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TECHNICAL PROGRAM / ABSTRACT

A11

Industrial Electronics & Applications

Time: 8:40 -13:00
Room: ROSE GARDEN

Chairs: Nabil Hidayat (Faculty of Electrical Engineering, Malaysia), Ili Shairah Abdul Halim (Universiti Teknologi Mara & Faculty of Electrical Engineering, Malaysia)

08:40 A Current Sensing Circuit Using Current-Voltage Conversion for PMOS-Based LDO Regulators

Tay Ho Quang (ICDREC - Vietnam National University, Vietnam)

In this paper, a standalone output current sensing module for CMOS low dropout linear voltage (LDO) regulator with PMOS as pass device is proposed. The main purpose of current sensing is to create an over-current protection or to limit the output current value in certain applications. Based on I-V conversion in which the supply voltage varies from 2.7V - 4.2V, the current clamp value varies from 178mA to 270mA in the case of 200mA load limiting. The proposal has been successfully fabricated using a CMOS technology, and verified through the correct operation of a power management prototype chip.

pp. 1-4

09:00 Five Phase Space Vector Modulation Voltage Source Inverter Using Large Vector Only

Mohd Syazimie Zulkifli (UiTM, Malaysia); Wan Noraishah Wan Abdul Munim (Universiti Teknologi MARA, Malaysia); Harizan Che Mat Haris (UiTM, Malaysia)

AC machine with a phase number higher than three enables utilization in electric drives and considered for several applications today. The multi-phase gives more advantages compared to three-phase counterparts. Voltage Source Inverter (VSI) is used to control the speed of three-phase by changing the frequency and the voltage. It consist of input rectifier, DC link and output converter. Space vector is also used as the method that preferred real-time modulation techniques and widely use for digital control of VSI. Since then, the study on Five Phase Space Vector Modulation VSI using large vector has been developed. This paper concentrate on the outer most decagon space vector only that does not include the whole of the decagon, d-q plane. The waveform of Line to Line Voltage, Phase to Neutral Voltage and Pole Voltage have been compared from theoretical view using Microsoft Excel and validate through simulation using MATLAB/Simulink. The Total Harmonic Distortion (THD) is compared with different modulation index and showed that the THD percentages reduced when the modulation index increased.

pp. 5-9

09:20 Modeling of AC-DC Converter Using 0.18 μ m CMOS Technology

Roskhatijah Radzuan (Universiti Teknologi Mara, Malaysia); Mohd Azril Ab Raop (Universiti Teknologi MARA, Malaysia); Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave Technology Centre, Malaysia); Mustafar Kamal Hamzah (Universiti Teknologi MARA, Malaysia)

This paper proposes a modeling of low-power CMOS transistors, which are suitable for AC-DC converter applications. First section described DC analysis of input and output device of CMOS transistor using Spectre simulation tool from Cadence Design Systems. After that, advanced CMOS transistors have been applied onto development of low-voltage CMOS AC-DC converter with minimized voltage drop and power consumption. The input voltage is set to 1.0 V and the operating power supply frequency is 50 Hz. As a result, the CMOS rectifier has gained 94 % of power efficiency and very small voltage drop, 39 mV with purely resistive load.

pp. 10-13

09:40 High Efficiency Multijunction Solar Cells

A Yousefi (IUST, Iran); Qurbonjon Kabutov (Physical-Technical Institute, Iran)

The idea that a multi-junction solar cell can achieve high efficiency has a long history, dating back to 1957. However the actual realization of efficient multi-junction solar cells that demonstrate the advantages predicted by the early studies, has taken approximately 30 years. Currently there is cause for optimism and considerable efforts are underway to bring highly efficient multi-junction solar cells to terrestrial concentrator systems. This paper will provide an overview of important developments of high efficiency multi junction solar cells over the last decade.

pp. 14-19

10:00 Single-Phase Matrix Converter with Reduced Switch Count Operating as Buck or Boost Rectifier

Rahimi Baharom (Universiti Teknologi MARA, Malaysia); Nabil Hidayat (Faculty of Electrical Engineering, Malaysia)

This paper presents Single-Phase Matrix Converter (SPMC) with reduced switch count operating as buck or boost rectifier. Instead of eight switches, SPMC with reduced switch count employed six switches due to redundant switches that present in previous buck and boost rectifiers using SPMC. Both buck and boost rectifiers are using the same proposed circuit topology which only six switches are being used with the same parameters of the RC load. The performance of buck and boost rectifiers is observed and the relationship between output voltage with the variation of modulation index is analyzed. Pulse Width Modulation (PWM) technique was used to synthesis the output voltage. These proposed circuits are being modelled using MATLAB/Simulink and verified by experimental test rig. Selected simulation and experimental results are presented for verification.
pp. 20-25

10:20 Effect of Different Widths in CMOS Rectifier for Low Voltage and Frequency Application

Mohd Azril Ab Raop (Universiti Teknologi MARA, Malaysia); Roskhatijah Radzuan (Universiti Teknologi Mara, Malaysia); Mustafar Kamal Hamzah (Universiti Teknologi MARA, Malaysia); Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave Technology Centre, Malaysia)

This paper presents the study on the effect of different widths in CMOS rectifier for low voltage and frequency application. The model is powered by 1V peak voltage of AC supply with frequency of 50Hz. This low frequency is used in this paper to match with the supply frequency from the power plant. The design is based on the CMOS 0.18 μ m technology. The paper focuses on the effect of the two different width sizes (4 μ m and 50 μ m). The result for 4 μ m is 558.36mV and increased by 40.6% for 50 μ m width. The simulation is run using CADENCE Simulation Tools software.
pp. 26-28

10:40 Morning Break

11:00 Comparative Study on Multistage Amplifier and Folded Cascode Amplifier Design in Sample and Hold Circuit Using 0.18 μ m CMOS Technology

Siti Lailatul Mohd Hassan (Universiti Teknologi Mara, Malaysia); Ili Shairah Abdul Halim (Universiti Teknologi Mara & Faculty of Electrical Engineering, Malaysia); Azra Afhzan Ab Rahim (Universiti Teknologi MARA, Malaysia); Tuan Norjihhan Tuan Yaakub (University Teknologi MARA, Malaysia)

This paper presents the comparison between multistage amplifier and folded cascode amplifier design using 0.18 μ m CMOS technology. The objective of this project is to compare gain and power dissipation between these two design models. Sample and hold circuit (SHC) is the main component in pipelined ADC. Designing a low power, high gain SHC is crucial, that is the main reason why multistage amplifier is applied in this project. Implementation has been done in 0.18 μ m technology, for a 5MHz sampling frequency, considering 1.2 Vpp voltage and 1.8V voltage supply using SILVACO EDA tools. From the simulation, the multistage amplifier consumes 0.139mW power and has gain of 94.64dB. The folded cascode amplifier has 6.5mW power dissipation and 70dB gain. From the simulation results, the multistage amplifier is better in term of gain and power dissipation than the folded cascode design.
pp. 29-34

11:20 Comparative Study of Comparator and Encoder in a 4-bit Flash ADC Using 0.18 μ m CMOS Technology

Ili Shairah Abdul Halim (Universiti Teknologi Mara & Faculty of Electrical Engineering, Malaysia); Siti Lailatul Mohd Hassan (Universiti Teknologi Mara, Malaysia); Azra Afhzan Ab Rahim (Universiti Teknologi MARA, Malaysia); Nurul Dalila Mohd Akbar (UiTM, Malaysia)

This paper describes a comparative study of comparator and encoder in 4-bit Flash Analog to Digital Converter (ADC) for Pipeline ADC to obtain a high speed ADC. In this paper, the conventional comparator is replaced with an open loop comparator and the non-ROM type encoder is used as the alternative for the conventional encoder. It is implemented using 0.18 μ m CMOS technology. Generally, the Silvaco Electronic Design Automation (EDA) tools is used for drawing the schematics, do the simulations and designing the layout of the proposed Flash ADC. The simulation results include 1.8V analog input range and 24.2662 mW of power dissipation at maximum sampling frequency of 500MHz with the lowest propagation delay time of 539.61ps.
pp. 35-38

11:40 Design and Fabrication of Long-wavelength GaInNAs Quantum Well Edge-emitting Lasers

Mohd Sharizal Alias (Telekom Malaysia Research & Development, Malaysia)

The paper presented comprehensive theoretical design study and experimental fabrication of long wavelength GaInNAs edge-emitting laser diode. The theoretical results reveals that optimal GaInNAs active region and device structure are acquired, where high material gain near 1.3 μ m and precise optical mode confinement are obtained. Room temperature lasing emission around 1.27 μ m with low threshold current and threshold current densities are achieved in broad area GaInNAs laser diode grown by molecular beam epitaxy. The theoretical results of photoluminescence spectrum and light-current-voltage characteristic shows a very good agreement with the experimental results.
pp. 39-42

