU standardization. This component along with service stratum, transport stratum and management functions are used to increase the performance in terms of better utilization of resources and guaranteed end-to-end Quality of Service (QoS) to the user. The work proposes the design of inter-domain and intra-domain interfaces required to interact among the components of Negotiation Service model in service stratum, FCAPS functionalities and transport stratum. Further, the aspect of performance monitoring to define the work flow of Negotiation service model in NGN ITU architecture for proving service guarantee is also discussed.

Keywords: *Negotiation Service, Transport Stratum, Service Stratum, NGN Management Functions, Service Provider*

Modeling Atmospheric Fading of Free Space Optical (FSO) Link and Experimental Demonstration of Multiple Input Multiple Output (MIMO) Link

Lt Col J.S. Randhawa[1], Maj. Uppanjeet Singh[2], Devi Chadha[3], Vinod Chandra[4]

[1,2]M.Tech Students, Electrical Engineering Department, Indian Institute of Technology Delhi
[3,4]Professor, Electrical Engineering Department & Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

Abstract

Free Space Optical (FSO) communication has recently come into the limelight because of its high bandwidth and other inherent advantages. It has a role in the future 5G small cells in outdoor access and indoor systems. The major problem with FSO links is due to atmospheric turbulence, which leads to fading in the signal. Turbulence can be mitigated by using FEC coding, antenna averaging multi-hop techniques or by using diversity schemes like MIMO for required link performance. It is important to model the atmospheric channel at 1,550 nm to quantify the fading caused by the atmosphere to design an FSO link with high performance. In the present paper, in order to model the atmospheric fading, we have induced fading in the output optical signal at the receiver by transmitting a modulated optical signal through the free space. The fading is induced by using a set of variable speed fan choppers. These choppers with various speeds have been used to model the fading produced by the atmospheric channel having different sets of scintillation effect on the received signal. The fading effect of atmosphere on FSO channel is, thus, simulated in a direct SISO link. This fading effect was ascertained by measuring parameters like BER and scintillation index of the received signal. To reduce the fading in the FSO system, MIMO diversity scheme is used and an experimental set-up was established in laboratory with two laser transmitters and two photo-detector receivers, establishing two uncorrelated diverse links. The chopper-induced fading is introduced in either of the two links of the MIMO system by placing the chopper in the beam path. Observations while studying fading effect are as follows: (a) For given data rate, the measured Q factor increases and scintillation index decreases as the fan chopper speed is increased, indicating that chopper gives higher fading at lower speeds and low fading at higher speeds; (b) MIMO performance was better than SISO in the presence of simulated fading effect. The obtained experimental results substantiate the intrinsic advantages of the diversity over SISO free-space optical link to achieve better link performance in terms of BER.

Keywords: *FSO, SISO, MIMO, Fading, BER, Scintillation Index*

Cellular Cognitive Radio—A Game Theoretic View

Priyanka Sharma[1], Garimella Rammurthy[2]

[1]MS (by Research), SPCRC, IIIT Hyderabad
[2]Associate Professor, SPCRC, IIIT Hyderabad

Abstract

Increase in consumer demands has drastically changed the scenario of telecommunication market. The limited availability of spectrum poses a problem for the regulatory bodies, network providers and consumers. The paper studies a shared deployment of Cognitive Radio among Mobile Network Operators (MNOs) as a solution to the Spectrum Crunch problem. Further, the paper utilizes game theory to provide insights on the strategic decision-making of MNOs concerning joint or independent investment in deployment of Cognitive Radio. An algorithm is proposed to obtain Nash equilibrium for the formulated game. The results help in quick and efficient analysis of different market structures.

Keywords: *Coalition Formation, Spillovers, MNOs, Joint Investment, Cognitive Radio*

Identification and Ranking of NFR for Telecommunication Systems

Harsimran Kaur[1], Ashish Sharma[2]

[1]Research Scholar, CSE, GLA University Mathura
[2]Professor, CSE, GLA University, Mathura

Abstract

Non-functional requirements (NFRs; like maintainability, performance, portability, etc.) are of utmost importance to improve the quality of system development for the telecommunication domain. The paper surveys the various identification techniques of non-functional requirement, discusses the problems with current and proposes the use of ISM (Interpretive Structure Model) technique for ranking the identified NFRs. We used four-layered approach [1] to NFR analysis by considering multiple views to meet all stakeholder expectations. It retrieved goals, sub-goals and finally identified non-functional requirements on the basis of the list of NFRs identified by Mairzia [7]. Some rules and validation criterion have been identified from literature to validate the identified requirements. The ranking of NFR while developing telecommunication system will ensure that the most critical non-functional requirements are addressed immediately in case of limited resources.

