

Brochure of
International Conference on Advances in
Electrical Engineering, 2011 (ICAEE 2011)
December 19-20, 2011
Independent University, Bangladesh



Organized by

Independent University, Bangladesh (IUB)



Cooperating Organization

The International Society for Optical Engineering



Technical Co-sponsor

The Institution of Engineering and Technology

International Conference on Advances in Electrical Engineering, 2011 (ICAEE 2011)

December 19-20, 2011

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CONTENTS

Messages: Page 5-7

Message from Prof. M Omar Rahman
Vice Chancellor (in charge), Independent University, Bangladesh
Chair, Advisory Committee, ICAEE 2011

Message from Prof. Mohammad S. Alam
Chair, Electrical & Computer Engineering Department, University of South Alabama, USA
Chair, International Program Committee, ICAEE 2011

Message from Prof. Mohammed Anwer
Dean, School of Engineering & Computer Science, Independent University, Bangladesh
Chair, Local Organizing Committee, ICAEE 2011

ICAEE 2011 Committees: Page 8-11

Advisory Committee
International Program Committee
Local Organizing Committee
Technical Committee
Paper Review Committee

Location map of IUB and Atrium (conference dinner place): Page 12

Conference Program Schedule: Page 13

Conference Dinner Details: Page 20

Presentation Timing Details: Page 20

Abstracts of Keynote Papers

Abstract of Keynote Paper 1: Page 22
Abstract of Keynote Paper 2: Page 23
Abstract of Keynote Paper 3: Page 24

Abstracts of Accepted Papers

Abstracts of Papers in Technical Session 1: Page 26-29
Abstracts of Papers in Technical Session 1P: Page 30-34
Abstracts of Papers in Technical Session 2: Page 34-36
Abstracts of Papers in Technical Session 3: Page 36-39
Abstracts of Papers in Technical Session 4: Page 39-42
Abstracts of Papers in Technical Session 4P: Page 42-44
Abstracts of Papers in Technical Session 5: Page 45-46
Abstracts of Papers in Technical Session 6: Page 46-49
Abstracts of Papers in Technical Session 6P: Page 49-52



Prof. M. Omar Rahman
Vice Chancellor (in-charge)
Independent University, Bangladesh



MESSAGE

It is an honor for Independent University, Bangladesh (IUB) to host the International Conference on Advances in Electrical Engineering (ICAEE), to be held during December 19-20, 2011. It is indeed a great pleasure that IUB will host this conference in every other year at its own newly built permanent campus in Bashundhara, Dhaka.

I, on behalf of IUB, welcome all the participants from far and wide to this common forum for sharing ideas and promoting intellectual growth.

We are all aware that electrical engineering is the driving force behind the development of a nation. With its large population, rapidly growing economy, and geographic and demographic characteristics, the people of the country look to the participants of ICAEE, to come forward to face the challenges and promote national development. I believe that the conference will reflect the recent growth and advancements in electrical, electronic, telecommunication, computer engineering and information technology, and will permeate almost every aspect of our daily lives.

It is this spirit of intellectual growth that has traditionally been fostered by IUB. Starting as one of the earliest private universities in the country, IUB has emerged as a leading institution for research and scholarly growth in business, engineering, telecommunication and ICT.

I wish ICAEE 2011 a great success.

Prof. M. Omar Rahman
Chair, Advisory Committee
ICAEE 2011



Prof. Mohammad S Alam

Chair

Electrical & Computer Engineering
University of South Alabama, USA



MESSAGE

On behalf of the *2011 International Conference on Advances in Electrical Engineering (ICAEE 2011)* program committee, I would like to thank you for participating in this conference. The Institution of Engineering and Technology (IET) is a technical co-sponsor and the International Society for Optical Engineering (SPIE) is a cooperating organization for ICAEE 2011.

Over the past few years tremendous advances have been made in the general area of electrical engineering. The main purpose of ICAEE 2011 is to bring together researchers and practitioners from academia, industry and government research labs to share their expertise on the latest trends and advancements in various areas of electrical engineering.

The 66 papers that were finally accepted for this conference are well balanced and report on the many ongoing efforts and recent research results in various areas of electrical and closely related fields. All papers submitted to ICAEE 2011 were author blind peer reviewed with experienced professionals from 11 countries outside Bangladesh before final acceptance decisions were made. The acceptance rate is nearly 57%. These papers summarize the research work of 188 researchers from 16 countries spanning over 5 continents thus providing true international flavor to this conference.

I would like to thank the authors for the contribution of their papers, the reviewers for their dedication and timely review, members of the International Program Committee for their guidance, members of the organizing committee for making local arrangements, IUB administration for providing the facilities, and the ICAEE 2011 staff to ensure timely production of this conference proceedings. I would also like to thank Dr. R. Gollapalli for efficiently coordinating the paper review process and Dr. M. A. Razzak for coordinating other conference related activities. Special thanks to IET for serving as a technical co-sponsor, and to SPIE for assisting in the advertisement of this meeting and for serving as a cooperating organization for ICAEE 2011. Finally, special thanks to Dr. Rashid's family for sponsoring the best paper awards.

I sincerely hope that you will take advantage of the various papers presented at this conference and explore collaborative research opportunities with fellow colleagues.

Finally, warmest welcome to Dhaka, the city of Muslin and Mosques, and enjoy its cultural heritage.

A handwritten signature in black ink, appearing to read 'm. s. alam'.

Prof. Mohammad S. Alam
Chair, International Program Committee
ICAEE 2011



Prof. Mohammed Anwer

Dean

School of Engineering & Computer Science
Independent University, Bangladesh (IUB)



MESSAGE

It gives me immense pleasure to welcome you all to the International Conference on Advances in Electrical Engineering (ICAEE), 2011, organized by the Independent University, Bangladesh (IUB). IUB takes its pride to get the opportunity in organizing the event in every other year.

Electrical Engineering is the driving force behind the recent technological developments. ICAEE aims to bring together academicians, scientists, engineers, researchers and students to share their experiences on the latest research, current practices and future trends in the fields of electrical and related engineering, and discuss the practical challenges encountered and the solutions adopted. At ICAEE, many renowned speakers from industry and academia locally and overseas will explore in detail the various issues of electrical & related engineering. We also look forward to hearing the ideas and views of the participants.

In its first appearance, this year ICAEE has received a large number of excellent submissions from 12 countries around the globe. A total of 66 papers are accepted and the acceptance rate is nearly 57%. Among them, 55 registered papers along with 3 keynote papers are scheduled for presentation by the researchers from different countries with nearly 50% foreign authors spanning over 5 continents, which make ICAEE a true international flavor. On behalf of the organizing committee, I welcome the keynote speakers, authors, session chairs, and participants from home and abroad to the conference. I extend my thanks to supporting universities and the sponsors for their financial support and other helps in organizing the event. Finally my hearty thanks go to the chairman and members of the International Program Committee, Technical Committee, members of the local organizing committee and honorable reviewers.

Your active participation will lead to a successful meeting for all participants to exchange innovative ideas. We hope you will enjoy the conference and your participation contributes to your professional development and relationships.

Prof. Mohammed Anwer
Chair, Organizing Committee
ICAEE 2011

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Location map of IUB and Atrium (conference dinner place)



Conference Program Schedule

Day 1

December 19, 2011

Registration & Conference Kit Distribution

Venue: Level 4 Lobby, Academic Building

Time: 08:30 AM – 9:00 AM

Inaugural Session

Venue: Lecture Theater (Room 5002), Level 4, Academic Building

Time: 09:00 AM - 10:00 AM

Inaugural Session Program Details

- 9:00 AM - Recitation from the Holy Quran
- 9:10 AM - Welcome address by the Chair, Local Organizing Committee
- 9:20 AM - Address by the Chair, International Program Committee
- 9:30 AM - Address by the Special Guest
- 9:40 AM - Address and official inauguration by the Chief Guest
- 9:50 AM - Vote of thanks by the Secretary, Local Organizing Committee
- 10:00 AM - End of inaugural session

Tea Break

Time: 10:00 AM - 10:30 AM, **Venue:** Level 4 Lobby, Academic Building

Key Note 1

Room Number: 5002, Lecture Theater, Level 4, Academic Building

Time: 10:30 AM - 11:15 AM

Session Chair: Prof. M. M. A. Rahman, Grand Valley State University, USA

Title: Advances in Power Electronics and Applications in Renewable Energy

Speaker:

Professor Muhammad H. Rashid

Electrical and Computer Engineering

University of West Florida, USA

Technical Session 1: *Communication and Wireless Systems*

Room Number: 6007, Level 4, Academic Building

Time: 11:15 AM - 1:00 PM

Session Chair: Prof. Ayman Al-Falou, ISEN Brest, France

Performance of Q-ary Pulse Position Modulation Free-Space Optical Communications using Gamma-gamma and Negative Exponential Atmospheric Turbulence Model

Bobby Barua, Mirza Moazzem Hossain, Md. Rezwan Islam, Md. Khairul Bashar

Performance Analysis and Development of an Efficient Handover Scheme for PMIPv6 in IEEE 802.16/WiMAX Network