12:00 A Firefly Algorithm Approach for Routing in VLSI

Mohd Nasir Ayob (Universiti Malaysia Perlis & Universiti Teknologi Malaysia, Malaysia); Amar Faiz Zainal Abidin (Universiti Teknologi Malaysia, Malaysia); Abdul Halim Ismail (Universiti Malaysia Perlis, Malaysia); Ahmad Fariz Hasan (Universiti Malaysia Perlis & UNIMAP, Malaysia); Hassrizal Hassan Basri (Universiti Malaysia Perlis, Malaysia); Muhamad Safwan Muhamad Azmi (Universiti Malaysia Perlis, Malaysia)

Many studies had been conducted in improving the performance of large scale integration circuits that heavily depends on the interconnected routing in the circuits. Strategic choice of wire placement and buffer placement for very large scale integration (VLSI) routing can improve time delay of VLSI circuit. This paper explores the use of Firefly Algorithm in VLSI routing. The location of doglegs is employed to model the firefly that represents the routing solution. The proposed approach is then compared with previous literature for benchmarking. The result indicates that it has a good potential in VLSI routing and can be further extended in future.

pp. 43-47



Computer Applications & Software Engineering

Time: 08:40 - 13:00
Room: Orchid

Chair: Abu Bakar Sultan (University Putra Malaysia, Malaysia), Riaza Mohd Rias (Universiti Teknologi MARA, Malaysia)

08:40 Evaluating Thread Level Parallelism Based on Optimum Cache Architecture

Mehdi Alipour (Qazvin Islamic Azad University, Iran)

According to the increasing complexity of embedded applications embedded processing engines have to process more computation-intensive tasks with limited area and power budget. By scaling down the feature size and emersion of multicores that are usually multi-thread processors, the performance requirements are somehow guaranteed. In the recent multi-core multi-thread systems, the performance and power consumption is severely related to the average memory access time and its power consumption. This makes the cache as a major important part in designing multi-thread multi-core embedded processor architectures. In this paper we perform a comprehensive design space exploration to find cache sizes that create the best tradeoffs between performance, power, and area of the processor. Finally we run multiple threads on the proposed optimum architecture to find out the maximum thread level parallelism based on performance per power and area efficient uni-thread architecture.

pp. 48-53

09:00 High Performance NonPreemptive Dynamic Scheduling Algorithm for Soft Real Time System

Zahereel Ishwar Abdul Khalib (University of Malaysia Perlis, Malaysia); Badlishah R Ahmad (Universiti Malaysia Perlis, Malaysia); Ong Bi Lynn Ong (Universiti Malaysia Perlis, Malaysia)

Scheduling algorithms for soft real time application should focus on increasing Deadline Meeting Rate (DMTR) during overload. Here we propose an algorithm which is based on EDF which boost the performance of soft real time system during overload while maintaining optimum performance during normal load poses by EDF. This algorithm does not require overload detection as many other overload handling algorithm do. With this algorithm we grouped jobs with nearly identical deadline using a novel algorithm and executes the jobs of a group utilizing another approach. We present the logic behind the algorithm along with some simulation result of the achieved DMTR compared to EDF.

pp. 54-59

09:20 M-Hadith: Retrieving Malay Hadith Text in a Mobile Application

Riaza Mohd Rias (Universiti Teknologi MARA, Malaysia)

Recent rapid advances in handheld devices make it possible for users to retrieve information anytime and anywhere. Existing information retrieval techniques usually require the users to spend much effort to refine their queries. Information retrieval in mobile devices would represent an extremely challenging search environment. Due to the existing challenging constraints in technology, there is a need to have a simple and easy information retrieval in mobile with an attractive interface to attract more users to use this application. The M-Hadith prototype is designed to provide searching Malay Hadith text based on query word using stemming algorithm to get results on the query. Since, stemming is a basic text processing tool where it is used for efficient and effective text retrieval and machine translation, therefore, it has been adapted in the development of M-Hadith. Early results in the mobile simulator show compatibility and efficiency in various type of mobile devices.

pp. 60-63

09:40 Offline Time-Stamping Using TPM and Its Java Library

Shohei Kakei (Gifu University, Japan); Masami Mohri (Gifu University, Japan); Yoshiaki Shiraiishi (Nagoya Institute of Technology, Japan); Ryoji Noguchi (Toyotsu Syscom Corp., Japan)

Digital time-stamp is a component for making a digital evidence of data. It proves that there has been a data since a particular time, and the data has not been tampered with after time-stamping. A PKI-based time-stamping scheme is standardized in RFC3161. In the scheme, Time Stamping Authority (TSA), which is a trusted third party, issues a digital time-stamp and a client cannot requests time-stamp to TSA without internet access. This paper proposes an offline time-stamping scheme using TPM. The proposed scheme can make time-stamp that is detectable with alteration and forgery. The implementation of the proposed scheme requires the knowledge of TPM. This paper shows the Java library for easy development of the offline time-stamping using TPM.
pp. 64-69

10:00 Applying Evolution Programming Search Based Software Engineering (SBSE) in Selecting the Best Open Source Software Maintainability Metrics

Abubakar Bakar (University Putra Malaysia & UPM, Malaysia); [Abu Bakar Sultan](#) (University Putra Malaysia, Malaysia); Hazura Zulzaili (University Putra Malaysia, Malaysia); Jamilah Din (University Putra Malaysia, Malaysia)

The nature of an Open Source Software development paradigm force Individual practitioners and organization to adopt through trial and error approach. This leads to the problems of coming across software and then abandoned after realizing the lack of important qualities to suit their requirements or facing difficulty in maintaining the software. Usually, one attribute is measured using single metric, however products can contain several Object oriented attributes. This novel study provides the guidelines that lead to the development of metrics model that can select the best metric or group of metrics to predict maintainability of Open Source Software
pp. 70-73

10:20 Vector-Based Monocular 3D Pose Estimation in Handling Self-occlusion and Foreshortening

[Azfar Tomi](#) (Universiti Teknologi Petronas, Malaysia)

The paper presented vector-based pose estimation in handling self-occlusion and foreshortening. Vector-based pose estimation basically based on 3D pose estimation from the image of user's motion captured by a monocular camera. Based on the method, a 3D human full body model is constructed. The silhouettes extraction from the image captured is being matched with the projection on a virtual image plane. Multipart alignment will be used to adjust 3D pose of the graphical 3D human full body based on silhouettes extraction. Each of body part alignment will be used to define a set of vector of body part represented as a skeleton model. The obtained model is used to identify the human pose and the associated 3D motion parameters. The vector for each body part is used as 3D pose information to achieve the marker-free interaction in the augmented environment and expected to enhance the tracking accuracy on monocular 3D pose estimation. In future work, this method will be applied for interaction in augmented reality (AR) environment.
pp. 74-78

10:40 Morning Break

11:00 Using Non-speech Sound as Acoustic Modality in Augmented Reality Environment

[Mohd Ihsan Alimi Mohd Filus](#) (Universiti Teknologi PETRONAS, Malaysia)

Mobile devices emergent development further enlivens Augmented Reality Technology (AR). AR possess the ability to shift the way community see the world by hauling graphics away from screen display and mix it with real environment. However small screen barrier remains as limitation in restricting the development of mobile games especially in mobile audio based games development. This is maybe due to the limited information that can be conveyed by audio. However, acoustic modality can enlighten small screen limitation by serving as alternative modality without distracting user's eye attention when running mobile application. Current games use audio in 4 different aspects namely music, effect, input and speech. Speech can be divided into two categories which is speech and non-speech sound where speech is best use in transmitting information while non-speech sound is most appropriate towards speed and language independent. This paper proposed an approach using non-speech sound as audio input channel (acoustic modality) for development of audio based games in AR environment that can enhance audio information presentation. The precautionary measurement has been discussed to contend with challenges and limitations.
pp. 79-82

11:20 Trusted Real Time Operating Systems - Identifying Its Characteristics

[Mohd Anuar Mat Isa](#) (Universiti Teknologi MARA & UiTM Shah Alam, Malaysia); Habibah Hashim (Universiti Teknologi MARA, Malaysia); Jamalul-lail Ab Manan (MIMOS Berhad, Malaysia); Ramlan Mahmod (University Putra Malaysia, Malaysia); Meor Mohd Azreen Meor Hamzah (Universiti Teknologi MARA (UiTM), Malaysia)