Keywords: *Non-functional Requirements (NFR), Identification, Classification, Ranking, ISM*

PAPR Reduction in SC-FDMA System Using NCT Technique

Deepak Palsania[1], Neetu Sood[2]

[1] M.Tech, Electronics and Communication, Dr. B.R. Ambedkar National Institute of Technology Jalandhar
[2]Professor, Electronics and Communication, Dr. B.R. Ambedkar National Institute of Technology Jalandhar

Abstract

Single carrier frequency division multiple access (SC-FDMA), a modified form of Orthogonal FDMA utilizes single carrier modulation and frequency domain equalization. Orthogonal Frequency Division Multiplexing (OFDM) technology is the best available option for supporting high data rate in both wired and wireless system, but a major drawback of OFDM is high peak-to-average power ratio. An advantage of SC-FDMA is its lower PAPR due to its single carrier structure. In this paper, we analyze the PAPR of SC-FDMA signal using nonlinear Companding Transform (NCT) technique for further reduction. It transforms the SC-FDMA signal by introducing the variable companding parameters in the companding function. The result shows better performance of the proposed work as compared to competitive alternatives.

Keywords: *Orthogonal Frequency Division Multiplexing (OFDM), Single Carrier Frequency Division Multiple Access (SC-FDMA), Nonlinear Companding Transform (NCT), Peak-to-average Power Ratio (PAPR)*

Compact Pentagonal Planar Slot Antenna for WLAN/WiMAX Applications

Rama Sanjeeva Reddy B.[1], D. Vakula[2]

[1]Research Scholar, Department of ECE, National Institute of Technology Warangal
[2]Assistant Professor, Department of ECE, National Institute of Technology Warangal

Abstract

A novel probe feed pentagon slot shaped planar antenna is designed and proposed supporting wireless local area network (WLAN) and worldwide interoperability for microwave access (WiMAX) applications simultaneously. Structure comprises of pentagon-shaped radiating element along with scaled down slot cut on the center of patch, having overall compact size of 40 × 40mm^2. The conventional pentagon patch resonates at 3.5GHz and the modified slot based structure resonates at tri bands of 2.4/3.5/5.2GHz. Effective comparison of antenna with and without pentagon slot is performed to obtain better impedance bandwidth and acceptable gain at operating frequencies. The simulated results exhibit that the designed antenna operates over triple frequency ranges, fulfilling the standards of WiMAX and WLAN. Gain values obtained are 5.6, 3.2, 2.04dB, respectively, over respective tri bands. In addition, acceptable radiation characteristics are obtained over the operating bands.

Keywords: *Pentagonal Planar Antenna, Slot Antenna, Tri Bands, Gain, Impedance Bandwidth*

Performance Evolution of SC-FDMA for Uplink Communication System

Sudhir B. Lande[1], Jyoti D. Gawali[2], B. D. Tale[3]

[1,3]Associate Professor, E & EC Department, KITS, Ramtek
[2]M.Tech. Electronics, E & EC Department, KITS, Ramtek

Abstract

Demand for high speed communication increases day-by-day. To fulfill this demand, 3rd Generation Partnership Project-Long Term Evolution (3GPP-LTE) system is more efficient system for the next generation communication system. OFDMA and SC-FDMA are key technologies in LTE system for downlink and uplink wireless communication system, respectively. The main aim of this work is to investigate the performance of Single Carrier Frequency Division Multiple Access (SC-FDMA) in uplink communication system. Recently, Orthogonal Frequency Division Multiple Access (OFDMA) has been implemented for uplink and downlink communication system. But OFDMA suffers from high Peak-to-Average-Power Ratio (PAPR) for uplink. In this paper, we implement SC-FDMA system in LTE system with advancement so that speed of communication increases with decrease in error correction. Here, pilots are inserted instead of subcarrier mapping which requires mapping of every bit in symbol transmitted symbol. Hence, in this paper, we compared the performance of both OFDMA and SC-FDMA system in uplink communication system by comparing PAPR. Performance of SC-FDMA system is evaluated in different modulation schemes such as BPSK, QPSK, 16-QAM and 64-QAM to measure the PAPR. Then, the performance of both systems compared in terms of Bit Error Rate and Power Spectral Density.