Kheya Banerjee, Md. Masud Rana, Zulkernine Ibne Tahasin, Rokon Uddin

A Rigorous Taxonomy Based Survey of Location Systems for Ubiquitous Computing

Md. Tarek Habib, Abdul Halim Miah, Farruk Ahmed

Performance Evaluation of IEEE802.11e EDCA Mechanism by Changing Contention Free Burst (CFB) Mode on Single Access Point (AP) based WLAN System

M. S. Hussain, N. M. S. K. Chowdhury, F. Ahmed

Distributed Cooperative Spectrum Sensing Based Cognitive Radio Prototype for Reliable Spectrum Sharing

Wasim Arif, N. Madhusudan Rao

PAPR Reduction of an OFDM Signal Using Double Companding Technique

Subaha Mahmuda, Tabassum Nasrin Haque, Feroz Ahmed

Design Challenges and Scope for Cognitive Radio Wireless Networks in Bangladesh

Tasnia Jahed, Ipshita Das, Niaz Iqbal, Sanjida Hossain Sabah, Hasan Shahid Ferdous

Location Based Information System using OpenStreetMap

Md. Rashidujjaman Rifat, Shubrami Moutushy, Syed Ishtiaque Ahmed, Hasan Shahid Ferdous

Technical Session 1P: Power Systems and Renewable Energy

Room Number: 6008, Level 4, Academic Building

Time: 11:15 AM – 1:00 PM

Session chair: Dr. Khosru M. Salim, Independent University, Bangladesh

Single-phase Grid Tie Photovoltaic Inverter for Residential Application

Syafrudin Bin Masri, Tan Kheng Kwan, Ragu Raman

Analysis of the Area Under the Peaks of EQE and Estimation of the Fill Factor of Different Blend Compositions of P3HT: PCBM Organic Solar Cells

W. A. Khan, J. Rozario, F. F. Mallik

Solar Adsorption Cooling: A Case Study on the Climatic Condition of Dhaka

R. A. Rouf, K. C. A. Alam, M. A. H. Khan, T. Ashrafee, M. Anwer

Microcontroller Based Three Phase Induction Motor Controller for Photovoltaic Applications

Nafisa Binte Yousuf, Khosru M. Salim, Rafid Haider

Implementing Sinusoidal PWM in a Single Chip Microcontroller to Operate a Full Bridge Solar Inverter

Rafid Haider, Md. Rajin Alam, Khosru M. Salim, Nafisa Binte Yousuf

Investigation of Dye-Sensitized Nano-Crystalline TiO₂ Solar Cell: Prospect, Problems and Remedies

Zawad Hossain, Md. Mosaddeq Rahman

High Efficient Multi-junction Photovoltaic Cell based on Indium-Phosphide-Oxide, Indium-Gallium-Arsenide and Indium-Gallium-Antimony

Mir Abdulla-Al-Galib, S. Barua, K. M. A. Salam, M. A. Awal, R. P. Wijesundera

Electricity Generation by Using Biogas and Oxygen-enriched air from Swine Manure for a Farm owner Requirement

Tsung-Han Lee, Wei-Tsung Lin, Chun-Hsiang Yang, Chiun-Hsun Chen

Maximaizing of distributed generation using particle swarm optimization

Pires BAS, Oliveira CBM, Medeiros Jr. MF

Lunch Break

Time: 1:00 PM-1:45 PM, **Venue:** IUB Cafeteria, Ground Floor, Library Building

Key Note 2

Room Number: 5002, Lecture Theater, Level 4, Academic Building

Time: 1:45 PM – 2:30 PM

Session Chair: Prof. Abdus Sobhan, Independent University, Bangladesh

Title: Graph Theory and Perfect Graphs

Speaker:

Professor Rajat K. Pal

Department of Information Technology
Assam University, India

Technical Session 2: Digital Signal and Image Processing

Room Number: 6007, Level 4, Academic Building

Time: 2:30 PM - 3:45 PM

Session Chair: Prof. Swapna Banerjee, Indian Institute of Technology Kharagpur

Quality Improvement and Quality Assessment of Digital Images

Sharmin Ahmed, Tasnim Nasir, Mohiuddin Ahmad

Quality Assessment of ECG Signal using Symlet Wavelet Transform

Md. Abdul Awal, Sheikh Shanawaz Mostafa, Mohiuddin Ahmad

Reconfigurable Architecture of a RRC FIR Interpolation Filter for Multi-Standard Digital Up Converter

Indranil Hatai, Swapna Banerjee, Indrajit Chakrabarti

Efficient Classification of Multispectral Imagery for Oil Spill Detection

P. Sidike, J. Khan, M. Alam, R. Gollapalli and S. Bhuiyan

Tea Break

Time: 3:45 PM - 4:15 PM, **Venue:** Level 4 Lobby, Academic Building

Technical Session 3: Power Electronics and Drives

Room Number: 6008, Level 4, Academic Building

Time: 4:15 PM – 5:30 PM

Session Chair: Prof. Muhammad H. Rashid, University of West Florida, USA

Vector Control of a Cost-Effective FSTP Inverter Fed Synchronous Reluctance Motor

Kalyan Kumar Halder, Md. Abdur Rafiq, B. C. Ghosh

High Performance Sensorless Control of Induction Motor Drive with Space Vector Modulation

Md. Habibullah, Kalyan Kumar Halder, Md. Abdur Rafiq, B. C. Ghosh

Design and Development of A computer controlled Three-phase inverter for Precise Speed variation of A Three-phase Induction Motor

Md. Aziz Ul Huq, Farruk Ahmed

Efficiency Comparison of VSC-HVDC System With Shrinking Span Membership Function Fuzzy Logic Controller and SPWM Control

R. Roy, S. Biswas, D. Debnat, H.S. Sah, I.K .Dutta

Temporal Behavior Analysis of Different Parameters of Electric Ignition System for Combustion Engines

Shaiyek Taslim, Shaikh Tousif, Rahman Musfequr, Rahman Mahbubur, Alam Shamaul, Sagar Chandra

Single Phase Two-Stage AC-to-DC Series Resonant Converter for Medium to High Power Applications

M. M. A. Rahman, M. M. Atiqur Rahman

Day 2

December 20, 2011

Key Note 3

Room Number: 5002, Lecture Theater, Level 4, Academic Building

Time: 9:00 AM – 9:45 AM

Session Chair: Prof. Rajat K. Pal, Assam University, India

Title: The Nuts and Bolts of Optical Image Compression and Encryption Methods

Speaker:

Professor Ayman Al-Falou

Optical Signal and Image Processing Laboratory (Vision lab)

ISEN Brest, France

Technical Session 4: *Digital Logic Design and VLSI*

Room Number: 6007, Level 4, Academic Building

Time: 9:45 AM – 11:15 AM

Session Chair: Dr. Afzal Hossain, Nanova Corporation, USA

Design of a MIPS Instruction Set Simulator (ISS) for a Multicore Computer Architecture Research in SystemC

Mohammad Qayum, Louis Johnson, Mohammad Haque, Nafish Quarishi

Crosstalk Minimization is a Challenge in Designing High Performance VLSI Circuits

Achira Pal and Rajat K. Pal

Test Vector Compression Technique in VLSI Circuits

Satyendra N. Biswas, Sunil R. Das, Mansour H. Assaf

Is Queuing Model Good for Processor Fast Benchmarking?

Afzal Hossain

Switching from Real to PVAM Mode Operation of Intel 80286 High Performance Architecture

Golam Mostafa

Development of an 8-Bit Microprocessor Learning System using Intel 8085 Architecture

Golam Mostafa

Technical Session 4P: *RF and Microwave Techniques*

Room Number: 6008, Level 4, Academic Building
Time: 9:45 AM – 11:15 AM
Session Chair: Dr. Prodipto Das, Assam University, India

High-Resolution Doppler Profiles for UWB Radar Signals using MUSIC Method

Nafish Quaraishi, Mohammad Qayum, Mohammad Haque

Measurement and Prediction of Indoor Signal Propagation for ISM Band

Nusrat Tanzim, Khandkar Rashid

Radio Frequency Controlled Vehicle Tracking System

Koushik Guha, Akash Mukherjee, Sanjib Das

Wideband Four-Branch Inverted-F Antenna for WLAN/WiMAX Applications

Debabrata Kumar Karmokar, Sumi Kundu, Md. Selim Hossain, Khaled Mahbub Morshed

Estimation of Rain Attenuation over DTH Antenna in India using DAH Model

Prodipto Das, Sajal Debnath, Abhijit Paul

Tea Break

Time: 11:15 AM - 11:45 AM, **Venue:** Level 4 Lobby, Academic Building

Technical Session 5: *Biomedical Engineering & Bioinformatics*

Room Number: 6007, Level 4, Academic Building
Time: 11:45 AM – 1:00 PM
Session Chair: Dr. Satyendra N. Biswas, Independent University, Bangladesh

Correlation of Heart-rate and Cardiac Cycle Duration under Different Body Positions and Breathing

Sheikh Shanawaz Mostafa, Md. Abdul Awal, Muhammad Muinul Islam, Mohiuddin Ahmad

Improvement of Medical Imaging Equipment Maintenance Management of Bangladesh

Md. Anwar Hossain, Mohiuddin Ahmad

Genetically Optimized HMM for Robust Speaker Identification in Noise

Md. Rabiul Islam, Md. Fayzur Rahman, M. Abdus Sobhan

Lunch Break

Time: 1:00 PM - 1:45 PM, **Venue:** IUB Cafeteria, Ground Floor, Library Building

