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Session 1 (11.00 am – 1.00 pm)

**Topic: Bioinformatics/Bioinstrumentation/Signal Processing/ Antenna/
Image Processing/System on Chips**

1. *Millimeter Wave Performance Evaluation in Open Areas and Suburban Putrajaya.....1*

Nor Fadzilah Abdullah (Universiti Kebangsaan Malaysia & Centre for Communications Research, Malaysia)

The demand for multi-gigabit data rate and insufficient spectrum in the microwave bands has inspired the use of millimeter wave bands in future fifth generation (5G) networks. In this paper, a 3D ray tracing model is used to analyse the statistical parameters for a millimeter wave channel operating at different carrier frequencies. The parameter consists of RMS delay spread, K-Factor and average received power. A map of Precinct 9, Wilayah Persekutuan Putrajaya is used in the simulation of cellular implementation in millimeter wave. The effect of different antenna element geometries have also been investigated. The results of this work can be used as a basis to design a millimeter wave network to improve user quality of experience.

2. *Preliminary Investigation on the Effect of Speed Variation to Pressure Distribution for Flat, Medium and High Foot Arch.....6*

Noor Ezan Abdullah and [Nina Madzhi](#)

This paper presents the investigation on the types of foot arch affecting plantar pressure distribution during running. In this study, 20 participants of different arch types volunteered. The participants were required to run on the treadmill at three different speeds with the FSR sensors placed under the sole of the shoes. Two sensors were used, one at forefoot and one at rear foot. Only left foot was examined through this study. The data was displayed in serial monitor and. The data were analysed to compare the foot pressure of individuals during running and to analyse the effect of speed on the voltage measured with different arch types. The rear foot showed higher pressure value compared to the fore foot

3. *Analysis and Classification of Muscle Activity During Biceps Exercise Using MMG Signals.....12*

[Mohamad Razif Mohamad Ismail](#)

Surface Mechanomyography (MMG) is the recording of mechanical activity of muscle tissue. MMG measures the mechanical signal (vibration of muscle) that generated from the muscles during contraction or relaxation action. This project is determined to focus on the study and develop suitable procedures and methods to analyze and classify muscle activity during biceps exercise using MMG Signals. There are two channels of MMG signal has been placed into biceps brachii muscles (Short Head Biceps Brachii and Long Head Biceps Brachii) by using VMG sensor (TSD250A) with two different weights. Five features have been

selected and utilized to proceed with analysis and classification in this project. These features were root mean square (RMS), standard deviation (STD), root sum square (RSSQ), peak to peak value, and peak absolute value to root mean square ratio. The analysis and classification is divided into two sections, which are comparison between different training data set proportion for Back-Propagation Artificial Neural Network (BPANN) and analysis of MMG signal with different weights. The finding of the result shows, the BPANN proposed was able to classify all samples in to the target output with an average accuracy above 80%.

4. ***Video Encryption by Using Visual Cryptography Based on Wang's Scheme.....17***
[Rinaldi Munir](#) and [Harlili Harlili](#)

Visual cryptography could be used to encrypt secret video so that each participant has their own share in encrypted form. The encrypted video could be played. To recover the original video, all participants have to combine their shares. In this paper, we developed a method to encrypt video using Wang's scheme. If the secret video has audio, then the scheme is applied to each frame. The audio could be combined to each share or not. Experiment results show that the scheme could be applied very well to video. The recovered video is same exactly with the original video.

5. ***Simultaneous Multi-Objective Optimisation for Low-Power Real-Time Networks-On-Chip.....23***
[M Norazizi Sham Mohd Sayuti](#)

Simultaneous configuration of task mapping and network routing is a way to address the schedulability issues in the Networks-On-Chip embedded hard real-time systems. The approach provides alternative routes as a way to reduce interferences from high-priority messages, but without a guarantee that the network routes produced are low in power dissipation. This drawback is due to the lack of insight on the power dissipated by the Networks-On-Chip. We propose a multi-objective optimisation technique with a macromodel to minimise power dissipation while maintaining the schedulability of the systems. The results from the experimental work show that the proposed technique could find a good trade-off between the two objectives.

1. *Auto-reclose Relay Simulation for Research and Education.....29*

[Muhd Hafizi Idris](#), [Mohd Rafi Adzman](#), [Mohammad Faridun Naim Tajuddin](#), [Melaty Amirruddin](#) and [Mohd Alif Ismail](#)

Auto-reclose relay is an important relay used to reenergize a line after the line was tripped by main protection relay due to fault occurrence. Failure of auto-reclose relay to reenergize the line will make power can't be transmitted through the line and power system will be in stress condition. Knowledge of auto-reclose protection scheme is quite difficult to be understood and only few power system software has auto-reclose model for power system study and the software are costly. This research is about modelling auto-reclose relay and its' scheme using Matlab Simulink. The developed model has been developed with some limitations to simplify the modelling process and the results gained show the capability of Matlab Simulink software to be used to model the scheme for education and research purpose.