Keywords: *SC-FDMA, OFDMA, SUI Channel*

Evolution of Smart Grid ICT—Management and Consumption

Sarika Varma[1], Vineeta Khemchandani[2]

[1]Research Scholar, UP Techinical University, Lucknow
[2]Assistant Professor, JSS College, Noida

Abstract

The transformation of electrical grids into smart grids, facilitating production, controlling of appliances from remote locations, energy storage and its exchange, and most importantly optimizations involving the maintenance as well as consumption of energy, have remarkably transformed the already intricate system of Information & Communication Technology (ICT). As it became a global phenomenon, many organizations throughout the globe initiated the prior activities of standardization having an aim of stimulating an integrated as well as mutually operated smart grid, which led to the rise of a huge amount of inconsistent architectures as well as standards. Some contemporary activities have come up to the front for the standardization, which aims to systematize the existent standards, thereby bringing forth the best practices for choosing the fair and accurate modes being executed in the designs involving smart grid. This paper adopts the directions derived from the approaches of NIST as well as ETSI/CEN/CENELEC, while making an effort to facilitate the systematization of current solutions. In this effort, the paper discusses the contribution reviews of ICT and relates its present state-of-the-art situation, along with the goal of forecasting the future trends in that area, and that would specifically be based upon the orientation involving current efforts applied amongst their relationships. This paper also involves a discussion about the various architectural standards applicable in differing conditions, such as ETSI (M2M), DLMA/COSEM, Open Smart Grid Protocol, apart from a detail discussion about Design Standards, such as CIM as well as Smart Energy Profile 2.0. The resulting systematization provides the guidelines for future researches of these architectures, additionally highlighting the ways these standards of smart grids converge towards common solutions for improving the interoperability of ICT infrastructure. The creation of described meta-architectures for this paper was done keeping in mind the creation of the path of harmonization relating the interoperability of protocols as well as architectures. Additionally, some approaches have been postulated for convergence when there are overlapping functionalities, and interconnect while targeting various use cases or/and scenarios.

Keywords: *Smart Grid, ICT*

Cooperative Free Space Optical Communication with DPSK Modulation over Atmospheric Turbulence and Pointing Errors

Vineeta Dubey [1], D. Chadha[2], Vinod Chandra[3]

[1]Research Scholar, Bharti School of Telecommunication Technology and Management, Indian Institute of Technology Delhi

[2,3]Professor, Bharti School of Telecom Technology and Management & Department of Electrical Engineering, Indian Institute of Technology Delhi

Abstract

In this paper, we analyse Differential Phase Shift Keying (DPSK) modulation scheme for single relay decode and forward cooperative free space optical (FSO) communication systems over atmospheric turbulence and pointing error (PE). DPSK has been considered as an advanced modulation format in the present optical communication systems because it attains 3 dB sensitivity benefit over on–off keying (OOK) and reduced peak power which mitigates the nonlinear effects. BER analysis has been done for single relay cooperative FSO communication system for Gamma–Gamma distribution channel model and taking into account the PE. The analysis has been done for symmetrical channel environment, in which all the links are facing the same turbulence and asymmetrical channel model in which direct link is facing slightly lower turbulence as compared to the FSO links associated with relay node. The system performance deteriorates when the effect of PE due to misalignment occurs in the system. This deterioration in system performance can be reduced by using different diversity combining techniques in the cooperative FSO communication system. Different diversity combining techniques such as Selection Combining (SC), Equal Gain Combining (EGC) and Maximal Ratio Combining (MRC) have been tested with cooperative FSO communication system using MATLAB® event-driven simulation. BER analysis shows that system performance can be improved by 22dB, 23dB and 24dB for BER of 10^{-3} with the use of SC, EGC and MRC, respectively, in the symmetrical channel environment with PE. For asymmetrical channel environment with PE, the system is improved by 18dB, 19dB and 20dB for BER of 10^{-3} with the use of SC, EGC and MRC, respectively. Hence, we can conclude that cooperative communication can be used as an efficient technique to reduce the effect of PE.