Technical Session 6: *Semiconductor and Nanotechnology*

Room Number: 6008, Level 4, Academic Building

Time: 1:45 PM – 3:00 PM

Session Chair: Prof. Srimanta Baishya, National Institute of Technology, India

Capacitance measurement of a SOI Tunnel FET

B. Bhowmick Shome, S. Baishya and J. Sen

Impact of Quantum Mechanical Correction in Surface Potential Based Compact Model on the Drain Current of Nanoscale MOSFETs

M. M. Mahmud, N. Haque, S. Sumaia, A. Haque

Structural and magnetic properties of Cu substituted Mn-Zn ferrites

F. Alam, H. N. Das, A. K. M. Akther Hossain

Impact of Cr³⁺ on the structural and magnetic properties of Mn-Cr-Zn ferrites

F. Alam, M. I. Rahman, A. K. M. Akther Hossain

Effect of Annealing on Structural and Electrical Properties of Zn_{0.2}Cd_{0.8}S Thin Film Deposited by Spray Pyrolysis

J. Saha, K. Azad, J. Podder

Design and Characterization of InGaN Based 1.55 μm Lasers Using Thermal Modeling

Md. Jahirul Islam, Md. Rafiqul Islam, Md. Mottaleb Hossain

Technical Session 6P: *Intelligent Systems and Robotics*

Room Number: 6007, Level 4, Academic Building

Time: 1:45 PM – 3:00 PM

Session chair: Prof. Farruk Ahmed, Independent University, Bangladesh

Dynamic Computation of Load Power Factor through the Evaluation of Maclaurin $\cos x$ Function using 8051 Microcontroller Architecture

Golam Mostafa

Offline Handwritten Character Recognition using Artificial Neural Network

R. H. Laskar, J. Mehedi, Priyesh Sethia, Sriyans Patwa, A. Sarkar and G. Snigdha

Indoor Positioning Using LED Based Visible Light Communication and Image Sensors

M. S. Rahman, B. Y. Kim² and K. D. Kim

Mobile Banking and Payment System Using Bluetooth Media

Khaya Banerjee, Md. Masud Rana, Md. Margoob Mahfuz, Md. Amjad Khan

Cloud-based E-governance with WiMAX for Developing Country

Ireen Sultana and M. A. Razzak

Spiking Neural Networks on High Performance Computing Platforms

Chong Chen and Tarek M. Taha

Simulated Annealing Variants in Solving The Staff Transfer Problem

Sriyankar Acharyya

A Hybrid Obstacle Avoidance Strategy for Active Bat IPS Guided Holonomic Mobile Robots

Md. Reaz Ashraful Abedin

Conference Dinner

Date: 20 December 2011, Tuesday

Time: 6:00 PM-9:00 PM

Venue: Atrium, 50-52 Progoti Sharani, Block-J, Baridhara, Dhaka-1212

Phone: +880-2-8810692, +880-1712-444422

E-mail: atrium_bd@yahoo.com

Announcement of the Best Paper Awards

Date: 20 December 2011, Tuesday

Time: 6:30 PM

Venue: Atrium, 50-52 Progoti Sharani, Block-J, Baridhara, Dhaka-1212

Presentation Timing Details

Contributed papers:

Presentation - 10 mins

Q & A - 2 mins

Keynote papers:

Presentation - 35 mins

Q & A - 10 mins

Abstract of Keynote Paper 1

Advances in Power Electronics and Applications in Renewable Energy

Muhammad H. Rashid, Ph. D.

Fellow IET (UK), Life Fellow IEEE (USA)

Department of Electrical and Computer Engineering

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E-mail: mrashid@uwf.edu

ABSTRACT

Power electronics has developed continuously over the years and are finding increasing applications. There are many power converter circuits some of which have become standard topologies and are available as modules from the manufacturers. The demand for the development of environmentally clean, reliable and affordable energy technologies have prompted renewed interest in renewable energy systems worldwide. Many renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generators. The renewable energy sources are generally converted to dc or ac electric voltages or currents. Many renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generators. The power electronics is finding increasing applications in renewable energy technologies to process efficiently and produce a flexible ac or dc output to match a variable or fixed load demand. This presentation reviews the chronological development of power electronic circuits and identifies circuit topologies for practical applications in renewable energy.

KEYWORDS: power electronics, power converter, renewable energy

Abstract of Keynote Paper 2

Graph Theory and Perfect Graphs

Prof. Rajat K. Pal

Department of Information Technology
Triguna Sen School of Technology
Assam University
Silchar, Cachar – 788 011, Assam, India

ABSTRACT

Nowadays graph theory is not only confined to Mathematics but also has been extended to other areas such as Computer Science and Information Technology (in developing algorithms and associated computation) along with other engineering and basic sciences. Combinatorial methods found in graph theory such as matching problem have been used to prove significant and illustrious results in a variety of quarters of different subjects. However, graph has its wide applications in various domains. Most of these applications require modeling of some problem by graph theoretical formulation, where computation of some graph theoretic invariant provides a desired solution to the problem attacked.

This presentation, as its name implies, tries to concentrate on a well-known class of simple, symmetric graph, popularly known as perfect graph. The size of the largest clique of a perfect graph is equal to its chromatic number. This property holds for all its induced subgraphs. For all types of graphs within the domain of perfect graph, the four graph theoretic invariants, stability number, chromatic number, clique number, and clique cover number can be computed in polynomial time. So it is obvious that, different types of perfect graphs have a huge prospect in solving various real life and scientific problems. As we are interested in the affluent algorithmic properties of various classes of perfect graph, we initially focus on two types of classical perfect graphs; they are triangulated graph and comparability graph. Gradually, we derive several subclasses of these two types of perfect graph by using some perfect preserving operations, and try to show some real life applications of them. Split graph belongs to one of these derived classes. Permutation graph and interval graph are other such notable derived classes of perfect graph.

Abstract of Keynote Paper 3

The Nuts And Bolts of Optical Image Compression and Encryption Methods

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ABSTRACT

This keynote paper synthesizes a research activity, under full development over the past years, realized in the field of the coherent optics applied to telecommunications, especially in the compression and encoding domains. Throughout this work, the federator topic, which allows to articulate the majority of the work, is the use of optical information processing techniques (image filtering (Fourier domain), holography, ...), in real-time, in close relation to their implementation on optical processors. Optics, thanks to its strong parallelism, is quite naturally imposed as an interesting solution conditioned in practice by the existence of powerful electro-optical interfaces. Indeed, Coherent optics is increasingly useful for real-time telecommunication and image transmission, most specifically when a large amount of information needs to be processed. In fact, progress in both data-processing networks and communication systems have considerably increased the quantity of exchanged information (i.e. high resolution imaging). In addition, the transmitted data can be, at any moment, intercepted by non-authorized people. This explains why considerable effort has been made in data encryption and secure transmission. For several applications, only a small part of the overall information is really useful. Thus applications can tolerate information compression that imposes important processing when the transmission bit rate is taken into account. To enable efficient and secure information exchange, it is often necessary to secure and to reduce the amount of information to be transmitted. In this context, much work was undertaken using the principle of coherent optics filtering to select relevant information and to encrypt it. But, these two operations (compression and encryption) are often carried out separately, although they are strongly bound and they influence each other. In this tutorial, we are interested in optical processing methodologies, based on filtering, which can be applicable to telecommunication, i.e. transmission and/or data storage. More particularly, we present and analyze the advantages and the drawbacks of optical compression and encryption methods, which have been proposed in the literature.

KEYWORDS: coherent optics, FFT, optical filtering, optical compression/decompression, optical image encryption/ decryption, multiple-image encryption, ICA, blind source separation, signal and image processing, transmission.

Performance of Q-ary Pulse Position Modulation Free-Space Optical Communications using Gamma-gamma and Negative Exponential Atmospheric Turbulence Model

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ABSTRACT

Free Space Optics (FSO) is an optical communication technology that uses light propagating in free space to transmit data between two points. Unfortunately, an optical wave propagating through the atmosphere experiences the fluctuations in amplitude and phase due to scintillation, which represents one of the most important factors to degrade the performance of an FSO communication system. To design a high performance communication link for the atmospheric FSO channel, it is of great importance to characterize the channel with proper model. In this paper, we investigate gamma-gamma and negative exponential atmospheric turbulence model for FSO communication where the modulation format is Q-ary PPM across lasers, with intensity modulation also Ideal photodetectors are assumed under turbulent condition. The performance results are evaluated in terms of symbol error probability (SEP) for different type of channel model.

KEYWORDS: Free Space Optics (FSO), pulse position modulation (PPM), probability of density function (PDF), symbol error probability (SEP), symbol energy.