2. *An Overview of Data-Driven and Model-Driven Based Prognostics Techniques for Power Modules.....34*

[Muhamad Hazwan Abdul Halim](#), [Norlida Buniyamin](#) and [Nobuyuki Naoe](#)

Prognostics is a practice of predicting health condition and remaining useful lifetime (RUL) of a device or a system. The prognostics of power module enabling the assessment of health condition and time predicted when the module will fail given the current characteristics and loading condition. The presents practice of prognostics on power transistor can be classified into three groups: Model-Driven, Data-Driven and Hybrid method. This paper present an overview of the Model and Data-Driven Methods and their main problem is discussed. This paper also proposes a new prognostics methodology, which utilizes the characteristics of voids, and ON-State resistance as inputs for the proposed algorithm termed as RULPAV. The proposed methodology is expected to improve the RUL prediction as well as to minimize the reliance on junction temperature measurement.

3. *One-Sided Variable Sampling Interval Control Chart for Monitoring the Coefficient of Variation.....40*

[Wai Kwan Lau](#), [Zhi Lin Chong](#) and [Peh Sang Ng](#)

The regular practice of using a coefficient of variation (CV) control chart is achieved by collecting the samples at a fixed sampling interval (FSI). Recently, various studies showed that the detection efficiency of a control chart in monitoring shifts in the CV can be enhanced by implementing the variable sampling interval (VSI) strategy. However, these studies also showed that the adaptive charts, such as the VSI chart, are ineffective in detecting a decrease in the CV. As a remedy to this problem, a one-sided VSI chart that is effective in monitoring the increase in the CV is required. Therefore, this paper proposes a one-sided VSI CV chart and compares its performance with the two-sided VSI CV

chart. For monitoring an increase in the CV, we revealed that the one-sided VSI CV chart has a superior performance compared to the two-sided VSI CV chart.

4. *Comparative Analysis of Single-Box and Two-Box RF Power Amplifiers' Behavioral Models Sensitivity to Delay Misalignment.....44*

[Moustafa Abdelnaby](#) and [Oualid Hammi](#)

This paper examines the sensitivity of power amplifier behavioral models to time delay misalignment. Memory polynomial model and twin-nonlinear two-box models are derived, from measured data, to model the behavior of a GaN Doherty power amplifier under various time misalignment conditions. The results show that the memory polynomial model is much less sensitive to delay misalignment than twin-nonlinear two-box models. In particular, the memory polynomial model accuracy is not altered by a delay underestimation up to one sample, and is only degraded when the delay is overestimated. Conversely, twin-nonlinear two-box models performances are degraded whether the delay is underestimated or overestimated. Hence, the identification of twin-nonlinear two-box models unavoidably requires accurate delay alignment with a sub-sample resolution while the memory polynomial model can be derived from low complexity coarse delay alignment. Hence, in comparison with the two-box models, the complexity of the memory polynomial model identification can be offset by the use of low-complexity coarse time-delay alignment algorithms.

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5. *Design and Implementation of Intelligent Control System for Egg Incubator Based on IoT Technology.....49*

[Ammar Aldair](#), [Abdulmuttalib Rashid](#) and [Mastaneh Mokayef](#)

In this paper, the smart egg incubator system is chosen in order to be integrated with the IoT technology. The egg incubator system has two sensors types: temperature sensor and humidity sensor. Those sensors are used to measure the condition of the incubator and send the data to microcontroller system that responsible to make the diction to operate the actuators to keep the environment inside incubator within the suitable conditions for egg. Those conditions are changed during incubation period and they depend on the egg type. Also, the designed incubator has a servo motor that used to tilt the egg 450 every 4 hours to avoid the sticking of embryo to the eggshell. To ensure that those conditions are realized, the microcontroller is programed to work as fuzzy logic control system for controlling the position of egg, temperature and humidity of the incubator to ensure the best performance for different egg type. The status conditions in the egg incubator are appeared on the LCD screen display. Next task is building IoT system in order to controlling the egg incubator remotely from anywhere over the world.