Keywords: *FSO, Cooperative Communication, Diversity Techniques, DPSK, Pointing Errors*

Design and Analysis of a Circular Etched Fractal Antenna for LTE, WiMax and UWB applications

Vinoth Kumar K.[1], Asokan V.[2], Indu Nair V.[3], Karthikeyan R.[4]

[1,2]PG student, Communication Systems, Kumaraguru College of Technology, Coimbatore
[3,4]Assistant Professor, Electronics and Communication Engineering, Kumaraguru College of Technology, Coimbatore

Abstract

In this paper, a low-profile compact CPW-fed fractal patch antenna is proposed for LTE, WiMax and UWB applications. Slotted circular shape is iterated using fractal geometry that exhibits a wider bandwidth and reduced return loss. Bandwidth is extended using ground plate modifications and outer circular radius tuning techniques. The low cost dielectric material FR4 (ϵ = 4.4) is used as substrate. The proposed antenna is simulated in FEM method using Ansoft HFSS v.13. The overall size of the miniaturized antenna is 30*32.4*1.6mm^3 with the operating frequency band from 1.6–10.4 GHz. Bandwidth is 8.8 GHz, measured from –10dB and VSWR = 2. The input impedance is 50Ω and it exhibits the Omni directional pattern. Finally, it is found to be suitable for mobile phone applications.

Keywords: *Fractal, UWB, LTE, WiMax*

Time Domain Sparse Channel Estimation for OFDM System Using Adaptive Sparse Sensing Based on Reweighted Zero Attracting Normalize Least Mean Forth algorithm

Arun Kumar[1], Neetu Sood[2]

[1] *Research Scholar, Department of Electronics and Communication Engineering, Dr. B.R. Ambedkar National Institute of Technology Jalandhar*

[2] *Professor, Department of Electronics and Communication Engineering, Dr. B.R. Ambedkar National Institute of Technology Jalandhar*

Abstract

This paper shows that the performance of Orthogonal Frequency Division Multiplexing (OFDM) system over a frequency selective multipath fading environment can be improved if Channel Impulse Response (CIR) is correctly estimated. Mostly researchers are using Non-linear Sparse Sensing (NSS) technique using different algorithms like Basis Pursuit De-noise (BPDN), Orthogonal Matching Pursuit (OMP) for pilot added sparse channel estimation. In this paper, we propose Adaptive Sparse Sensing (ASS) based on Reweighted Zero Attracting Normalize Least Mean Fourth (RZA-NLMF) algorithm to estimate pilot added sparse channel coefficients. Simulation results show that the accuracy to estimate the channel coefficient as well as noise performance has improved over BPDN based NSS method.

Keywords: *Non-linear Sparse Sensing (NSS), Adaptive Sparse Sensing (ASS), Basis Pursuit De-nose (BPDN), Reweighted Zero Attracting Normalized Least Mean Forth (RZA-NLMF)*

Threshold Adaptation Using Non-linear Optimization for Transmission Rate Enhancement in Cognitive Radio

Ajay Kumar Singh[1], Rajoo Pandey[2]

[1]M.Tech, Electronics and Communication Engineering, National Institute of Technology Kurukshetra

[2]Professor, Electronics and Communication Engineering, National Institute of Technology Kurukshetra

Abstract

In this paper, the adaptation of threshold for energy-based spectrum sensing in cognitive radio is studied using non-linear optimization. In conventional energy-detection method, fixed energy threshold is used for spectrum sensing, which does not work properly in those areas where noise variance is large. In practical cases, the Signal to Interference plus Noise Ratio (SINR) experienced at secondary user receiver changes in each slot of a time-slotted system. This variation in SINR occurs due to the time-varying nature of primary user activities and wireless channels. Instead of using fixed threshold, an adaptive threshold has been proposed in the literature that varies according to the SINR to maximize the average rate of secondary user while keeping the average probability of missed detection within predefined level. However, to maximize the average rate of secondary user, the threshold is considered as a linear increasing function of SINR in the optimization process. In this paper, we propose to use a non-linear increasing function to formulate the threshold in terms of SINR. The simulation results on MATLAB show that average rate of secondary user can be improved using the proposed non-linear optimization policy function for dynamic threshold adjustment in comparison to the previously used linear optimization policy function.