Real Time Operating System (RTOS) had emerged in the market for the past few decades to provide solutions over various platforms that range from embedded devices to more sophisticated electronic system such nuclear plant and spacecraft. The evolution of the design of operating systems continues to endure the need of diverse applications that run on various platforms. Recently, there was a new element introduced to provide trust enhancement on the platform using Trusted Computing. In this paper, we discussed Trusted Computing and STP framework in providing the mechanism to check whether hardware, software or application running on the platform behaves as expected without need for further verification. We further discussed different architectures of RTOS and introduced the

concept of Trusted Real Time Operating System (TRTOS). The term "behave as expected" needs characterization in operating system behaviours so that we can identify any new properties to be added as TRTOS characteristics during design and implementation. This paper identifies a few of these characteristics and further extends the concept of trust in the realization of RTOS.
pp. 83-88

11:40 Dimensioning of Photovoltaic Array Using Genetic Algorithm

Shahril Irwan Sulaiman (Universiti Teknologi MARA, Malaysia)

This paper presents an Computational Intelligence (CI)-based algorithm for optimizing the configuration of a photovoltaic (PV) array of a grid-connected photovoltaic (GCPV) system using Genetic Algorithm (GA). GA had been used to determine the optimal number of PV modules per strings and the optimal number of parallel PV strings such that the technical performance of the system could be optimized. GA was found to outperform Evolutionary Strategies (ES) during the sizing process in terms of producing better expected annual energy output for the GCPV system
pp. 89-93

12:00 Fuzzy Evaluation in IT Supplier Selection

Fairuz Shohaimay (Universiti Teknologi MARA Pahang, Malaysia); Nazirah Ramli (Universiti Teknologi MARA Pahang, Malaysia); Siti Rosiah Mohamed (Universiti Teknologi MARA Pahang, Malaysia)

Supplier selection is crucial as it involves in-depth research process whereby multiple criteria should be considered. With the rising cost of raw materials and products, the management is forced to make better choices when selecting supplier. This paper proposed a fuzzy evaluation technique by using fuzzy linguistic variables in selecting the best IT supplier based on certain criteria. Result shows that Supplier 1 is the best supplier among the choice of four suppliers. Conclusion suggests the applicability of the proposed method to improve future decision making in supplier selection.
pp. 94-98

12:20 Validating Fuzzy Decision Model Using Risk and Confidence Analysis

Zamali Tarmudi (UiTM Sabah, M'sia, Malaysia)

This paper proposes two validation analyses, namely the risk attitudes and level of confidence for fuzzy multi-criteria decision-making model. Risk attitudes are employed to test the outcomes in dealing with the different decision maker's attitude towards risk and uncertainty. Conversely, confidence analysis are used to test how confidence (i.e., pessimistic, moderate, optimistic, etc.) decision makers make a decision which respect to the difference situation and condition. A case study related to the municipal solid waste disposal decision in the state of Selangor and Kuala Lumpur Federal Territory was used to demonstrate the feasibility of the proposed analysis. The result shows that the proposed analysis can improve the relevance and acceptability of the model. Thus, more confident decision and better solution can be derived concurrently in decision-making process.
pp. 99-102

12:40 Wind Direction Extraction From Synthetic Aperture Radar (SAR) Using Wavelet Transform Technique

Arnis Asmat (University of Technology MARA, Malaysia); Siti Noratiqah Mohamad Deros (Universiti Teknologi MARA, Malaysia); Shattri Mansor (University Putra Malaysia (UPM), Malaysia); Muhammad Zamzuri Zainal Abiddin (Universiti Teknologi MARA, Malaysia)

Backscatter of RadarSat-1 SAR images for incidence angles between 20° to 70° at an ocean area is caused by Bragg scattering. The Bragg-scale waves created based on the response of the ocean to the wind stress. Therefore, wind direction can be retrieved in radar images from the orientation of the wind streaks that visible in the images. However, the variation of the incidence angle can cause geometric distortion and variation in scattering components. SAR images for Wide-3 and Extended-High 6 modes have produced wind direction which similar as recorded in AWAC data with correlation are $r=0.94$ and $r=0.98$ respectively. The wind blows for both images is correspond during North East Monsoon (September to March) with wind speed about 0.9 m/s. However, weak correlation is exhibits for Standard-2 ($r=0.29$), it may due to wide range of incidence angle that slow wind speed become invisible to the wavelet formation. From the result, it shows that Extended High-6 mode is considered the best mode to make use for extracting wind direction with high correlated with AWAC data. This is also confirmed that large incident angle with small range angle provides more information on wind direction, as Extended High-6 having the largest incidence angle among the two modes. As conclusion, the SAR backscatter is closely affected by the incidences angles, and this can provide on wind direction information for wind studies.
pp. 103-106

14:00 FPGA-based Finger Vein Biometric System with Adaptive Illumination for Better Image Acquisition

Yee Hui Lee (Universiti Teknologi Malaysia, Malaysia); Mohamed Khalil-Hani (Universiti Teknologi Malaysia, Malaysia); Rabia Bakhteri (Universiti Teknologi Malaysia, Malaysia)

Finger vein imaging using near infrared methods have high sensitivity towards illumination and often suffer from bad image sharpness and loss of information. An embedded image acquisition subsystem with adaptive illumination control based on image quality assessment is introduced in this paper in order to acquire finger vein image with good quality for high accuracy authentication. The quality of the acquired finger vein image is assessed using two-dimensional (2D) entropy and the infrared illumination is adaptively adjusted based on the assessment result. 2D entropy for finger vein image quality assessment that is suitable for hardware implementation is proposed. Mathematically, the proposed 2D entropy significantly improves the performance as well as resource utilization of the quality assessment module compared to previous work. Besides that, buck converter is designed as the Light-Emitting Diode (LED) driver circuit to control the brightness level of the high power infrared LED array efficiently for finger vein image capture. The proposed subsystem is deployed in the FPGA-based finger vein biometric system operates on Nios2-Linux Real Time Operating System (RTOS). Experimental results show that finger vein images acquired through the proposed image acquisition subsystem contain more information as well as better image sharpness compared to finger vein images captured under fixed illumination.

pp. 107-112

14:20 The Designs of Low Power AC-DC Converter for Power Electronics System Applications

Roskhatijah Radzuan (Universiti Teknologi Mara, Malaysia); Mohd Azril Ab Raop (Universiti Teknologi MARA, Malaysia); Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave Technology Centre, Malaysia); Mustafar Kamal Hamzah (Universiti Teknologi MARA, Malaysia)

This paper reviews low power AC-DC converter in different techniques capable of developing high efficiency of energy consumption in many applications. By using low power AC-DC converter, the size of whole system integrated circuit could be reduced. However, the requirements of CMOS converter that required low input voltage and low voltage drop of MOS transistors is discussed. Different techniques in different application are implemented to overcome those problems. In this paper, the reviews of low power AC-DC converters have been focused for energy harvesting systems and wireless power devices only. These AC-DC converters consume several micro-watts from small ac or rf signal voltage and achieve excellent performance in terms of power efficiency. However, the power efficiency of AC-DC converter system is actually highly correlated to the relationship between voltage and the alternating current in ac source. It is because, an in-phase voltage and current in alternating current source is causing in good power factor performance. Power factor correction, PFC is important in many single-phase AC-DC converter circuits to reduce harmonic distortion, hence increase power efficiency of electric appliances. Therefore, the low power AC-DC converter with PFC is proposed. The post-layout of low power AC-DC converter is designed by using the Silterra 0.18 μm technology. The whole post-layout AC-DC converter circuit consumes only 50 μW and works in low voltage, 1V. The power efficiency of whole system also improved to 93%. The proposed low power AC-DC converter with PFC is suitable for future power electronics systems such as battery charger and energy conversion devices.

pp. 113-117

14:40 Can Thermal Biofeedback Be Implemented on Cellular Phones for Therapeutic Uses?