6. *Fabrication and Performance Analysis of Post-Iodine Doped Amorphous Carbon.....55*

[Nurfadzilah Ahmad](#), Mohd Firdaus Abdullah, Shafinaz Sobihana Shariffudin and Nina Madzhi

The use of camphor oil as the naturally-safe precursor has been extensively studied to reveal the amorphous carbon structure as a potential material for carbon solar cell. This paper presents the simple fabrication technique to produce the Iodine post-doped amorphous carbon (a-C:I). The a-C:I were synthesized from the simple Aerosol-Assisted Chemical Vapor Deposition (CVD) and were made into a film with transmittance value of approximately 80% and absorption coefficient, α of $\sim 10^5 \text{ cm}^{-1}$. Electrical characterization results in ohmic behavior with the optimum conductivity of $7.19 \times 10^{-4} \text{ Scm}^{-1}$ and the structure from Atomic Force Microscope (AFM) was rough with an average roughness value of 14nm.

Session 3 (9.00 am – 10:30 am)**Topic: Expert System/Parallel Programming****1. *Hardware Implementation of 24-Bit Vedic Multiplier in 32-Bit Floating-Point Divider.....60***C Hanuman and J. Kamala

Most of the Digital operations in computing systems performed by using Floating-Point (FP) arithmetic. FP multiplication is widely used arithmetic operation compared to addition, subtraction and division operations. Multipliers performed using Vedic technique shows higher speed of operation with better precision but it occupies slightly more area compared to conventional multipliers. In this paper, we implemented 24-bit Vedic multiplier using Urdhva-Tiryakbhyam (UT) technique with modified Carry Save Adders (CSA). The proposed high speed multiplier is used for calculating Mantissa part (24-bit) in single precision FP Division. This method outperform existing multipliers used for FP Division in terms of speed and accuracy. All the design parameters are evaluated using VIVADO synthesis tool and results are verified by simulation. The design was coded in Verilog HDL and is implemented in NEXYS 4 DDR FPGA kit.

2. *Exploration of TCP Parameters for Enhanced Performance in a Datacenter Environment.....65*Mohsin Khalil and Farid Ullah Khan

TCP parameters in most of the operating systems are optimized for generic home and office environments having low latencies in their internal networks. However, this arrangement invariably results in a compromised network performance when same parameters are straight away slotted into a datacenter environment. We identify key TCP parameters that have a major impact on network performance based on the study and comparative analysis of home and datacenter environments. We discuss certain criteria for the modification of TCP parameters and support our analysis with simulation results that validate the performance improvement in case of datacenter environment.

3. *ANN Diagnostic System for Various Grades of Yellow Flesh Watermelon Based on the Visible Light and NIR Properties.....70*Noor Ezan Abdullah, Azra Afhzan Ab Rahim, Abg Mohd Azamuddin Abang Yahya, Anis Diyana Rosli and Nina Madzhi

There are many traditional method to identify the ripeness of the watermelon. Some of the method is destructive and not many people have knowledge to identify the watermelon is ripe or not. The aim of this study is to develop an intelligent system that able to classify the ripeness of various type of watermelon using Artificial Neural Network (ANN) as the classifier system by using MATLAB through a different training algorithms which are Levenberg-Marquardt, Scaled Conjugate Gradient and Resilient Backpropagation. The classifying technique is made based on the optical properties (VIS/NIR) for

yellow watermelons. A high percentage of accuracy had been achieved in classifying the grades of the yellow watermelon via Levenberg-Marquardt training algorithm. It can produce optimum and better output despite its lower number of connections by having a 86.7% sensitivity and 80% accuracy.

4. ***Performance Analysis of the Iterative Turbo Decoding Stopping Criteria in AWGN Channel.....76***

[Roslina Mohamad](#), [Nuzli Mohamad Anas](#) and [Mohamad Yusof Mat Nasir](#)

This paper presents the performance analysis of iterative turbo decoding stopping criteria in additive white Gaussian noise (AWGN) channel. The channel reliability factor is required for iterative turbo decoding where it depends on the error variance of the channel estimate as well as the signal-to-noise ratio (SNR) when the channel estimation is flawed. The majority of the turbo decoding stopping criteria expect idealize channel reliability available at the receiver since they require a threshold in view of signal-to-noise ratio (SNR) data. The Cross-entropy (CE), Hard Decision Aided (HDA) and Sign-Change Ratio (SCR) were utilized for the simulation process by comparing the reliability channel stopping criteria. It is further enhanced by expanding puncturing method the rate of the system for AIN. The reliability for high code rate can terminate early at low SNR while keeping up BER performance however more regrettable at certain frame size. Consequently, the different frame size does not influenced the BER performance either in unscaled or scale condition of the modulation.