Keywords: *Cognitive Radio (CR), Energy Detection, Spectrum Sensing and Threshold Adaptation*

Comparative Analysis of Different Wavelet-based Image Fusion Methods Using Nonlinear IHS Transform

Mahesh P. Chakkarwar[1], Anil V. Deorankar[2], Prakash Chandore[3]

[1]M.Tech. Scholar,Computer Science & Engineering, Government College of Engineering, Amravati
[2]Head of Department, Information Technology, Government College of Engineering, Amravati
[3]Assistant Professor, Computer Science & Engineering, Government College of Engineering, Amravati

Abstract

Traditional remote sensing images were not having high spatial resolution and high spectral resolution. Image fusion is a method of synthesizing images with high spectral as well as high spatial resolution from images generated by different sensors of satellites such Panchromatic (PAN) which have spatially high resolution and Multispectral (MS) which have high spectral resolution. Basically image fusion is nothing but interpreting spatially high panchromatic images by introducing spectral information into it. Direct intensity substitution in the MS image leads to color distortion when there is large intensity difference between MS and PAN images. Wavelet-based image fusion allows introducing spatial information from PAN image to MS image rather than direct intensity substitution. In this paper, image fusion methods based on orthogonal and non-orthogonal wavelet decomposition using substitutive and additive methods are compared. Due to the decimated process applied during wavelet decomposition, using Mallat's wavelet decomposition leads to loss of linear continuity in the diagonal features of the image.

Due to the un-decimated process of wavelet decomposition, a trous algorithm preserves the spatial information, while due to the redundant nature of a trous algorithm, image fusion shows lower spectral coefficient as that of fusion using Mallat's decomposition. Substitutive image fusion method gives good results by minimizing Root Mean Square Error (RMSE) and maximizing Correlation Coefficient (CC) by maintaining optimal spatial coefficient.

Keywords: *Image Fusion, Wavelet, DWT*

Genetic Algorithm Optimization Tool for Channel Estimation and Symbol Detection in MIMO–OFDM Systems

Apoorva S. Agrawal[1], Shrikant Chamlate[2]

[1]M.Tech Electronics, E & EC Department, KITS, Ramtek
[2]Assistant Professor, E & EC Department, KITS, Ramtek

Abstract

The quality of wireless media is described by three parameters. These parameters are its transmission range, transmission rate and reliability. In the conventional OFDM systems, one parameter can be increased on the cost of decreasing other two parameters. However, by combining MIMO with OFDM systems, all the three parameters can be improved simultaneously. Symbol decoding and channel estimation are the two essential tasks of MIMO–OFDM system. We are using NLMS algorithm to accomplish these tasks. These tasks can also be excellently achieved by various other algorithms such as maximum likelihood (ML) detector, LMS, RLS, etc. All these algorithms face a common problem of robustness. Also, the complexity of these algorithms is very high in the system with a large number of transmitters and receivers and having large constellation size. These algorithms don't even provide the optimal solution. Genetic algorithm has the advantages of significantly less computational complexity, greater robustness and is closer to the optimal solution. In this paper, we are designing a genetic algorithm-based optimization tool for symbol detection in MIMO–OFDM systems to reduce computational complexity and raise the robustness of the system.

Keywords: *Genetic Algorithm (GA), MIMO–OFDM systems, symbol detection, channel estimation*

Performance Analysis of 2.5 Gb/s FSO System under Different Weather Conditions for Various Advanced Modulation Formats

Aneet Kaur[1], Anu Sheetal[2]

[1]M.Tech Student, Department of Electronics and Communication Engineering, Guru Nanak Dev University, Regional Campus, Gurdaspur

[2]Assistant Professor & Incharge, Department of Electronics and Communication Engineering, Guru Nanak Dev University, Regional campus, Gurdaspur