Performance Analysis and Development of an Efficient Handover Scheme for PMIPv6 in IEEE 802.16/WiMAX Network

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ABSTRACT

In the era of wireless communication, the world is deploying WIMAX (worldwide interoperability for microwave access) as the standard for broadband wireless communication. A network-based mobility management protocol called pmipv6 (Proxy Mobile Internet Protocol Version 6) is being actively standardized. In this paper, an efficient handover scheme is proposed within a PMIPv6 domain in the WIMAX network. The proposed scheme reduces handover latency by eliminating the need of a policy server (PS) and by pre-registration of the mobile node for a new access point. Furthermore, a comprehensive analysis has been done by NS-2 (Network Simulator-2) for evaluating the delay of the proposed scheme and the results reveal that the proposed strategy has significantly reduced the handover latency.

KEYWORDS: Authentication Latency, Handover Latency, PMIPv6, Registration latency, WiMAX.

A Rigorous Taxonomy Based Survey of Location Systems for Ubiquitous Computing

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ABSTRACT

Emerging ubiquitous computing applications must know where things are physically located. To meet this must, many different location systems and technologies have been developed. In this work, we discuss the basic techniques used for location detection, describe taxonomy of location system features, present a survey of research and commercial location systems, and finally, compare these location systems using the identified features. It is our hope that this paper is a useful reference for a newcomer to the area of location detection for understanding and evaluating the many options in this domain.

KEYWORDS: Location system, taxonomy, location detection technique, performance, deployment.

Performance Evaluation of IEEE802.11e EDCA Mechanism by Changing Contention Free Burst (CFB) Mode on Single Access Point (AP) based WLAN System

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ABSTRACT

Contention free burst (cfb) is one of the new features introduced in the ieee802.11e enhanced distributed channel access (edca) mechanism, besides categorizing the traffic with four different classes (voice, video, best effort, background) with dissimilar priorities; hence provisioning service differentiation among different traffic classes. This paper presents the simulation results, indicating the possible effect of cfb mode over service differentiation performance of the edca mechanism. Remarkably, this mode benefited video data traffic the most. The simulation study also showed that, cfb mode can potentially protect performance of lower priority traffic class, when the system faces overall throughput saturation.

KEYWORDS: IEEE802.11e, edca, ap, contention free burst (cfb), transmission opportunity (txop)

Distributed Cooperative Spectrum Sensing Based Cognitive Radio Prototype for Reliable Spectrum Sharing

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ABSTRACT

There has been a thorough study and new system implementation intricacies involved in the design of Cognitive Radio which can intelligently sense the spectral environment and is flexible enough to adapt transmission parameters to maximize system capacity while co-existing with legacy wireless network. The pivotal design challenges are the need to sense the active primary users (PU) and cognitive users (CU) and accordingly process these in a way that maximizes the channel utilization, keeping the necessary parameters intact. We are introducing a novel concept of using memory elements dovetailed with the use of queuing algorithm for switching of primary users and cognitive users as required to keep up the motive of optimum channel utilization. Our approach has earned us edge over the conventional approach void of memory management, in terms of efficiency, quality of service and added intelligence. An another communication paradigm which promises significant capacity and multiplexing gain increase in wireless networks is Cooperative communications and networking which allows distributed terminals in a wireless network to collaborate according to a distributive transmission and realize a new form of space diversity to combat the detrimental effects of fading channels. One of the most important challenges for CR systems is to identify the presence of licensed (primary) users over a wide range of spectrum at a particular time and specific location. We establish the use of cooperative spectrum sensing in cognitive radio systems to enhance the reliability of detecting primary users. We shall describe the Cognitive radio through the implemented prototype and design the framework of cooperative communication through hard decision count or ensuring reliability by reducing the false detection probability.

KEYWORDS: Cognitive Radio, Spectrum underutilization, Memory Management, Cooperative Communication, False detection

PAPR Reduction of an OFDM Signal Using Double Companding Technique

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ABSTRACT

In this paper, a new nonlinear companding technique, called “double companding” is proposed to reduce high Peak-to-Average Power ratio (PAPR) of Orthogonal Frequency Division Multiplexing (OFDM) signals. In the double companding scheme, primarily companded signals are further companded by which the PAPR can be improved significantly. However, simulation shows that there is a trade-off between reduction of the PAPR and Bit Error Rate (BER).

KEYWORDS: Orthogonal Frequency Division Multiplexing (OFDM), Peak-to-Average Power Ratio (PAPR), BER, Complementary Cumulative Distribution Function (CCDF).

Design Challenges and Scope for Cognitive Radio Wireless Networks in Bangladesh

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ABSTRACT

Standards groups and regulatory bodies around the world are increasingly seeking new ways of using and allowing access to allocating spectrum. In most parts of the world, cellular network bands are overloaded, but amateur radio and paging frequencies are not. Independent studies performed in some countries confirmed that observation, and concluded that spectrum utilization depends strongly on time and place. Moreover, fixed spectrum allocation prevents rarely used frequencies (those assigned to specific services) from being used by unlicensed users, even when their transmissions would not interfere at all with the assigned service. In this research we studied the frequency usage pattern of a large telecom company to identify the possibility of establishing a cognitive radio network using their licensed band. Experimental simulation results shows that a carefully designed network will boost the throughput significantly.

KEYWORDS: next generation networks, cognitive radio, exponential on/off model, primary user, secondary user.

Location Based Information System using OpenStreetMap

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ABSTRACT

Faced with an increasingly difficult challenge in growing both the average revenue per user (ARPU) and the number of subscribers, wireless carriers and their partners are developing a lot of new products, services, and business models based on data services. Location based services, which provide information specific to a geographic location, are a key part of this portfolio. Our Location Based Information System is such a location based application that works as a audio road guider for both the normal and visually impaired people using OpenStreetMap. OpenStreetMap (OSM) is a world-wide campaign for developing open source maps. The prospect of such open source maps is very bright in commercial, educational and political points of views. In this paper we discuss the challenges and features of our proposed Location Based Information System as an example of the usability of OpenStreetMap. We also discuss about the problems we face while developing OSM in a developing region like Bangladesh. Finally, we present the future scope of various location based services using OpenStreetMap.

KEYWORDS: OpenStreetMap, Location Based Services, Bangladesh, Audio Message, Road Guider, Blind People.

Single-phase Grid Tie Photovoltaic Inverter for Residential Application

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ABSTRACT

This paper presents a grid tie photovoltaic inverter (GTI) system in photovoltaic (PV) power generation, PV system for residential application. The proposed GTI switched with a combination switching strategy of square wave and the sinusoidal pulse width modulation, SPWM. The combination switching strategy and the performance of the inverter simulated under grid tie condition in SIMULINK are discussed. Moreover, the strategy of sending power into the grid also will be discussed.

Analysis of the Area Under the Peaks of EQE and Estimation of the Fill Factor of Different Blend Compositions of P3HT:PCBM Organic Solar Cells

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ABSTRACT

The study is based on polymer: fullerene blend organic solar cells and comprises the external quantum efficiency (EQE) for different combinations of the poly(3-hexylthiophene) (P3HT): [6,6]-phenyl C60 butyric acid methyl ester (PCBM) blend organic solar cells. The external quantum efficiency for different combinations has been illustrated lately in order to analyze. The Voltage versus current density curve for different combinations has also been illustrated and the fill factors (FF) for those combinations have been calculated. For the P3HT:PCBM organic solar cells, the EQE is lowest for the 1:4 P3HT:PCBM combination, increases gradually for the 1:2 and 1:0.5 combination and is at the maximum for the 1:1 P3HT:PCBM combination. The current density follows the same route. By determining the maximum obtainable voltage and current density along with the open circuit voltage and short circuit current density, the fill factor can be calculated. The results show the fill factor for different combinations of P3HT:PCBM solar cells.

KEYWORDS: P3HT, PCBM, EQE, fill factor, resistance area product.

Solar Adsorption Cooling: A Case Study on the Climatic Condition of Dhaka

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ABSTRACT

The study investigates the performance of an adsorption chiller driven by solar collector panel mathematically for the climatic condition of Dhaka. Based on the solar radiation data it is seen that at least 13 collector (each of 2.42 m^2) is essential to achieve the required heat source temperature (around 90°C) to run the cooling unit. It appeared during the investigation that the unit provides the cooling capacity around 10 kW at noon with base run condition, while the system provide the solar COP around 0.35. As the cycle time has a major effect on heat source temperature as well as on system performance, it is observed that there is an optimum cycle time for the collector size. Therefore it may be concluded that the collector size may be reduced by setting the optimum cycle time.

KEYWORDS: Adsorption, solar heat, renewable energy, air-conditioning, heat source temperature.

Microcontroller Based Three Phase Induction Motor Controller for Photovoltaic Applications

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ABSTRACT

This paper intends to develop a three phase induction motor controller for different solar applications. This paper offers an idea to implement the green power not only in household applications but also for industrial purposes. Bangladesh is suffering from severe power crisis and many small industries are suffering from lower productivity for this crisis. On the other hand, many entrepreneurs are not getting permission for new industries. A solar based system with efficient speed control system can be used to setup a number of small industries in the remote areas of Bangladesh where national grid fails to supply sufficient power. A three phase induction motor can perform robustly in this field. Industrial motors require speed controlling technique to supply variable speed from time to time. This paper focuses on the developments in the field of efficient optimization of three-phase induction motor through optimal control and design techniques, which can be used in small industries in Bangladesh. A three phase induction motor was successfully run with a prototype setup, established with 320Watt solar panel and a three phase inverter with appropriate and low cost gate drive circuit. The experiment results fully satisfied the demand of the project, as the smooth speed control of a three phase induction motor was done effectively.