David Infante Sanchez (University of Birmingham, United Kingdom); Tim Collins (University of Birmingham, United Kingdom); Robert Stone (University of Birmingham, United Kingdom)

This paper compares the outcomes of thermal biofeedback based on a cellular phone with the outcomes of thermal biofeedback using a PC. Thermal biofeedback has been reported to be useful to decrease stress and anxiety and improve the condition of other disorders such as diabetes, pain, and hypertension. This technique of biofeedback is based on trying to increase temperature of the extremities by trial and error. The raise in temperature is produced by a higher blood circulation. A comparison on the increase of temperature using biofeedback on PC and a cellular phone is done. Questionnaires for acceptance of technology and stress were applied to develop the interface of thermal biofeedback on the cellular phone. The feedback in biofeedback can be a numerical value of the variable, a video or music. It was found that the users preferred as feedback a numerical display of the temperature. The outcomes of the increase of the temperature are similar in the mobile and static equipment. This paper suggests that thermal biofeedback is feasible to be implemented on mobile devices.

pp. 118-123

15:00 Investigation of Homogeneous Multi Robots Communication Via Bluetooth

Abdul Halim Ismail (Universiti Malaysia Perlis, Malaysia); Muhamad Safwan Muhamad Azmi (Universiti Malaysia Perlis, Malaysia); Shahrman Abu Bakar (Universiti Malaysia Perlis, Malaysia); Wan Khairunizam Wan Ahmad, Engr (University Malaysia Perlis & Motion, Signal, Image Processing and Pattern Recognition Research Group, Malaysia); Hassrizal Hassan Basri (Universiti Malaysia Perlis, Malaysia); Norasmadi Abdul Rahim (Universiti Malaysia Perlis, Malaysia); Mohd Nasir Ayob (Universiti Malaysia Perlis & Universiti Teknologi Malaysia, Malaysia)

Task assignments to team of homogenous autonomous robots are in research trends in robotic field. Autonomous homogeneous multi-robot is known to have similar architecture in terms of structure and identical control system as well as their tasking. At present, most research of multi-robot mainly focuses on motion control layer. Nevertheless, a successful control and coordination of a group of robot rely on effective inter-robot communication. In this paper, in depth investigation of the Bluetooth between two homogenous mobile robots, namely MechA and MechI, is presented. MechA is pre-programmed with dedicated movement, and upon completion the data acquired is sent to MechI for coordination. A distance-based measurement was made for comparison, giving a reliable data for crisp observation. Coordination of multi-robots can be done by controlling the movement of each mobile robot through wireless communication between mobile robots with error distance of 0.0322 ± 0.0147 m.

pp. 124-129

15:20 Dynamic Obstacle Avoidance Approach for Car-like Robots in Dynamic Environments

Mohd Sani Mohamad Hashim (Universiti Malaysia Perlis, Malaysia); Tien-Fu Lu (University of Adelaide, Malaysia); Hassrizal Hassan Basri (Universiti Malaysia Perlis, Malaysia)

In this paper, a new dynamic obstacle avoidance approach for nonholonomic mobile robots in dynamic environments is presented. In dynamic environments, the mobile robot is expected to encounter and safely avoid the obstacles along its way. This inevitably will delay the mobile robot in keeping to its original planned timeframe. To address this scenario, the proposed approach will ensure the mobile robot is able to gain the time lost during obstacle avoidance and reach the final point at the specified time. This approach is based on the dynamic trajectory planning scheme which utilized the replanning approach in order to avoid the obstacle. The performance of the proposed approach is tested through simulations in a simplified city-like dynamic environment.

pp. 130-135

15:40 Afternoon Break

16:00 Programmable Logic Controller (PLC) for Polymer Mixing Tank

Azra Afhzan Ab Rahim (Universiti Teknologi MARA, Malaysia); Mohd Hazwan Md Shah (UiTM Shah Alam, Malaysia); Ili Shairah Abdul Halim (Universiti Teknologi Mara & Faculty of Electrical Engineering, Malaysia); Siti Lailatul Mohd Hassan (Universiti Teknologi Mara, Malaysia)

This project focuses on improving performance of the plant's sludge dewatering process by using Omron CP1E Programmable Logic Controller (PLC) to increase the efficiency of the process which leads to reduction in cost of the polymer product. The process requires manually mixing the cationic polymer long chains with raw water to produce a product that will be sent to the sludge tank process and filter press process where the sludge will harden for disposal. The addition of PLC into the process will reduce error caused by human. The Omron PLC will control the inlet intake water sequence process and polymer for pump on how much the concentration needed to be mixed by measuring the level of water inside the tank. The project works on upgrading an established system that uses manual mix method to automated method that will produce more accurate concentration of polymer without any human error.

pp. 136-141

16:20 Effect of 10 and 20 Hz Photic Stimulation on Stress and Temperature of the Fingers

David Infante Sanchez (University of Birmingham, United Kingdom); Tim Collins (University of Birmingham, United Kingdom); Robert Stone (University of Birmingham, United Kingdom)

This paper evaluates the effect of photic stimulation at frequencies of 10 and 20 Hz on lowering stress for therapeutic purposes. This study also measures the increase of the temperature in the extremities when the person is receiving this stimulation as it has been found that photic stimulation increases the temperature by means a higher blood circulation. A photic stimulator circuit based on Arduino was designed which generates sine waves of different frequencies. In this experiment four participants were recruited to receive a photic session lasting 20 minutes, afterward stress was assessed. During the photic session the temperature of the index finger was recorded. It was found that this protocol decreased stress in the individuals on a global average of 20%. The temperature of the finger was increased during the stimulation of 10 and 20 Hz, but both frequencies had a different effect on the trend of the increase of temperature. These preliminary outcomes suggest that a photic stimulation might be used for therapeutic applications to reduce stress levels and improve general well-being. The increase of temperature produced by a higher blood circulation could also be used for therapeutic purposes to improve problems related to diabetes and hypertension.

pp. 142-146

16:40 Real Time Intrusion Detection System for Outdoor Environment

Liang Kim Meng (MIMOS Berhad, Malaysia); Hon Hock Woon Hon (MIMOS Bhd, Malaysia); Johari Khairunnisa (MIMOS Berhad, Malaysia); Choong Teck Liong (MIMOS Berhad, Malaysia); Zakaria Khairil (MIMOS Berhad, Malaysia)

This paper aims to present the overall architecture of intrusion detection system and its effectiveness in detecting intruder at outdoor environment. The outdoor environment is exposing to various brightness condition in terms of the weather, day transition, dynamic background of the scene, shadow and the visibility degree of the infrared camera.

In this work, the capturing devices and intrusion detection system are setup physically at the pilot site. A thorough evaluation is done for consecutive three days in order to measure the accuracy of the system in detecting intruder throughout the day and night. In addition, the system is evaluated together with a commercial intrusion detection system from Australia as a technology benchmark. The accuracy of the proposed system and benchmark system is illustrated in this paper and the proposed system delivers higher accuracy as compared to the benchmark system.
pp. 147-152

17:00 Improved Data Minimization Technique in Reducing Memory Space Complexity for DNA Local Alignment Accelerator Application

Syed Abdul Mutalib Al Junid (Universiti Teknologi MARA, Malaysia); Nooritawati Md Tahir (Universiti Teknologi MARA, Malaysia); Zulkifli Abd. Majid (Universiti Teknologi MARA, Malaysia); Abdul Karimi Halim (Universiti Teknologi MARA, Malaysia); Khairul Khaizi Mohd Shariff (Faculty of Electrical Engineering, Universiti Teknologi MARA, Malaysia)

Improved data minimization technique for optimize the length of DNA sequence and alignment result characters representation towards reducing the memory complexity is presented in this paper. The ultimate objective is to improve and optimize data representation for DNA sequences and alignment result character. The project is divided into two stages, which are algorithm design and architecture of improved data minimization technique. In algorithm design, the mathematical proved is used to obtain the optimal size of characters representation while in the architecture, the comparator and look up table are the two important elements required to design complete improved data minimization. The code is written, compile and simulate using Altera Quartus II Version 9.0 EDA tools. Moreover, Verilog Hardware Description Language (HDL) and Altera Cyclone II EP2C35 FPGA are used as coding language and target device. In addition, the structural modelling technique is used for reducing the design complexity. In theoretical and simulation result, the conversion of the improved data minimization has been proved and taking 50% more memory compare to previous work, but it covers DNA sequences and alignment result characters. Therefore, the improved data minimization can optimize the process of DNA sequences alignment by minimizing the character representation for both DNA sequence and alignment result characters.
pp. 153-156

Signal & Image Processing

B12

Time: 14:00 - 18:00
Room: Orchid

**Chair: Patrick Sebastian (Universiti Teknologi PETRONAS, Malaysia),
Yusnita Mohd Ali (Universiti Teknologi MARA, Malaysia)**

14:00 Hardware Centric Automatic Recognition of Road Signs

Ashkan Hashemi (Mid-Sweden University, Sweden); Benny Thörnberg (Mid Sweden University, Sweden)

In this paper we present a novel and robust algorithm for automatic recognition of road signs by using histogram of oriented gradient (HOG) as the main feature and minimum distance classifier (MDC) to classify numbers written on speed limit road signs. It also describes how other geometrical properties can be added to feature vector in order to increase the robustness of proposed algorithm.
pp. 157-162

14:20 Feature Subset Selection of Parkinson's Disease Based on Voice Samples

Zahari Abu Bakar (UiTM, Malaysia); Rohilah Sahak (Stamford College, Malaysia); Nooritawati Md Tahir (Universiti Teknologi MARA, Malaysia)