Abstract

Selection of modulation format is one of the major problems for the transmission of data at very high speed. In this paper, we evaluate the performance of 2.5Gb/s free space optic (FSO) system using different modulation formats like Carrier-Suppressed Return-to-Zero (CSRZ), Non-return-to-zero (NRZ), Return-to-zero (RZ), Duo-binary, Quadrature phase-shift keying (QPSK), Differential phase-shift keying (DPSK) under different weather conditions like clear sky, fog, snow, haze and rain by using various values of power. Evaluation is performed in terms of bit error rate (BER), quality factor, eye height and range covered by the system for different weather conditions. Results show that by increasing range, quality factor decreases and BER and eye height increases. Further simulation results showed that RZ and duo-binary perform best under different weather conditions, followed by CSRZ, DPSK and NRZ. Finally, QPSK gives the worst performance among all modulation formats. Duo-binary format in FSO is suited for distance between 1m to 2,000m and gives the best results for 0.1mW power with quality factor of 79.17 with zero bit error rate and with eye height of 0.000217643 at 1m distance, and as the distance increases, the quality factor decreases. RZ format in FSO is very well suited for the data transmission in between 1m to 9,000m for 5mW power, giving quality factor 1,160.92 at 1m with zero bit error rate and with 0.0102434 value of eye height, BER and eye height increases as distance increases for both values of power. QPSK gives very poor value of quality factor such as 2.31485 at 1m distance. So, overall RZ gives the best performance for long distances and as well as at high values of power, whereas Duo-binary gives the best performance at very low values of power and QPSK gives the worst performance under all conditions.

Keywords: *Attenuation, Q-Factor, MZM, BER, NRZ, RZ, CSRZ, DPSK, QPSK, Duo-binary*

On the Performance Analysis of Combined (Time Shared) Composite Multipath/Shadowing (Weibull-Log Normal) and Unshadowing Fading Channels

Rupender Singh[1], Sanjay Kumar Soni[2]

[1] M.Tech. Scholar, Department of Electronics & Communication Engineering, Delhi Technological University, New Delhi

[2] Associate Professor, Department of Electronics & Communication Engineering, Delhi Technological University, New Delhi

Abstract

Composite (time shared) composite multipath/shadowing and unshadowing fading environments are frequently encountered in different mobile realistic scenarios. These channels are generally modeled as a time shared sum of Rician multipath fading (unshadowing) and different composite multipath/shadowing fading. In this paper, we present the performance analysis of combined (time shared) composite (Weibull-Lognormal shadowed) fading and Unshadowed fading. We adopt efficient tool proposed by Holtzman to approximate composite (Weibull-Lognormal shadowed) fading. The performance measures of fading communication systems such as Probability density function (PDF) of Signal to Noise ratio (SNR), Amount of fading (AF), Outage probability (*P*out) and Channel Capacity (C/B) will be calculated. Graphical results will be presented for different signals and fading parameters. The different expressions have been provided in closed form and are of great importance in assessing the performance of communication systems in composite channels.

Keywords: *Composite (Time Shared) Composite Multipath/Shadowing, Weibull-Lognormal Shadowed (WL, Probability Density Function (PDF), Signal to Noise Ratio (SNR), Amount of Fading (AF), Outage Probability (Pout) and Channel Capacity(C/B)*

Image Compression Using Compressed Sensing with Random-convolution Principle and Adaptive Binary Optimization

Pankaj Boldara[1], Yogesh Dandawate[2]

[1]Research Scholar, Department of Electronics & Telecommunication Engineering,
[2]Professor, Department of Electronics & Telecommunication Engineering
[1,2] Vishwakarma Institute of Information Technology, Savitribai Phule Pune University

Abstract

Compressed Sensing (CS) is a mathematical theory of measuring and keeping the vital part of the signal during acquisition, at the cost increasing further reconstruction procedure. With quantized measurement, it provides robust reconstruction. In this paper, we propose sensing and reconstruction approach compiling with the high dimensionality of signal or image data and providing reconstructions with acceptable visual quality. The encoding describes data sensing which follows principles of physics. Random convolutions are performed optically in series cascaded by sampling and binary thresholding. According to predefined functions, we can either measure or ignore the binary samples obtained. Encoding yields binary measurements established on random-convolution principles. More than a few binary forms of a grayscale image can be captured by an extended process devised by us. Where each of these sensed forms will correspond to one convolution which is distinct and is performed by an optical system. To achieve higher compression at the output of encoder, we propose Adaptive Binary Optimization (ABO), by method of Repetition and Correlation Coding (RCC) which is feature rich technology and delivers high data compression rates and security. ABO generates byte and bit matrix which exploits the correlation and transforms the data. Finally, using bound-optimization principles, we get iteratively reweighted least-squares (IRLS) which is fast reconstruction algorithm which converges in lesser iterations and is easily parameterized. This proposed technique achieves average compression ratio 5.3433 at output of encoder and also illustrates that method reconstructs images with reasonable quality having average PSNR 22.021 at 0.25 bits per pixel (bpp) with 16 iterations, as we increase the iterations the PSNR also increases but not linearly rather logarithmically with bpp constant.