KEYWORDS: Three phase Induction motor, V/f Control, PWM technique, Solar, PIC Microcontroller.

Implementing Sinusoidal PWM in a Single Chip Microcontroller to Operate a Full Bridge Solar Inverter

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ABSTRACT

This paper presents the technique of generating Sinusoidal Pulse Width Modulated (SPWM) signals from a PIC18F4431 microcontroller. The generated SPWM signals have appropriate dead time gap to operate the switches of a full bridge single phase solar powered inverter which gives a 50 Hz pulse width modulated sine output. The dead time prevents short circuit situations. Also, a 'soft start' mechanism for the inverter system is implemented by the microcontroller, to deal with the effects of the inrush current. The software allows the microcontroller to change the inverter output voltage by altering the modulation index, to limit the inrush current. Before applying the program to the microcontroller, a simulation was run and the results of the simulation were later verified with the microcontroller output.

KEYWORDS: Sinusoidal PWM, Full Bridge, Solar Inverter, Soft Start, PIC18F4431 Microcontroller

Investigation of Dye-Sensitized Nano-Crystalline TiO₂ Solar Cell: Prospect, Problems and Remedies

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ABSTRACT

This paper explores the prospects and problems of an organic dye-based electro-chemical solar cell (dsc) that will be economically affordable, technically feasible and environmentally friendly, especially for its implementation in Bangladesh. The cell uses nano-crystalline titanium dioxide semiconductor soaked in organic dye on a conducting glass substrate. A comparative study of dye-sensitized solar cells (dsc) with silicon solar cells shows that their performance is comparable to that of silicon cells in terms of light absorption and electricity generation. A modified dsc structure is proposed that has the potential to improve the cell performance. Preliminary results obtained for the cells fabricated are also presented.

KEYWORDS: Dye solar cell (DSC), organic dye, nano-crystalline titanium dioxide, feasibility.

High Efficient Multi-junction Photovoltaic Cell based on Indium-Phosphide-Oxide, Indium-Gallium-Arsenide and Indium-Gallium-Antimony

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ABSTRACT

Multi-junction solar cells enable very high photovoltaic efficiencies by virtue of employing different band gap materials in series connected tandem cells to access the full solar spectrum. Researchers are trying to get materials, which would have higher photon absorption in the range of the solar spectrum thus enhancing the efficiency of the solar cell. However, little work to date has been devoted to light trapping and enhanced absorption in III-V compound solar cells. In this paper, we have performed a comparison of photon absorption, reflectance and transmittance with existing multi-junction cells and have proposed a new multi-junction photovoltaic cell based on InPO/InGaAs/InGaSb, which shows significant improvement of photon absorption in the spectral range of 528nm – 710nm, contributing to a higher efficiency of the solar cell.

KEYWORDS: Photovoltaic, single-junction, multi-junction, anti-reflective coating, InPO/InGaAs/InGaSb.

Electricity Generation by Using Biogas and Oxygen-enriched air from Swine Manure for a Farm Power Requirement

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ABSTRACT

This study carried out 30 kW-generator experiments on a small biogas plant in a swine farm to collect data. The experimental results showed that the optimum biogas flow rate for the present engine was around 240 to 260 L/min, and the maximum power generation, the corresponding thermal efficiency, and the percentage of consumed CH₄ were 26.8 kW and 28.7%, respectively, at a biogas supply rate of 260 L/min. With 3% oxygen-enriched air, the maximum power generation, thermal efficiency, and the percentage of consumed CH₄ had increased up to 28.2 kW and 30.2% approximately for 260 L/min, and the engine could operate normally at a lower limiting fuel supply rate of 220 L/min.

KEYWORDS: Biogas, Biogas generator, Oxygen-enriched air, Combustion, Thermal efficiency

Maximizing of distributed generation using particle swarm optimization

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ABSTRACT

This work develops a methodology for defining the maximum active power being injected into predefined nodes in the studied distribution networks, considering the possibility of multiple accesses of generating units. Feasible solution will not have losses greater than the base case, i.e., without the distributed generation. It is proposed an algorithm, which is based on the particle swarm optimization, applied to an optimal load flow study for maximizing the penetration of distributed generation. The algorithm defines allowed values of nominal active power of distributed generation, in percentage terms relative to the demand of the network, from proposed values by producers.

KEY WORDS: Distributed generation, optimization, particle swarm optimization, power systems, load flow.

Technical Session: Day 1, Session 2
Digital Signal and Image Processing

Quality Improvement and Quality Assessment of Digital Images

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ABSTRACT

Digital images are affected by noise in their acquisition and transmission. The motive of this work includes different types of noises in digital image along with the way to denoise those affected images. Basically, this work is concerned with those noises that occur in magnetic resonant images (MRI). There are various types of filters for denoising the digital images. The image quality is compared with the respect of signal to noise ratio (SNR). The denoised images and comparison of their quality has essentially increased the valuable approaches of modern medical science. Different types of filter's algorithm are implemented in C/C++ environment with OpenCV library to access the quality of images. Complex wavelet filtering is more efficient than the other filters for denoising.

KEYWORDS: Noisy image, denoised image, image quality, signals to noise ratio, complex wavelet transform.

Quality Assessment of ECG Signal using Symlet Wavelet Transform

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ABSTRACT

Noise reduction is important for getting useful bio-medical signal such as, ECG signals. Because ECG signal can be corrupted by various types of noise which leads to incorrect diagnosis. However, details features of the signal must be conserved very well after the de-noising for proper diagnosis. In this paper, Symlet wavelet filter as well as different kinds of moving average and S-G filter was studied for de-noising of ECG signal. R-peak automatically identifies via R-peak detection algorithm. RMSE, PRD, R-peak distortion error were used to assess the performance of the filters. Simulated and experimental ECG data showed that Symlet wavelet filter is best among the other filters in the case of de-noising with a RMSE of 0.0522 and 0.0224 respectively.

KEYWORDS: Moving average, Savitzky-Golay, Symlet wavelet, ECG signal, BIOPAC system.

Reconfigurable Architecture of a RRC FIR Interpolation Filter for Multi-Standard Digital Up Converter

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ABSTRACT

The present paper proposes one multiplier-less reconfigurable architecture of RRC interpolation FIR filter for the next generation multi-standard digital up-converter and validates its performance using FPGA. The designed filter is capable to implement ranging from 8 to 1024 tap filters with three different interpolation factors of 4, 6, and 8. The proposed filter operates at maximum frequency of 286.8 MHz by consuming only 1,535 slices of XC2VP30 FPGA device. Results reveal that the proposed design is a good candidate for high-speed operation with less area consumption compared to the previously reported reconfigurable poly-phase architectures.

KEYWORDS: Digital Up Converter, Root raised Cosine Filter, Reconfigurable Architecture, Interpolator, and Software Defined Radio System.

Efficient Classification of Multispectral Imagery for Oil Spill Detection

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ABSTRACT

Multispectral imaging is a very important tool in remote sensing over a vast region on earth. It provides detailed spectral and spatial information that enables analyzing surface material over large areas. Accordingly, for locating and identifying objects in large geographic region; classification of land cover from multispectral remotely sensed imagery is one of the most significant applications. The purpose of this paper is to review and assess representative methods from major image classification algorithms and to apply those methods for oil spill detection on the ocean surface.

KEYWORDS: Remote Sensing, Multispectral Image, Classification, Oil Spill Detection.

Technical Session: Day 1, Session 3
Power Electronics and Drives

Vector Control of a Cost-Effective FSTP Inverter Fed Synchronous Reluctance Motor

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ABSTRACT

In this paper, a high-performance vector control methodology for Synchronous Reluctance Motor (SynRM) is proposed. In the control scheme, instead of a usual Six Switch Three Phase (SSTP) inverter a Four Switch Three Phase (FSTP) inverter is used. The reduction of the number of power switches from six to four improves the cost-effectiveness, volume-compactness and reliability of the three phase inverter. A simulation model of the drive system is developed and analyzed in order to verify the effectiveness of the approach. A comparison of performances of the FSTP inverter fed SynRM drive with the SSTP inverter fed drive is made. The effectiveness of the proposed drive system is also tested for different operating conditions. The results show that the drive system is able to operate stably and continuously with satisfactory static and dynamic performance.

KEYWORDS: Cost-effectiveness, FSTP inverter, hysteresis current controller, SynRM, and vector control.

High Performance Sensorless Control of Induction Motor Drive with Space Vector Modulation

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ABSTRACT

A high performance sensorless control of induction motor drive is presented in this paper. The control principle is based on direct torque control (DTC) with space vector modulation (SVM) technique. The torque control of DTC is implemented through the torque control loop that enhances robustness of the control system. The SVM with minimum time control algorithm reduces the torque and flux ripples and improve steady state performance. A correlated real time recurrent learning (CRTRL) algorithm based recurrent neural network (RNN) is proposed to estimate rotor flux and torque. A simple speed estimator for the induction motor is proposed to make the controller cost effective and speed sensorless. The proposed control methodologies and simulation results are given and discussed.

KEYWORDS: Sensorless, space vector modulation, correlated real time recurrent learning, torque ripple, flux ripple.