In this study, semi automation prediction of PD is investigated based on twenty two features of voice samples extracted from 147 subjects. Firstly, the original features of voice are used for recognition of PD or otherwise with MLP as classifier and Levenberg Marquardt and Scaled Conjugate Gradient as training algorithm. Next, to identify the number of significant features amongst the original attributes, Principal Component Analysis is implemented to perform this task. Upon implementation of PCA, the first four eigenvalues are identified as the significant principal components and further validated by the rule of thumb of PCA namely the Scree Test as well as Cumulative Variance rule. Based on initial findings attained, it was found that SCG as training algorithm contributed as the most suitable algorithm to be used by the classifier based on 92.9% accuracy rate with original features as inputs to classifier and 94.2% upon completion of PCA as feature subset selection
pp. 163-166

14:40 Moving Object Extraction in PTZ Camera Using the Integration of Background Subtraction and Local Histogram Processing

Syaimaa' Solehah (University Malaysia Perlis & Mimos Bhd., Malaysia); Shahrul Yaakob (University Malaysia Perlis, Malaysia); Zulaikha Kadim (MIMOS Bhd, Malaysia); Hon Hock Woon Hon (MIMOS Bhd, Malaysia)

This paper proposes a technique of extracting moving object using a pan-tilt-zoom (PTZ) camera. The technique is based on the integration of background subtraction and local histogram processing. Background images are modeled as multiple images and their corresponding camera pose information (pan and tilt angles). To detect object in current image, first the system will determine the most matched background based on the acquired PTZ's pose information. Then the matched background is compensated with respect to current image, whereby the background subtraction is done between the two aligned images. The resultant output is then cleaned up using morphological opening operator, before local histogram processing is done and finally followed by closing operation. The results show the moving object can be successfully extracted after go through these four steps.

pp. 167-172

15:00 Texture Feature Extraction Using 2-D Gabor Filters

Rosniza Roslan (Universiti Teknologi MARA, Malaysia); Nursuriati Jamil (Universiti Teknologi MARA, Malaysia)

Texture feature extraction is a procedure of computing and describing the features and characteristics of image which numerically describes that texture image properties. This paper investigated texture feature extraction using 2-D Gabor Filter to extract the texture features of Inverse Fast Fourier Transform (IFFT), texture energy and transformed IFFT. The Gabor filter bank experimented on seventy two collected samples of skull-stripped T1-weighted, T2-weighted and FLAIR MRI brain images utilizing four frequencies and four orientations. Results showed that texture feature extractions of two highest frequencies with all four orientations produced the highest acceptance rate.

pp. 173-178

15:20 Classification of Speaker Accent Using Hybrid DWT-LPC Features and K-Nearest Neighbors in Ethnically Diverse Malaysian English

Yusnita Mohd Ali (Universiti Teknologi MARA, Malaysia); Paulraj M (Universiti Malaysia Perlis, Malaysia); Sazali Yaacob (Universiti Malaysia Perlis, Malaysia); Shahriman Abu Bakar (Universiti Malaysia Perlis, Malaysia)

Accent is a major cause of variability in automatic speaker-independent speech recognition systems. Under certain circumstances, this event introduces unsatisfactory performance of the systems. In order to circumvent this deficiency, accent analyzer in preceding stage could be a smart solution. This paper proposes a rather new approach of hybrid way to optimize the extraction of accent from speech utterances over other facets using linear predictive coefficients (LPC) derived from discrete wavelet transform (DWT). The constructed features were used to model an accent recognizer, implemented based on K-nearest neighbors. Experimental results showed that the hybrid dyadic-X DWT-LPC features were highly correlated to the Malay, Chinese and Indian accents of Malaysian English speakers through an increase of classification rate of 9.28% over the conventional LPC method.

pp. 179-184

15:40 Afternoon Break

16:00 Parametric Tracking of Multiple Segmented Regions

Patrick Sebastian (Universiti Teknologi PETRONAS, Malaysia); Vooi Voon Yap (University Tunku Abdul Rahman, Malaysia); Richard Comely (Middlesex University, United Kingdom)

This paper proposes a tracking method based on parameters obtained from multiple blobs. The multiple blobs are derived or obtained from segmenting a single blob into multiple blobs or multiple regions that have the same color information where these regions generally remain the same as the target moves. The target being tracked is a person or human walking through the camera view field where the number of regions are dependent on the clothing worn and the general build of the person being tracked. This would indicate that the head, limbs and torso of a person would be segmented into regions of interest. The parameters used in tracking a multiple region or blob target are the vectors between the regions of interest and the mean values of the regions of interest. In this paper, the vector used is derived from the top most region to the lowest region of the multi region target. In addition, the difference between the mean values of the regions is used as a means of tracking in addition to the vector between the regions of interest. The results obtained showed that correct target tracking had consistently higher tracking rate compared to incorrect tracking. Correct tracking rates had higher than 0.9 TDR rates as compared to incorrect tracking that ranged from 0 to 0.6.

pp. 185-189

16:20 Improved Feature Matching Technique in Low Overlap Area

Marizuana Mat Daud (University of Technology Petronas & MIMOS Berhad, Malaysia); Zulaikha Kadim (MIMOS Bhd, Malaysia); Hon Hock Woon Hon (MIMOS Bhd, Malaysia); Ibrahima Faye (UTP, Malaysia); Aamir S Malik (Senior Lecturer, Malaysia)

Low overlap area is one of the problems in finding matching between two frames. When the camera moves on a static planar, the structure of the image deteriorates. As the camera moves, the same object might appear different with different

camera views. Thus, it causes matching failure in subsequent images. We propose a rotation translation approach to assist existing feature matching algorithm. The method consists in rotating the image through a rotation translation model and applying Singular Value Decomposition (SVD) scheme and histogram patch similarity for filtering. The experimental results show that adding the proposed algorithm improves considerably the results in case of very small overlap region.
pp. 190-195

16:40 Human Parasitic Worm Detection Using Image Processing Technique

Raafat Salih Hadi Alsameraai (Universiti Malaysia Pahang, Malaysia); Kamarul Hawari Ghazali (Universiti Malaysia Pahang, Malaysia); Zulkeflee Khalidin (Z. Khalidin, Malaysia); Zeehaida Mohamed (Universiti Sains Malaysia, Malaysia)

Intestinal parasites of protozoa and helminthes may cause disease or even death to animals and humans. In a current study of fecal sample examination to detect parasites, a technologist examines images manually using a lighted microscope. This method of examination is known to be inefficient when it involves a large number of samples. On top of that, it is very important to introduce a system that is capable of assisting the technologist in the examination of fecal samples. In this paper, an automatic process is proposed to detect different types of parasites from fecal samples using an image processing technique. Image processing techniques have been introduced to automatically screen the existence of parasites in human fecal specimens. This process involves methods such as noise reduction, contrast enhancement, segmentation, and morphological analysis. At the classification stage, we propose a simple classification method using logical threshold, whereby the ranges of feature values have been identified to classify the type of parasite. The proposed system has been tested with 100 parasite images of each class, which promotes accuracy. (Abstract)
pp. 196-201

17:00 Frequency Analysis of EEG Signal Generated From Dyslexic Children

Che Wan Nurul Fatimah Che Wan Fadzal (Universiti Teknologi Mara, Malaysia); Wahidah Mansor (Universiti Teknologi MARA, Malaysia); Khuan Y Lee (Universiti Teknologi MARA, Malaysia); Sabrina Mohamad (University of Kuala Lumpur British Malaysian Institute, Malaysia); Sariah Amirin (Dyslexia Association Centre, Malaysia)

Dyslexia is a neurological disorder which needs to be detected at an early stage to know their specific needs and to help them cope with the problem. One of the ways to detect dyslexia is by using Electroencephalogram (EEG). In this study, the EEG signals recorded from dyslexic's children while performing writing activities were analyzed. The EEG signals were recorded from 4 channels; C3, C4, P3 and P4 and filtered using band pass filter with frequency range 8 Hz to 30 Hz. The signal was analyzed using Fast Fourier Transform. Analysis of EEG signals showed that the range of frequency for dyslexic children during writing is 22 - 28 Hz which is considered high and indicates that they are trying hard to write a correct word.
pp. 202-204

17:20 Classification of Imagined Writing From EEG Signals Using Autoregressive Features

Azlee Zabidi (Universiti Teknologi MARA, Malaysia); Wahidah Mansor (Universiti Teknologi MARA, Malaysia); Khuan Y Lee (Universiti Teknologi MARA, Malaysia); Che Wan Nurul Fatimah Che Wan Fadzal (Universiti Teknologi Mara, Malaysia)

Imagined writing is one of the techniques that may improve writing disorder when brain is trained to perform the activity. The imagined writing activity embedded in EEG signal can be extracted and classified using Autoregressive model and Multi Layer Perceptron. This paper describes the classification of imagined writing letters from EEG signals using Multi Layer Perceptron with Autoregression model as feature extraction method. The optimum Autoregression model order was determined by examining the classification accuracy of Multi Layer Perceptron under various orders. The results showed that the number of Autoregression order for classifying imagined letters from EEG signals is in the range of 16 and 20.
pp. 205-208