5. ***Development of Automated Microcontroller-Based Lighting Control System for Indoor Room Implementation.....82***

[Norashikin M. Thamrin](#) and [Nurul Afiqah Mohd Arifin](#)

Currently, light control system is another efficient way to increase electrical efficiency in a house. Even some of the big company started to install the system in order to cut down the electricity expenses. This paper discusses the development of a microcontroller-based hardware platform for lighting adjustment with the environment light intensity measurement. The main aim of the research is to design a custom lighting control system in order to improve the light intensity of the controlled environment for suitable requirement. The procedure of light dimming corresponding to the need of the user will result in the energy saving. The analysis of energy consumption with and without control system is discussed.

1. *Five-Input One-Output Universal Filter Using Simple CMOS OTAs.....87*

[Montree Kumngern](#)

This paper presents a new five-input one-output voltage-mode universal filter using simple operational transconductance amplifiers (OTAs). The circuit uses six OTAs and two grounded capacitors. The circuit can realize low-pass, band-pass, high-pass, band-stop and all-pass filters into one topology. The natural frequency and the quality factor can be electronically controlled by adjusting the bias currents. Also, the circuit possesses high input impedance for all filtering functions. The simulation results have been verified by PSpice simulators using CMOS technology of 0.18 μm form TSMC.

2. *Emergency Power Pack with Navigation System for Mount Climber.....91*

[Wafi Aziz](#), [Norain Rahim](#), [Wan Norhisyam Abd Rashid](#), [Mohd Zaidi Mohd Tumari](#), [Shamsul Rahimi Subki](#), [Ahmad Muzaffar Abdul Kadir](#), [Siti Asma Che Aziz](#) and [Nurul Saqinah Abdul Aziz](#)

Mount climbers always experiencing unexpected situation such as their cellphone is running out of battery especially in a long trip of mount climbing. This situation is become worst when they are stuck or ashtay in the middle of the mountain. The use of renewable energy for power storage would solved this crisis. Hence, the aim of this project is to develop an emergency power pack for mount climber with Global Positioning System (GPS) navigation system. This power pack is using renewable energy sources; solar-wind energy, to store the energy inside a power bank for emergency use. Moreover, it also includes an SOS feature where the climber can push the 'panic button' to send an emergency notification message together with the exact location via Short Messaging Service (SMS) when they went astray in the middle of their climb to the rescue team.

3. *Intelligent Self-Propelling Baby Stroller with Obstacle Avoidance.....96*

[Norain Rahim](#), [Wafi Aziz](#), [Wan Norhisyam Abd Rashid](#), [Mohd Zaidi Mohd Tumari](#), [Wan Haszerila Wan Hassan](#), [Suhaila Mohd Najib](#), [Norleзах Hashim](#) and [Nur Syafiqah Abd Rama](#)

The aim of this project is to present the development of a self-propelling baby stroller with obstacle avoidance, using wireless technology. Carrying infants or children in public is very challenging for parents, especially for those who bring their baby stroller in crowds. Thus, this study offers the self-propelling baby stroller via bluetooth technology, which can be used as a safety and alert system to handle the stroller movement. The initiative of this study is to overcome the traumatizing and carelessness of the parents in monitoring infants inside a baby stroller. This system is a combination of software and hardware components to control and operate the movement of a baby stroller. The system design is divided into three parts: designing hardware circuit; designing software in C-language to program the Arduino UNO; and designing an application for Android phone as a

controller. Furthermore, the uses of bluetooth and ultrasonic in this study can detect and prevent the stroller from crashing the obstacle.

4. ***Knowledge Management System in Industrie.....107***

[Norlida Buniyamin](#) and [Putri Norlyana Mustafa Kamal](#)

This paper presents the need for a Knowledge Management System in industries, as more and more industries are realizing the importance of knowledge in an organization. A general methodology that is used in developing a KMS is also presented. A few literature reviews on recent KMS development and implementation researches have also been summarized in this paper. This paper serves as an introduction to a research that is currently being conducted at a case study company. A proposed methodology for this research has also been presented. The methodology proposed is adapted from a previous research, on a collaborative methodology to capture tacit knowledge in an organization.

5. ***Clock Gating Implementation on Commercial Field Programmable Gate Array (FPGA).....102***

[Wai Kong Lee](#), [Beng Liong Tan](#), [Kai Ming Mok](#) and [Hock Guan Goh](#)

This paper discusses the application and implementation of clock gating technique to RISC32 (a customizable processor on Field Programmable Gate Array (FPGA)) for reduction of dynamic power consumption on clock tree. The FPGA used is Artix-7 (xc7a100tcsg324-1) from Xilinx with 28nm technology. The power consumption of clock tree is reduced by 24% after implementing the proposed clock gating technique.