Design and Development of a Computer controlled Three-phase Inverter for Precise Speed Variation of A Three-phase Induction Motor

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ABSTRACT

The speed of a three-phase induction motor can be varied within a wide range other than its rated value if its input parameters (frequency, voltages) are varied properly. For industrial, mainly in knitting and some other sophisticated use of three-phase induction motor, precise and accurate control of the speed of the motor is necessary. Three-phase inverter is an essential unit of a three-phase induction motor drive. The present three-phase inverter is so designed that its input parameters can be easily varied through proper software program and computer interfacing hardware. N-channel MOSFET is used as power device to avoid inter phase commutation failure and also to avoid extra high voltage source to implement commutation. A special one way delay circuit is introduced to ensure non short circuit situation. The input frequency to the inverter can be varied by varying the input voltage to the voltage controlled oscillator (VCO). This voltage change is done by the computer through writing proper codes in a particular register/buffer in the interfacing circuits. The proper input voltage to the inverter is set by operating AVR/Variac instructed by the computer. Though the frequency of the inverter can be varied between a wide range, the inter phase separation remains always 120° yielding a true pattern of a three-phase power supply.

KEYWORDS: Inverter, Drive, Motor, MOSFET, VCO

Efficiency Comparison of VSC-HVDC System with Shrinking Span Membership Function Fuzzy Logic Controller and SPWM Control

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ABSTRACT

In this paper the comparative study of VSC-HVDC system with Shrinking Span Membership Function (SSMF) Fuzzy Logic Controller (FLC) and VSC-HVDC system with PWM control is analyzed. The fuzzy logic controller provides a means of converting a linguistic control strategy based on expert knowledge into an automatic control strategy. The SSMFs have different spans for various term set elements in the universe of discourse. This research work has three objectives; the first one is to show the effect of PWM controller on HVDC. The second one is to show Shrinking factors on the performance of FLC and the third one is efficiency comparison of VSC-HVDC system between Fuzzy logic controller and PWM controller.

KEYWORDS: VSC-HVDC system, Fuzzy Logic Controller, PWM control, Shrinking Span Membership Function.

Temporal Behavior Analysis of Different Parameters of Electric Ignition System for Combustion Engines.

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ABSTRACT

The aim of this work was to build a Mathematical model with differential Equations for an ignition system that can be used to simulate the temporal Behavior of the voltages applied to Spark plugs. The mathematical model was used to simulate the dynamic Electrical behavior of the ignition System. Models of the included Components were developed. A physical Model for the creation of electrical Sparks in a gas in homogeneous Electric fields was developed too. The Sparking potential dependency upon Gap distance, pressure, temperature And composition is discussed too. In Addition it was investigated that how Different parameters affect the Maximum allowed speed of revolution. Behaviors of different parameters are Verified with extensive simulation Results.

KEYWORDS: Ignition systems, Otto cycle, wet and dry conditions, comments and discussions.

Single Phase Two-Stage Ac-To-Dc Series Resonant Converter for Medium To High Power Applications

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ABSTRACT

This paper presents a new single-phase, pulse width modulated (PWM), two-stage ac-to-dc series resonant converter with 3-phase high frequency transformer isolation for high power applications and low total harmonic distortion (THD). This converter uses a boost converter operating in discontinuous current mode (DCM) for natural power factor correction and a 3-leg bridge for dc-to-dc converter using phase shifted PWM with frequency modulation for output voltage control to process high power. Principle of operation and different operating modes are presented with analysis. Based on the analysis design example of a 1 kW, 360 V, 50 kHz ac-to-dc series resonant converter is presented to explain design procedure. PSPICE simulation results for the designed converter are also presented. These results verify converter operation and show high power factor and low total harmonic distortion of this converter for a reasonably wide range of load.

KEYWORDS: pulse width modulation, series resonant converter, boost converter, total harmonic distortion

Technical Session: Day 2, Session 4
Digital Logic Design and VLSI

Design of a MIPS Instruction Set Simulator (ISS) for a Multicore Computer Architecture Research in SystemC

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ABSTRACT

Hdl languages like verilog or vhdl are very cumbersome and slow for system level simulation but high level languages like c, c++, and java are not good enough to provide standardization and cannot simulate the real flow of the instructions. SystemC provides a unique and unprecedented opportunity to design a complex hardware like multicore processors in more abstract and standardized way. Designing a multicore system in systemC is very suitable as it can be designed in highly modular, intuitive and standardized way. In this paper, design and testing of a research based ISS for MIPS architecture is explored and its advantages over other ISS designs written in other languages is also discussed.

KEYWORDS: ISS, MIPS, SytemC, Benchmark

Crosstalk Minimization is a Challenge in Designing High Performance VLSI Circuits

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ABSTRACT

Crosstalk minimization is one of the most important aspects in interconnecting VLSI circuits. With the advancement of fabrication technology, devices and interconnecting wires are placed in closer proximity and circuits operate at higher frequencies. This results in crosstalk between wire segments. In this paper, we show that the crosstalk minimization problem in the reserved two-layer Manhattan routing model is NP-complete, even if channels are free from any vertical constraint. In addition, we introduce the problems of minimizing bottleneck crosstalk and approximating crosstalk minimization, and prove that these problems are also NP-complete. We further show that all these results hold even if doglegging is allowed.

KEYWORDS: channel routing; NP-hardness; crosstalk minimization; high performance routing; bottleneck crosstalk; approximation algorithm; doglegging; green computing.

Test Vector Compression Technique in VLSI Circuits

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ABSTRACT

The subject paper presents study on a new hybrid test vector compression method for testing VLSI circuits. In the proposed approach, a software program is first loaded into the on-chip processor memory along with the compressed test data sets. For minimizing on-chip storage besides testing time, the test data volume is initially reduced by compaction in a hybrid manner before downloading into the processor. The technique utilizes some adaptive coding techniques for realizing lossless compression. The compression program need not be loaded into the embedded processor, since only the decompression of test data is needed for the automatic test equipment. The developed scheme requires minimal hardware overhead, while the on-chip embedded processor can be reused for normal operation on completion of testing. The paper reports results on studies of the problem and demonstrates the feasibility of the suggested methodology with simulation results on selected ISCAS 85 combinational and ISCAS 89 full-scan sequential benchmark circuits.

KEYWORDS: system-on-chips; built-in self-testing; very large scale integration; test vector compression.

Is Queuing Model Good for Processor Fast Benchmarking?

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ABSTRACT

Processor architecture simulations take days during design when silicon not available. Long simulation time is impractical, yet cost of early design mistake is high. Analytical models execute fast and recently introduced method named Fast Benchmarking produce performance results in milliseconds. With accurate analytical model, results produced by Fast Benchmarking are also accurate. For example, instruction fetch results differ by $\pm 7\%$ on average with simulations. This paper examines queuing model of a processor suitable for Fast Benchmarking. Compared to artificial neural network or simulation, the queuing model gives better insight about a micro-architecture design.

KEYWORDS: Processor, Architecture, Benchmarking, Modeling, and Simulation.

Switching from Real to PVAM Mode Operation of Intel 80286 High Performance Architecture

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ABSTRACT

Now-a-days, the PC users can perform many tasks concurrently in a secure and cost effective manner by virtue of High Performance Features of the Intel 80286+ architectures that support multiuser-multitasking operations (known as Multiuser support), execution of an application program much larger than the installed physical memory (known as Virtual Memory support) and the activation of the chip's internal electronic hardware protection fences to prevent an unauthorized user from accessing-corrupting the code-data of another user (known as Protection support). All these distinctive features of the modern microprocessors (MPU) are available to the users in PVAM (Protected Virtual Address Mode) mode, the operation of which requires Real Mode (RM) initialization of complex data structures like GDT Table (Global Descriptor Table), LDT Table (Local Descriptor Table), IDT Table (Interrupt Descriptor Table), GDTR (Global Descriptor Table Register), LDTR (Local Descriptor Table Register), IDTR (Interrupt Descriptor Table Register), Descriptors and finally 'switching over mechanism from Real Mode to PVAM Mode'. This paper presents a brief review of Intel Architecture, theory of RM-PVAM modes of operations, code-level implementation of Real-to-PVAM switching (Fig. 4) and a practical example of a 'Protected Mode Program (Fig. 10)' with reference to 80286 architecture, which for the 1st time in 1982 had implemented PVAM features and remained as design base line for the architectures of 80386–Pentryn.

KEYWORDS: PVAM Mode, Real Mode, Built-in Protection fence, Virtual Address, 80286 trainers.

Development of an 8-Bit Microprocessor Learning System using Intel 8085 Architecture

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ABSTRACT

Human intelligence chalks out a set of sequences, which a machine is forced to follow to produce the desired result. Microprocessor (MPU) is a semiconductor chip that learns these sequences from human being and passes to the high-tension peripherals of the target machine. To sustain man-machine co-existence for the betterment of the society, it is very crucial that the coming-up generations practice the art of microprocessor programming using basic (simple and elementary) learning systems. In this paper, the design and development methodology of an 8-bit microprocessor learning system (trainer) using Intel 8085 architecture has been presented. The 8085 microprocessor though appeared in 1978 is still considered as one of the most simplest and versatile chips for learning purposes at the undergraduate studies.