17:40 Pattern Classification in Recognizing Qalqalah Kubra Pronunciation Using Multilayer Perceptrons

Hasliza Abu Hassan (Universiti Selangor, Malaysia); Azlee Zabidi (Universiti Teknologi MARA, Malaysia); Ihsan M. Yassin (Universiti Teknologi Mara, Malaysia); Muhammad Nazir Muhammed Khalid (Universiti Selangor, Malaysia)

Quranic recitations require precise pronunciation in its recitation. Because of this, Tajweed is important as a set of rules that govern how certain verses must be pronounced. One of the many Tajweed rules is called Qalqalah. The voice signals of Qalqalah Kubro (QK) (one of the Qalqalah variations) pronunciation have distinct patterns which can be recognized with pattern classification algorithms such as Multilayer Perceptron (MLP). This study investigates the performance of the MLP in identifying correct pronunciation of QK of a reader. The pronunciation sound waves of QK were first divided into equal length segments. Next, important features were extracted using Mel Frequency Cepstrum Coefficient (MFCC) analysis. After training, the MLP performance was analyzed to discriminate between correct and incorrect pronunciations. Results show that the MLP classifier trained using the MFCC features was able to accurately distinguish between the two cases.
pp. 209-212

Network & Communications Technology

A21

Time: 08:40 - 13:00

Room: Rose Garden

**Chair: Makhoulouf Aliouat (University ferhat Abbes of Setif, Algeria),
Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave
Technology Centre, Malaysia)**

08:40 Teletraffic Performance of Microcells with Overlay Macrocell in Hierarchical Cellular Network

Azita Laily Yusof (Universiti Teknologi Mara, Malaysia); Norsuzila Ya'acob (Universiti Teknologi Mara, Malaysia); Mohd Tarmizi Ali (Universiti Teknologi Mara, Malaysia); Azlina Idris (Universiti Teknologi MARA, Malaysia); Norbaiti Sidik (UiTM, Malaysia)

Nowadays the demand for cellular mobile phone has grown rapidly. If the cellular user population is increase there is a need to maximize the number of subscriber in the system. To achieve the goals of maximizing network capacity, hierarchical topology cell is being studied. In this hierarchical topology cell, microcell is overlaid over the macrocell to handle overflow calls. Mobile subscriber is divided into two classes which are low and high mobility users. High mobility users assigned to macrocells and undergo handoff when crossing macrocell boundaries, while low mobility users assigned to microcells and undergo handoff when crossing microcell boundaries. A simulation model of macrocell/microcell overlays in cellular network is developed. The simulation results show that there is a significant reduction of blocked calls rate while improving the Grade of Service (GOS) percentage in the network.
pp. 213-217

09:00 Performance Study on Relay Station Usage in IEEE 802.16j Mobile Multi-hop Relay Network

Mohd Dani Baba (Universiti Teknologi MARA, Malaysia); Wan Nurul Izza Wan Darman (UTHM, Malaysia); Darmawaty Mohd Ali (University Teknologi Mara, Malaysia)

IEEE 802.16j Mobile Multi-hop Relay (MMR) WiMAX networks allow the coverage area to be extended and enhanced the throughput of a WiMAX network by deploying Relay Station (RS). In conventional WiMAX network with only Base Station (BS), if the Subscriber Station (SS) is located far away from the BS or not in Line-of-sight (LOS) with the BS may suffer some deterioration of service. In this paper, we investigate the deployment of RS to improve the per-user throughput as well reducing the delay experience by the user. Simulations were performed using OPNET Modeler 16.0 where only one real-time service is considered for two different scenarios. From the simulations, it shows that Transparent RS (T-RS) does improve the user throughput at certain distance from the BS but with some increase in delay.
pp. 218-223

09:20 Measurement of WLAN Strength and Evaluation of BER in OFDM Based on Indoor Propagation

Bibi Sarpinah Sheikh Naimullah (UiTM Sarawak, Malaysia); Mazlina Mansor Hassan (UiTM Sarawak, Malaysia)

This project is done to measure the Wireless Local Area Network (WLAN) signal strength and evaluate the Bit Error Rate (BER) under indoor propagation. This study evaluated the BER in OFDM using BPSK, QPSK, 16QAM and 64QAM modulation techniques in multipath fading environment. MATLAB simulation was written to model and to simulate BPSK, QPSK, 16QAM and 64QAM under different channel conditions. A comparison study is carried out to obtain the best BER performance for each modulation techniques stated above which was based on transmission scheme under Rayleigh Fading and Additive White Gaussian Noise (AWGN) channel conditions. The WLAN signal measurement was relate to the results of BER using BPSK, QPSK, 16QAM and 64QAM to identify which modulation techniques produces less noise.
pp. 224-228

09:40 Cognitive Radio Test Bed Experimentation Using USRP and Matlab®/Simulink®

Nuzli Mohamad Anas (Universiti Teknologi Malaysia & MIMOS Berhad, Malaysia); Hafizal Mohamad (MIMOS Berhad, Malaysia); M Tahir (IIUM, Malaysia)

Sensing of spectrum holes constitute the fundamental step to utilize spectral resources efficiently in Cognitive Radio (CR). This new technology trends intends to alleviate the scarce and underutilized spectrum issues occurred in traditional fixed spectrum allotment. CR defined as dynamic spectrum usage of unlicensed (secondary) user in opportunistic manner without causing harmful interference to licensed (primary) user. Much recent works presented as either theoretical or simulation approach. However, this paper presents a design prototype of indirect and non-parametric of spectrum sensing method implemented using low-cost Universal Software-defined radio Platform (USRP™). A spectrum-sensing algorithm based on energy detection is designed and built on top of Matlab®/Simulink® interfaced with a USRP™ main board and SBX transceiver daughterboard; both are Ettus Research product.

pp. 229-232

10:00 On the Energy Consumption in Optical Burst Switching (OBS) Networks

Mohammed Joudah Zaiter (Universiti Tenaga Nasional, Malaysia); Salman Yussof (Universiti Tenaga Nasional, Malaysia); Abid Abdelouahab (Universiti Tenaga Nasional, Malaysia); Cheng Lai Cheah (Universiti Tenaga Nasional, Malaysia); Adnan Mohammed (Universiti Tenaga Nasional, Malaysia)

Energy consumption of Optical Burst Switching (OBS) network is modeled. It is shown that a significant network-operation energy savings can be achieved by an OBS with the appropriate parameters setting; in particular the data burst size. The paper also provides a mathematical model for calculating the energy per bit across OBS Network.

pp. 233-236

10:20 Effects of Shell and Body Tissue Stimulating Liquid (BTSL) Thickness on Capsule Antenna Performance

Muhammad Solihin Zulkefli (Universiti Malaysia Perlis, Malaysia); Mohd Fareq Abd Malek (Universiti Malaysia Perlis, Malaysia); Faizal Jamlos (Universiti Malaysia Perlis, Malaysia); Syed Idris Syed Hassan (Universiti Malaysia Perlis, Malaysia); Suzanna Harun Ronald (Universiti Malaysia Perlis, Malaysia); Mohd Hafizuddin Mat (Universiti Malaysia Perlis, Malaysia); Khairudi Mohd Juni (Politeknik Tuanku Syed Sirajuddin, Malaysia); Mohd Iskandar Mohd Saleh (Politeknik Tuanku Syed Sirajuddin, Malaysia)

In this paper, the study of shell and body tissue stimulating liquid (BTSL) thickness and its effects on capsule antenna performance at 2.45 GHz were presented. Two simulation setups which consists two different sets of shell and BTSL position near the capsule antenna were used in the simulation process. The reflection coefficient, directivity, gain and efficiency performance in those simulation setups were determined and compared. The influence of human tissue thickness on the antenna behavior must be considered.

pp. 237-241

10:40 Morning Break

11:00 A 2.45 GHz Harmonic Suppression Rectangular Patch Antenna

Rosemizi Rahim (Universiti Malaysia Perlis, Malaysia)

This paper presented a new design of rectangular patch antenna which is able to suppress the harmonic frequencies. The techniques that are used in the suppression of harmonics are a notch-loaded and curvature slots at the antenna patch together with an open stub and inset feed transmission line. The partially ground with a circular slot at ground plane is also introduced to reduce the overall patch size. The patch antenna is designed on an FR4 substrate with $\epsilon_r=4.7$ and a thickness of 1.6 mm give -40dB return loss at 2.45GHz and suppress all the harmonics up to -1dB. The proposed of harmonic suppression antenna can avoid by using harmonic filter circuit in the rectenna circuit and active integrated antenna (AIA) applications, thus the system becomes compact and cheaper.