Keywords: *Compressive Sensing, Random-convolution, Adaptive Binary Optimization, Bound Optimization, Iteratively Reweighted Least Squares (IRLS)*

Bio-inspired Heuristic Algorithm to Reduce Call Blocking Probability in Hybrid Channel Allocation of Cellular Network

Sharada Narsingrao Ohatkar[1], Dattatraya S. Bormane[2]

[1]Research Scholar, Department of Electronics, RSCOE, Savitribai Phule Pune University, Pune
[2]Professor, Department of Electronics, RSCOE, Savitribai Phule Pune University, Pune

Abstract

For increasing the growth of cellular communication services, scare spectrum is efficiently used with reusing channels to achieve cost of service. Channel allocation techniques are employed for reduction of call blocking probability. However, today's traffic demands are non-uniform and strangely changes according to the timing in day. Minimizing call blocking probability (CBP) may raise the interferences, which may increase call dropping probability. The role of channel allocation technique is to allocate channels to cells in such a way as to minimize CBP also call dropping probability. In this work, a Hybrid Channel Allocation technique based on bio-inspired Genetic Algorithm (GA) and Particle Swarm Optimization (PSO) are proposed. In proposed GA and PSO methods, CBP is calculated for Non-Uniform Traffic demand considering co channel constraint. Results show reduction in CBP as compared to reported literature, where GA is applied for a 49 cell benchmark problem. Comparing the proposed methods shows reduction in CBP and the computation time required is also found to be less with PSO than GA. Graph theory based fitness function is designed. In GA, use of integer genetic representation for crossover and mutation operation is done. In PSO, the velocity and position of particle is updated with the help of previous values (memory) which directs search and speeds up with minimum fitness value for optimum solution.

Keywords: *Evolutionary Optimization, Genetic Algorithm, Particle Swarm Optimization, Hybrid Channel Assignment, Call Blocking Probability, Graph Theory*

Heuristic Algorithms for Routing and Wavelength Assignment (RWA) Planning Algorithms in Optical WDM Networks

Amit Bisaria[1], Virendra Singh Shekhawat[2], V. K. Chaubey[3]

[1]Masters Student, Department of Electrical & Electronics Engineering, BITS, Pilani
[2]Assistant Professor, Department of Computer Science & Information Systems, BITS, Pilani
[3]Professor, Department of Electrical & Electronics Engineering, BITS, Pilani

Abstract

In this paper, static and dynamic planning algorithms have been proposed for Routing and Wavelength Assignment (RWA) problem in optical WDM networks. Integer Linear Programs (ILP) based formulation of RWA Planning algorithm gives optimal solution; however, its poor run time complexity limits its acceptability. The performance of such algorithms can be improved by incorporating appropriate heuristic algorithms. In this work, we have simulated and analyzed the relative performances of the four static planning RWA heuristics algorithms named as Hop based Routing-considering Requests in Descending order of Traffic demand (HR-RDT), Degree based Routing-considering Requests in Descending order of Traffic demand (DR-RDT), Hop based Routing-considering Requests in Descending order of Hop count (HR-RDH) and Hop based Routing-considering Requests in Ascending order of Hop count (HR-RAH). All algorithms have been implemented in a MATLAB based simulation tool for WDM networks named MatPlanWDM. Least cost routing algorithm has been used in all algorithms and link cost defined in terms of degree of the node and/or hop. The simulation results reveal that HR-RAH algorithm outperforms in terms of traffic loss behavior, average number of wavelengths used per light-path and average traffic routed by a link. The DR-RDT algorithm performed better in terms of traffic distribution as compared to hop based routing algorithms. Dynamic Planning Algorithm has been explored for path-based RWA algorithms. The best path selection has been made based on the better wavelength availability on a path. Three heuristics have been analyzed to examine better wavelength availability among a set of shortest paths. These heuristic algorithms differ in terms of book keeping and time complexity. These algorithms have been compared for light-paths establishment successful ratio. The findings indicate that examination of 50 per cent of the links of total path length from both sides together (i.e. source and destination nodes) gives better results as compared to other approaches.