KEYWORDS: Printed Circuit Board, Printed Through Hole, Monitor Program, Assembler, MicroTalk-8085, Intel-Hex File

Technical Session: Day 2, Parallel Session 4
RF and Microwave Techniques

High-resolution Doppler Profiles for UWB Radar Signals using MUSIC Method

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ABSTRACT

In this paper we have extended multiple signal classification (music) technique for UWB noise radar signals to achieve better resolution with more precise Doppler estimation compared to the conventional Fourier transform (ft) based methods. Performance of UWB (1 GHz) noise radar signals using ft-based and music-based techniques have been simulated and examined for comparison purpose for multiple moving targets within the same radar range bin. Music clearly provides Doppler profiles with high resolution and accuracy for multiple moving targets.

KEYWORDS: UWB, MUSIC, Doppler, FFT

Measurement and Prediction of Indoor Signal Propagation for ISM Band

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ABSTRACT

This paper is focused on the measurement and prediction of indoor signal propagation for ISM band system in frequency bands 2.4 GHz and 5.3 GHz. In this research, two basic radio propagation models are studied and compared with theoretical and practical data. This comparison result is implemented on the test indoor wireless network. Based on the consideration, this paper proposes an enhancement to the path loss model in the indoor environment for improved accuracy in the relationship between distance and received signal strength. The model can be used as a prediction model that can be further developed to fit in other indoor scenarios too.

KEYWORDS: WLAN, ISM Band, Indoor Propagation Model, Path Loss

Radio Frequency Controlled Vehicle Tracking System

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ABSTRACT

The Global Positioning System (GPS) is now widely used in all forms of applications ranging from catching of robbers to surveying purposes used by military. In this short span of time GPS has become an important part of the advanced technology being used. However in this project I have replaced the GPS technology with RF Antennas for tracking a car. This replacement will be cost effective & will be much simpler than the prevalent GPS technology. In a very small scale we are using radio controlled car using RF Antenna. In a very small scale we are using radio controlled car using RF antenna. For this purpose we will be using phase detection method and the observed phase difference can be used to calculate the distance between the transmitter and the receiver. As it is a real case scenario so there is a possibility of multipath fading and to overcome this we can use orthogonal Frequency Division Multiplexing (OFDM) scheme. I have tried to design a MATLAB model based on this simple and intelligent system and also it will incur very low cost as compared to GPS system.

KEYWORDS: Global Positioning System, Vehicle locator Unit, OFDM, RSSI, Intersymbol Interference, QAM, Phase Shift Keying, Fast Fourier Transformation, IFFT, MIMO.

Wideband Four-Branch Inverted-F Antenna for WLAN/WiMAX Applications

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ABSTRACT

This paper presents a wire type wideband four-branch inverted-F antenna for 5 GHz WLAN/WiMAX applications by means of numerical simulation. The antenna has good peak gain of 6.66 dBi with less than 1.5 dBi gain variations within the 10 dB return loss bandwidth throughout the 5 GHz operating band. Moreover the proposed antenna can provide a wide impedance bandwidth of 2.45 GHz (4650~7100 MHz) and the size of the antenna is very small 17×20 mm². In addition, the proposed antenna has achievable return loss and radiation characteristics.

KEYWORDS: Inverted-F Antenna, Wideband Antenna, Low Profile Antenna, WLAN, WiMAX.

Estimation of Rain Attenuation over DTH Antenna in India using DAH Model

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ABSTRACT

In telecommunication, 4G mobile systems are almost ready to be launched and 3G services are already launched which drastically offered content rich services, wireless broadband access to Internet, and worldwide roaming, GPS and many more. However the broadcasting nature of the satellite and wireless communication and increased popularity of wireless devices introduce problems in many directions. Direct-to-Home (DTH) TV viewers and service providers must be assured of the error-free successful data communication. No signal problem during windy and rainy season is very common in DTH. The paper focuses the research work to improve the quality of DTH services in heavy raining zones of sub-tropical Indian regions bordering Bangladesh. Here the rain patterns of the regions from 2006-2010 are presented. The rain attenuation is estimated using DAH model over TATA Sky DTH antenna. The rain attenuations found in the estimation are very nominal but it disturbs highly to the service.

KEYWORDS: DTH, rain intensity, rain attenuation, signal strength, DAH model

Correlation of Heart-rate and Cardiac Cycle Duration under Different Body Positions and Breathing

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ABSTRACT

Electrocardiogram (ECG) is one of the inexpensive, simple to perform, risk-free tools for the early analysis of many cardiac abnormalities. The relation between mechanical event and electrical event is important because they are used to determine idiosyncrasy of heart. This paper describes the ECG as a primary tool for evaluating electrical events within the heart and to correlate the electrical events with the mechanical events that occur during the cardiac cycle under different body position and breathing such as supine, sitting up, regular breathing, deep breathing and post-exercise. The cardiac cycles are recorded using BIOPAC system and are analyzed by BSL PRO 3.7.3 software. The heart rate and cardiac cycle duration have significantly different values under different physical conditions which are supported by low p-value ($1.67602e-12$) in ANOVA test and their interpretations are also described in this paper.

KEYWORDS: ANOVA, Cardiac cycle duration, ECG, electrical event, heart rate, mechanical event.

Improvement of Medical Imaging Equipment Maintenance Management of Bangladesh

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ABSTRACT

This paper deals with the development of standard Medical Imaging Equipment Maintenance Management System (MIEMMS) in the health services of Bangladesh. Users of equipment should be trained to do routine simple maintenance on equipment. This will increase user care of equipment and cooperation with maintenance technicians to reduce equipment breakdowns. At the same time, this will promote the culture of equipment care and maintenance to improve the quality of health care. Proper maintenance of medical equipment is essential to keep the instrument functional long time with highest quality reliable diagnosis condition and to save capital investment. Various obstacles for expanding medical equipment maintenance capabilities in Bangladesh have been discussed. Maintenance Management problems are complicated by the ever-increasing use of medical imaging equipment as health care is modernized. To date, the maintenance situation in Bangladesh is getting worse and requires special attention. Maintenance capabilities are considered during the initial stage of making a decision to acquire equipment, maintenance problems can be minimized. The mission is to ensure that equipment used for patient care is safe, available, accurate, and affordable.

KEYWORDS: Medical imaging equipment, maintenance management, health services, safety and calibration, record keeping.

Genetically Optimized HMM for Robust Speaker Identification in Noise

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ABSTRACT

This paper presents an approach to evaluate the performance of a robust speaker identification system under noisy environment by a hybrid algorithm based on Hidden Markov Model (HMM) optimized by Genetic Algorithm (GA) using cepstral based speech features. Though the traditional HMM based speaker identification system is very sensitive to the speech parameter variation, the proposed hybrid system is found to be stable and performs well for improving the robustness and naturalness of human-computer interaction. In this work, we investigated two approaches that utilize speech utterance to improve speaker identification performance in acoustically challenging environments: one seeks to eliminate the noise from the acoustic features by using speech pre-processing techniques. The other task combines cepstral features that have been used by the Genetic algorithm based Hidden Markov Model hybrid system to improve the performance of speaker identification system. According to the NOIZEOUS speech database, the highest speaker identification system has been achieved to be 60.18% under eight different noisy environments such as airport, babble, car, exhibition hall, restaurant, street, train and train station noise.

KEYWORDS: Robust Speaker Identification, Genetic Algorithm, Hidden Markov Model, Speech Feature Extraction, Hybrid System.

Technical Session: Day 2, Session 6
Semiconductor and Nanotechnology

Capacitance measurement of a SOI Tunnel FET

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ABSTRACT

here a study of the performance of a SOI tunnel field effect transistor with raised buried oxide in drain region has been done. The heterogate dielectric used to reduce the parasitic bipolar current at the drain side and to increase the tunneling current at the source side. The study is carried out using 2d synopsis TCAD tools. Due to source side tunnel barrier conventional tunnel FET has low on current and increased miller capacitance effect. It is shown that the proposed device exhibits improved performance interims of higher I_{on}/I_{off} , better subthreshold swing, and lower gate capacitance compare to conventional silicon tunnel FET and suitable for low power digital application.

KEYWORDS: Band-to-band tunneling, SOI, heterogate-dielectric, subthreshold swing (SS), miller capacitance.

Impact of Quantum Mechanical Correction in Surface Potential Based Compact Model on the Drain Current of Nanoscale MOSFETs

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ABSTRACT

Impact of the Quantum Mechanical (QM) correction in surface potential (SP) based compact model on the drain current of nanoscale MOSFETs is studied. Comparison has been made between a QM model which accounts for wave function penetration effect and the QM models PSP and Prégaldiny et al., both of which incorporate bandgap widening approach and neglects wave function penetration effect. Results show that the wave function penetration effect into the gate dielectric plays an important role in modeling the drain current of nanoscale MOSFETs. Models which neglect this effect tend to overestimate the I_{Dsat} and hence underestimate the drain current. The impact is more pronounced in the moderate inversion region.

KEYWORDS: characteristics, compact model, quantum mechanical (QM) effects, surface potential, wave function penetration effect.