pp. 242-246

11:20 Cascaded Ring Bandpass Filters with High Out-of-band Rejection

Norfishah Ab Wahab (Universiti Teknologi MARA, Malaysia); Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave Technology Centre, Malaysia); Zuhani Ismail Khan (Universiti Teknologi MARA, Malaysia); Sameh Kh. M. Khanfar (Universiti Teknologi MARA (UiTM), Malaysia); Gaëtan Prigent (LAPLACE & GRE, France)

This paper presents two microwave bandpass filter topologies which are based on two different ways of series-cascading two quarter-wavelength side-coupled ring resonators. In the first topology, a quarter-wavelength impedance inverter is used to connect the two rings. As each ring gives two poles, a 4th order bandpass filter is obtained from the topology. The impedance inverter is replaced by a quarter-wavelength coupled line in the second topology. In this case, two half-wavelength resonators are formed at the interconnection between the rings and the coupled line, leading to the creation of an extra of two poles in the passband response. Thus, a 6th order filter is obtained from the second topology. Both topologies are realized at 2 GHz center frequency using microstrips on epoxy-glass substrate. Measurement results are found to be in good agreement with the simulations with very high out-of-band rejection level.

pp. 247-249

11:40 Observation of Equatorial Ionospheric Plasma Bubbles At Peninsular Malaysia

Norsuzila Ya'acob (Universiti Teknologi Mara, Malaysia); Mohd Tarmizi Ali (Universiti Teknologi Mara, Malaysia); Azita Laily Yusof (Universiti Teknologi Mara, Malaysia); Azlina Idris (Universiti Teknologi Mara, Malaysia); Darmawaty Mohd Ali (University Teknologi Mara, Malaysia); Noor Hijjah Mohd Yusof (UiTM, Malaysia)

The research on observation of equatorial plasma bubbles (EPBs) ionospheric at peninsular Malaysia by using Malaysian Real Time Kinematic Global Positioning System Network (MyRTKnet). Plasma bubbles which usually occur during midnight. This determination is made for satellites in Peninsular Malaysia in the September period of 2007 at Universiti Utara Malaysia (UUMK) and Sungai Petani (SGPT). The important parameter in this project is Total Electron Content (TEC) which is the value of TEC change rate; ΔTEC is taken within the period of every 15 seconds in order to detect Plasma Bubble. TEC is extracted using GPS receiver which in RINEX format that supplied by JUPEM (Department Of Survey and Mapping Malaysia). The value of ΔTEC is compared base on the

dropness of TEC value within the scale. It is shown that most equatorial plasma-bubble events commence at 18:00 UT on 6th September 2007 for PRN 26, and may last for less than 60 min.
pp. 250-255

12:00 Adaptive Nodes Diagnosis and Recovery for Wireless Sensor Networks

Makhlouf Aliouat (University ferhat Abbes of Setif, Algeria); Zibouda Aliouat (Ferhat Abbes University of Sétif, Algeria); Miloud Naidja (University Ferhat Abbas of Sétif, Algeria)

The rapid increasing development of the wireless sensor networks (WSN) and their wide spread over numerous domains of our daily life, keep on drawing researchers attention in order to make them reaching the expected and promising maturity. So for this purpose, many attributes in WSN have been paid more attention than that of dependability. Indeed, when the node density is large, a node failure rate increases inevitably leading to impede the proper functioning of a WSN. Therefore, to ensure that the running applications can be completed successfully, it is crucial to detect failed sensor nodes or precisely failed parts of a sensor node and then take appropriate actions to continue using the correct parts and overcome as possible the failed ones. In this paper, we present a diagnosis mechanism for sensor nodes failures in WSN; this mechanism distinguishes several causes of node performance degradation and provides an effective alternate action to recover from the failure enabling a node to carry on contributing to successful network deployment goal.
pp. 256-261

12:20 MoBots: A New Generation of Botnets on Mobile Devices and Networks

Meisam Eslahi (University of Malaya, Malaysia); Rosli Salleh (University of Malaya, Malaysia); Nor Badrul Anuar (University of Malaya, Malaysia)

Mobile devices and networks are now well integrated with advanced capabilities and technologies such as the Internet. Today, mobile security has become a globally critical issue due to high usage of mobile devices, their convenience and mobility. However, they are not properly protected compared to computer and computer networks, and the users pay less attention to the security updates. Recently, Mobile devices and networks have been targeted by one of the most dangerous cyber threats called botnets. Mobile botnets have not fully explored yet as they newly migrated to mobile infrastructures. Therefore, in this paper, we present an overview of mobile botnets includes studies on the new command and control mechanisms, their real examples and malicious activities. We also review the current challenges and limitations of botnet detection in mobile environments followed by existing solutions.
pp. 262-266

12:40 Resilient Sinks for Long Lived Wireless Sensor Networks

Makhlouf Aliouat (University ferhat Abbes of Setif, Algeria); Zibouda Aliouat (Ferhat Abbes University of Sétif, Algeria); Chafik Titouna (Doctoral School stic, University of Msila, Algeria)

Wireless sensor network is a set of autonomous sensor nodes dedicated to sense sizes of physical phenomena of a geographical area of interest. The sizes so collected are converted to numerical data to be transmitted to a specific node called base station or sink. After some appropriate processing, the data are sent out to a monitoring center. Therefore, a sink takes over a vital role in a WSN since it achieves an interface between the rest of the deployed sensor network and the end user. Consequently, a failed sink may abort the overall mission of the network. Due to their crucial functions, sinks must be designed and maintained to be robust enough in order to face trouble coming from the harsh environment wherein nodes are deployed. Thus, as a keystone of a WSN, sink has to be provided with ability to recover from failures. In this paper, we propose a protocol avoiding the sink to be a central point of failure, thus giving it the capacity for fault tolerance more significantly. This protocol allows error detection instantaneously and speedy error recovery. The results obtained from simulation, with TinyOS/PowerTOSSIM simulator, have been very convincing.
pp. 267-272

Computer Applications & Software Engineering 2

A22

Time: 14:00 - 18:00
Room: Rose Garden

**Chair: Borhannuddin Arifin (University Technology MARA, Malaysia),
Zahari Abu Bakar (UiTM, Malaysia)**

14:00 Photo Detector Junction Properties and Dynamic Aptness Analysis -Computational Study
Bablu K. Ghosh (University Malaysia Sabah, Malaysia)

As a lower band edge material application of Si photodiode as detector; reverse biasing impacts on its carrier drift or sensing speed, junction capacitance as well as its operating bandwidth. The variation of n-doping also ensures the variation of reverse breakdown voltage. In this paper we analyze the effect of n-doping profile (body doping) and the reverse voltage effect on Si photo device characteristic parameters such as depletion capacitance-junction width (JW), generation rate, operating bandwidth and gain as well. Whenever body doping concentration is increased it reduces the break down voltage, as a result effective JW is decreased and capacitance is found to be increased consequently reduces the operating bandwidth and sensing speed.
pp. 273-277

14:20 Implementation of Decompression Algorithm in Alzheimer's Disease Database

Ihsan M. Yassin (Universiti Teknologi Mara, Malaysia); Syed Farid Syed Adnan (UiTM Shah Alam, Selangor & FKE, Malaysia); Hasliza Abu Hassan (Universiti Selangor, Malaysia); Azlee Zabidi (Universiti Teknologi MARA, Malaysia)

Databases are convenient and structured methods of sharing and retrieving data. Because of this, they are key components of the information system infrastructure for today's modern research. This paper presents a decompression algorithm for retrieving information stored in a MySQL database. The database stores genetic information of Malaysian Alzheimer's disease (AD) patients. Due to the size of the data, previous works have compressed the data for efficient storage. This paper presents a decompression method to retrieve the data and display it to the user. The decompression algorithm was implemented using PHP. Results show that the algorithm has been successfully implemented.
pp. 278-281

14:40 The Mole Concept Using MS Excel

Borhannuddin Arifin (University Technology MARA, Malaysia); Umiatun Yeop (University Technology MARA, Malaysia); Hanim Ismail (University Technology MARA, Malaysia)

A program has been developed to assist chemistry students in understanding the mole concept. The mole concept is a fundamental concept in chemistry that students need to understand before they can solve problems such as calculating the number of atoms in an element, mass of a substance or finding the stoichiometric amounts of reactants or products in a given chemical reaction. This program will be able to calculate the number of moles of a substance, the empirical formula of a compound and solve problems related to reaction stoichiometry. Also included are short notes, glossary of terms and questions in the form of quiz in the form of true/false and multiple choice type questions. Another feature of this program is the periodic table of elements where the physical properties of the elements can be displayed. The program is written in Visual Basic language using the Visual Basic editor of the Microsoft Excel software. The data required for developing this program are stored in the Excel worksheets and the user interface is linked to the data using Visual Basic programming. This program receives a positive feedback based on a perception survey on 50 students
pp. 282-286