Keywords: *Routing and Wavelength Assignment (RWA), Wavelength Division Multiplexing (WDM), Static Planning Algorithms, Dynamic Planning Algorithms, Optical WDM Networks, WDM Aware Link Weight Functions, MatPlanWDM*

Design and Analysis of a Single Wide Band 24 GHz Planar Microstrip Antenna for Vehicular Communications

G. Christina[1], A. Rajeswari[2], S. Mathivanan[3]

[1,3]Assistant Professor, Department of ECE, Coimbatore Institute of Technology, Coimbatore
[2]Professor, Department of ECE, Coimbatore Institute of Technology, Coimbatore

Abstract

The availability of the 24–24.25 GHz (license exempt worldwide) provides short-range high-speed communication possible. A single patch antenna suitable for integration and operation in a compact 24-GHz wireless radar is designed, simulated, and the characteristics are presented. The design is simulated for various substrate materials. With increased values of dielectric constant, the centre frequency was found to vary from around 24 GHz to 22.56 GHz and a fractional bandwidth of 5.75 per cent was achieved. With increasing heights of substrate, fractional bandwidth is found to slightly increase. Hence, the height is fixed at 0.787 mm which is the maximum limit. With further simulations, it is found that if the width is decreased, input impedance increases which in-turn affects the radiation characteristics and when the length is decreased, resonant frequency shifts. Various feed techniques are also analyzed. The probe feed method resulted in a return loss of –10.15 dB and the response is very poor. Parasitic coupling also increased return loss and reduced the bandwidth (fractional bandwidth = 4.4%). With further simulations inset feed is found to produce good bandwidth, gain and directivity. Hence, the patch antenna is optimally designed on RT-Duroid 5880 which has a low dielectric value of 2.2. The antennas are fed through inset feed line. Circular polarization is achieved through the layout of the rectangular patch dimensions. Antenna gain values of ~5.9 dBi are obtained in addition to a very less return loss of ~25dB. The design provides a 10dB bandwidth of around 1.2 GHz suitable for automotive radar systems with a range resolution of 25 cm.

Keywords: *24 GHz, Microstrip Patch, Vehicular Communications*

Performance Analysis of Channel Equalization in Filter Bank Multicarrier

S. Anuradha[1], Vaibhav Awachat[2], Bhuvaneshwar Panwar[3], Bijay Kumar Gupta[4]

[1]Assistant Professor, ECE Department, National Institute of Technology Warangal
[2,3,4]Bachelor of Technology, ECE Department, National Institute of Technology Warangal

Abstract

Filter Bank Multi Carrier (FBMC) is considered a potential candidate for the 5G air interface, as its inherent properties provide the flexibility needed to respond to the diverse service requirements expected in future communication scenarios. It offers a number of benefits over conventional Orthogonal Frequency Division Multiplexing (OFDM) with Cyclic Prefix (CP) such as improved spectral efficiency by not using a redundant CP and by having much better control of out-of-band emission. The most obvious difference between the two techniques is in frequency selectivity. Hence, more elaborate equalization concepts are needed compared to the single-tap per-subcarrier equalizer sufficient in the OFDM with CP. We analysed a least-mean-square (LMS) algorithm based on the mean-squared error (MSE) adapted to the principle of orthogonally multiplexed QAM filter banks (OQAM-FBMC) that leads to a per-subchannel adaptive equalizer with low complexity, a linear-phase FIR amplitude equalizer and an all pass filter as phase equalizer that provide enhanced robustness to timing estimation errors. Performed equalization at certain frequency points within a subband using complex FIR filter (CFIR-SCE).

Keywords: *FBMC, CFIR-SCE, AP-SCE, Low Complexity, MSE*

Notes

Notes

Notes

Notes

Notes