Structural and magnetic properties of Cu substituted Mn-Zn ferrites

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ABSTRACT

Mn_{0.50}Zn_{0.50-x}Cu_xFe₂O₄ with x = 0.00, 0.05, 0.15, 0.25 ferrites were prepared by combustion technique. The lattice parameters of the samples are calculated using Neilson-Relay function from the X-ray diffraction (XRD) pattern. The lattice parameter is found to decrease with increasing Cu content in these ferrites. The average grain size decreases with increasing Cu content. The initial permeability decreases with increasing Cu content. The resonance frequency of all samples shifted towards the higher frequency as μ_i / decreases with increasing Cu content. The field dependent magnetization decreases first for x = 0.05 and for further increase in cu concentration magnetization increases. Appreciable values of μ_i / of these ferrites are suitable for transformer applications.

KEYWORDS: Mn-Zn ferrite, combustion, lattice parameter, porosity, permeability.

Impact of Cr³⁺ on the Structural and Magnetic Properties of Mn-Cr-Zn Ferrites

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ABSTRACT

Cr³⁺ ion substituted Mn_{0.50}Zn_{0.50}Cr_xFe_{2-x}O₄ (with x = 0.0, 0.3 and 0.6) ferrites have been prepared by combustion method and sintered at various temperatures (1250, 1300 and 1350°C). Phase pure single phase cubic spinel structure was confirmed by means of X-ray diffraction patterns. The lattice parameter was found to decrease with increase in Cr content. The grain size, bulk density and initial permeability decrease with increase in Cr content. The bulk density decreases for a constant sintering temperature but it increases with increase in sintering temperature. The real part of initial permeability decreases with increase in Cr content but enhances the utility range of frequency. The B-H loops of the compositions were measured at room temperature. The incorporation of Cr³⁺ caused the magnetization, retentivity and hysteresis losses to decrease. So the inclusion of chromium is advantageous for high frequency transformer applications.

KEYWORDS: Mn-Zn ferrite, hysteresis, lattice parameter, retentivity, permeability.

Effect of Annealing on Structural and Electrical Properties of Zn_{0.2}Cd_{0.8}S Thin Film Deposited by Spray Pyrolysis

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ABSTRACT

Zn_{0.2}Cd_{0.8}S thin film has been deposited onto preheated glass substrates at 250°C by a simple spray pyrolysis technique. The surface optical photograph and Energy Dispersive X-ray (EDX) has been taken to study the surface morphology and compositional analysis of the as-deposited film and annealed Zn_{0.2}Cd_{0.8}S films of annealing temperatures at 400, 500, 600 °C for one hour. X-ray diffraction has been taken on as-deposited Zn_{0.2}Cd_{0.8}S thin films and also for annealed samples for structural characterization. Electrical parameters like resistivity, conductivity, sheet resistance, activation energy etc. of the Zn_{0.2}Cd_{0.8}S film has been measured by the Van der Pauw method.

KEYWORDS: Spray pyrolysis, Zn_{0.2}Cd_{0.8}S, X-ray, EDX, and Activation energy.

Design and Characterization of InGaN Based 1.55 μm Lasers using Thermal Modeling

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ABSTRACT

Recently a large number of devices and simulations involve in optoelectronic system designs, and the associated need for compact optoelectronic device models leads us to a thermal modeling for InGaN based 1.55- μm quantum-well heterostructure lasers. The thermal resistance and TBR (thermal boundary resistance) are calculated by solving Klemens–Callaway expression. The output power and its temperature dependency are also evaluated by solving the thermal rate equations. This model allows the calculation of thermal resistance, threshold current and temperature dependency on applied direct current. The relative importance of the various mechanisms is evaluated, and self-heating is shown as an important factor affecting the threshold current at high temperatures. The thermal characterization helps to investigations of transient electrical processes in the diode sources under heating by direct current.

KEYWORDS: Thermal modeling, rate equations, heterostructure, quantum well, self heating.

Technical Session: Day 2, Parallel Session 6
Intelligent Systems and Robotics

Dynamic Computation of Load Power Factor through the Evaluation of Maclaurin $\cos x$ Function using 8051 Microcontroller Architecture

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ABSTRACT

Power factor is an index of the utilization efficiency of electric energy at the load side. Linear inductive loads of the industries operate at low power factor and thus reduce the utilization factor of electric energy. To counteract it, the industry owners install PFI plant, which measures the load power factor and then switches capacitor banks as needed to raise the power factor. This paper presents a method [Eqn. 2], which finds the phase shift (θ) between v - i waves by detecting their zero crossing points, transform it into equivalent counts (N) and then pass it into the Maclaurin $\cos x$ Series for dynamic computation of power factor by 8051 microcontroller. The method has been tested using 8051 microcontroller (Fig. 1[2]) and the results are found in good agreement with the theoretically computed results (Table 1).

KEYWORDS: Zero Crossing Points, PFI Plant, Power Factor, Maclaurin Series, Inductive Load.

Offline Handwritten Character Recognition using Artificial Neural Network

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ABSTRACT

The performance of an optical character recognition (OCR) system lies in the feature extraction stage. This paper attempts to recognize the optical characters using a feature set based on point feature approach. The feature set is obtained by subdividing the character into certain number of subzones. Point feature is extracted for each of these subzones to define the representative features of the character. The strength of the algorithm lies in number of feature points extracted to recognize the character. The system is trained using multilayer feed forward neural network. The experimental results show that the proposed method yields an overall recognition rate of 97:83%.

KEYWORDS: Optical character recognition, neural network, pattern recognition, feature extraction, point feature, off-line character recognition.

Indoor Positioning Using LED Based Visible Light Communication and Image Sensors

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ABSTRACT

We propose an algorithm for high Precision indoor positioning using Lighting LEDs, visible light Communication and image sensors. In The proposed algorithm, 3-dimensional Coordinate information transmitted From at least four LEDs are Demodulated by two image sensors at The unknown position. The unknown Position is then estimated from the Geometrical relations of the led Images created on the image sensor. The proposed system can estimate the Unknown position within the accuracy Of few centimeters. Positioning Accuracy can be increased by using High resolution image sensors or by Increasing the separation between the Image sensors.

KEYWORDS: VLC, Indoor positioning, LED, Image sensor.

Mobile Banking and Payment System Using Bluetooth Media

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ABSTRACT

The considerable increase of mobile device users in recent years causes a strong demand on secured wireless bank services and reliable mobile commerce (m-commerce) applications. Since mobile payment (m-payment) & banking is a critical part of most wireless information services and mobile commerce applications, how to build secured m-payment systems becomes a research hotspot. This work presents an effective mobile payment system (MPS) in existing wireless insecure environments using mobile devices. The proposed framework provides a secure and convenient payment mechanism.

KEYWORDS: Interactive voice response, Mobile payment system, Point of sale and Wireless access protocol.

Cloud-based E-governance with WiMAX for Developing Country

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ABSTRACT

Developing countries have the challenges for state management to prioritize of service area. Education and ICT (information and communication technology) is the most preferred area to improvise in economic way. In this article, a model of cloud-based e-governance has been proposed addressing the developing countries. The etiquette and challenges of cloud-based e-governance has also been discussed.

KEYWORDS: cloud computing, e-governance, WiMAX technology, Internet, digital country.

Spiking Neural Networks on High Performance Computing Platforms

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ABSTRACT

In this paper we examine the acceleration of four spiking neural network models on three categories of high performance processors: x86, STI Cell, and NVIDIA GPGUs. The x86 processor utilized is a dualcore AMD Opteron, the Cell processor is in a Sony Playstation 3s, while the GPGPU is an NVIDIA Tesla S1070 system. The results indicate that the GPGPU platform provides higher performance compared to the Cell and x86 platforms examined.

KEYWORDS: Neuromorphic, multi-core processors.

Simulated Annealing Variants in Solving The Staff Transfer Problem

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ABSTRACT

The Staff Transfer Problem occurs in large organizations that have offices and work-sites at multiple locations. As a strategy of Human Resource Management the authority transfer a subset of employees from one office/work-site to other at regular intervals. The problem has been modeled in this paper as a Combinatorial Optimization Problem and different variations of Simulated Annealing have been applied to solve this problem. Our observation is that the variants incorporated with tabu list perform better than greedy or basic Simulated Annealing.

KEYWORDS: Simulated Annealing, constraints, optimization, greedy strategy, tabu list.

A Hybrid Obstacle Avoidance Strategy for Active Bat IPS Guided Holonomic Mobile Robots

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ABSTRACT

In this paper, two different concepts of avoiding obstacles are combined as a hybrid method for an Active Bat Indoor Positioning System guided mobile robot. The concept of Active Bat IPS guidance for mobile robot navigation has recently been developed, where path planning algorithm is presented for navigating through permanent static obstacles using predefined stations. Here we have described strategy for avoiding temporary static and dynamic obstacles about which the robot does not have any knowledge beforehand. Collective use of Tangent Bug algorithm and Velocity Obstacle method with Directive Circle concept can efficiently deal with any type of unknown obstacles in an indoor environment. State of motion (static or dynamic and speed, direction) is determined from range-sensor's reading as velocity vector of the obstacle and these data are used for limiting robot's velocity and direction of movement to avoid possible collision in this hybrid strategy.

KEYWORDS: mobile robot, active bat, tangent bug, velocity obstacle, directive circle

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