15:00 An Expert System Based Headache Solution

Md. Rajib Hasan (Universiti Utara Malaysia, Malaysia); Shariful Hasan (University Putra Malaysia, Malaysia); Fadzilah Siraj (Universiti Utara Malaysia & Head of Research and Consultancy, R&D Serindit Com UUM Sdn Bhd, Malaysia)

Human is becoming busier, and the rush hours can cause physical and mental stresses. In many countries, it is found that the patients in neurological department are increasing randomly. However, the numbers of doctors are not sufficient to serve the patients. Furthermore, at times the doctors need other doctors' opinion in supporting the decision making. This paper investigates the potential developing of an expert system for headache detection.
pp. 287-292

15:20 Firearm Identification Using Numerical Features of Centre Firing Pin Impression Image

Nor Azura Md Ghani (University Teknologi MARA, Malaysia); Saadi Ahmad Kamaruddin (International Islamic University Malaysia & IIUM, Malaysia); Choong-Yeun Liong (Universiti Kebangsaan Malaysia (UKM), Malaysia)

There are many crime cases such as murders or robberies which frequently involve firearms, especially pistols. The centre firing pin impression image on a cartridge case is one of the important clues for firearms identification. In this study, a total of 16 features of geometric moments up to the sixth order were extracted from centre of firing pin impression images. A total of five pistols of the Parabellum Vector SPI 9mm model, made in South Africa were used. The pistols were labelled as Pistol A, Pistol B, Pistol C, Pistol D, and Pistol E. A total of 747 bullets have been fired from the five pistols. Under preliminary analysis, Pearson correlation coefficients between all pairs of features showed the features were significant and highly correlated among the features. This problematic features were solved by divided the features into subgroups of variables based on similar characteristics under principle component analysis. The features that highly correlated were combined into meaningful components or factors. Discriminant analysis was applied to identify the types of pistols used based on the factors obtained. Classification results using cross-validation under discriminant analysis showed that 75.4% of the images were correctly classified according to the pistols used. The results of the study had shown a significant contribution towards Royal Malaysian Police Force in handling crime cases which involve firearms in more systematic manner
pp. 293-296

15:40 Afternoon Break

16:00 *Behaviour of EEG Alpha Asymmetry When Stress is Induced and Binaural Beat is Applied*

Haryanti Norhazman (University Teknologi MARA, Malaysia); Norliza Zaini (Universiti Teknologi Mara, Malaysia); Hasmila Akmar Omar (Universiti Teknologi Mara, Malaysia); Lucyantie Mazalan (Universiti Teknologi MARA, Malaysia); Maizura Mohd Sani (Universiti Teknologi Mara, Malaysia); Rozita Jailani (University Teknologi MARA, Malaysia); Sahrim Lias (Universiti Teknologi MARA, Malaysia); Mohd Nasir Taib (Universiti Teknologi MARA, Malaysia)

Stress can be perceived as the reaction of the body towards observed mental, emotional and physical distress. It is highly curable if it is detected and managed early. There are various methods in relieving anxiety and stress such as meditation. However, to some people, this act is hard to perform. Therefore, they switch to another therapy which is easier and simpler but deliver similar side effects as meditation i.e. brainwave entrainment. Binaural beat is one type of such brainwave entrainments, in which two signals with different frequency are presented to each ear simultaneously. In regards to this, our research work focuses on studying the effects of binaural-beats to people with stress, specifically the effects to their EEG signals. In such context, this paper presents the results collected from the experiments performed on a number of participants. EEG signals of the participants are recorded in three different states namely the initial state, after stress induction and after binaural-beats entrainment. The Alpha Symmetry method has been employed in analyzing the results especially to study the effect of stress induced and binaural beats entrainment on the participants' alpha waves.

pp. 297-301

16:20 *A Lightweight and Secure TFTP Protocol for Smart Environment*

Mohd Anuar Mat Isa (Universiti Teknologi MARA & UiTM Shah Alam, Malaysia); Nur Nabila Binti Mohamed (Universiti Teknologi MARA, Malaysia); Habibah Hashim (Universiti Teknologi MARA, Malaysia); Syed Farid Syed Adnan (UiTM Shah Alam, Selangor & FKE, Malaysia); Jamalul-lail Ab Manan (MIMOS Berhad, Malaysia)

"Internet of Things" (IoT) has become the everyday buzz words in recent years. As part and parcel of the Smart environment where human beings and things interact intelligently, trust and mobility becomes the basic prerequisites. However, to unify trust and mobility, a security protocol must be used for information exchanges among human and things; as well as between things and things (such as between Wi-Fi Client and Wi-Fi AP). In this paper, we present an enhancement of a security protocol for bulk data transfer amongst embedded devices (similar to the practices in IoT). We also proposed a security framework for enhancing security, trust and privacy (STP) for embedded system infrastructure. We suggested the use of lightweight symmetric encryption (for data) and asymmetric encryption (for key exchange) protocols in Trivial File Transfer Protocol (TFTP). The target implementation of TFTP is for embedded devices such as Wi-Fi Access Points (AP) and remote Base Stations (BS). We have chosen Das U-Boot (Universal Boot loader) as the horizontal security platform for this new security implementation which is suitable for Smart Environment.

pp. 302-306

16:40 *Implementation of IPTV Over UNifi*

Norbaiti Sidik (UiTM, Malaysia); Azita Laily Yusof (Universiti Teknologi Mara, Malaysia); Nur Abdullah (UiTM, Malaysia)

Nowadays, IP technology is very familiar to be combined with two ways broadband network. Most of the providers around the world are making significant investments in order to achieve delivered of a digital video content to subscribers. However, it is important to understand the basic network that being used in IPTV system. Network traffic also will be considered to this system. The purpose of this paper is to study on characterization of Internet Protocol Television (IPTV) which focus on its architecture, basic operations and IPTV protocols. Wireshark simulation program is used as a network protocol analyzer to analyze capture file and look at its protocol such as User Datagram Protocol (UDP), Transmission Control Protocol (TCP) and others. The operation of this system is fully of Internet Protocol (IP) based on Access Network System. Based on this information, not all of the parameters in Wireshark will be chosen since Wireshark has many types of network traffic measurement. Other than that, provider also will provide better network services to customer for example by using IPTV by Unifi there is good on signal received even in bad weather.

pp. 307-311

17:00 *Development of Online Database System for Rubber Tree Leaf Disease*

Syed Farid Syed Adnan (UiTM Shah Alam, Selangor & FKE, Malaysia); Noor Ezan Abdullah (Universiti Teknologi Mara, Malaysia); Hadzli Hashim (Universiti Teknologi MARA, Malaysia); Yuslinda Wati Mohamad Yusof (Universiti Teknologi MARA, Malaysia); Mohammad Yaakub Sidik Malim (Universiti Teknologi Mara, Malaysia)

This paper presents about the rubber tree leaf diseases compiled into a PHP script and a database system using MySQL. The rubber tree leaf diseases represent the input in the database system. There are three selected diseases that can be identified using the database system which are Corynespora Leaf Spot, Bird's Eye Spot, and Collectotrichum Leaf Disease. These three types of diseases will each be put into the database system. By using PHP, a server-side language which sends Web pages to requesting visitors (you, the client, with your Web browser). When a visitor goes to a Web site written in PHP, the server reads the PHP code and then processes it according to its scripted directions. The client will be able to put the input data online and the database system output will identify the diseases based on user data input. The purpose of the database is to identify type of rubber tree leaf diseases. The database is a collection of data, stored and kept organized by the Database Management System. The client does not have the data which helps them to identify which type of diseases that they have. Therefore, by using the database system, this will give the client the advantage to identify the diseases without having the requirement to collect data and to determine the type of diseases.

pp. 312-317

17:20 Online Personalized Audio Therapy Recommender Based on Community Ratings

Norliza Zaini (Universiti Teknologi Mara, Malaysia); Mohd Fuad Abdul Latip (Universiti Teknologi MARA, Malaysia);
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Haryanti Norhazman (University Teknologi MARA, Malaysia)

This paper presents an online system that promotes audio therapy for tuning users' mental states to different modes. By using this system, users may tune and listen to meditative audios to get the calming effects to relieve stress, listening to energizing audios when feeling lethargic in the morning and listening to enlightening audios to help in learning. Being a first timer to use such system, a new user may need assistance in choosing a suitable and effective audio in getting the desired outcome. One way in offering such assistance is to deploy a recommendation platform, where ratings from other users of the system; (especially friends of the user) are counted and adopted as the basis for recommendations. The novelty of this system lies in the mechanism for constructing and personalizing the recommendations on suitable therapy audios for a particular user.

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