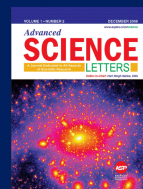# ICCSE2016

International Conference on
Computational Science and Engineering 2016
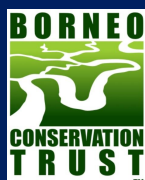
28th – 30th November 2016
Kota Kinabalu, Malaysia
www.iccsengr.org

Advanced SCIENCE LETTERS

ICCSE

Faculty of Computing & Informatics

Eco Campus

Transforming Ideas into Reality

Jointly Organized By

BORNEO CONSERVATION TRUST™

Center Of Excellence
In Semantic Agents

UMS
UNIVERSITI MALAYSIA SABAH

UNIVERSITI MALAYSIA SABAH

Supported By

VALIANT

MOSTI
KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION
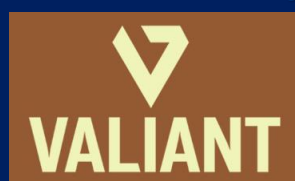
COMPUTATIONAL SCIENCE AND ENGINEERING SERIES

2016 INTERNATIONAL CONFERENCE ON COMPUTATIONAL
SCIENCE AND ENGINEERING
Sutera Magellan Resort, Kota Kinabalu, Sabah, Malaysia
28th –30th November 2016

CONFERENCE PROGRAM AND ABSTRACT BOOK

Jointly Organized by

Borneo Conservation Trust (BCT)
Kota Kinabalu, Sabah, Malaysia

and

Center of Excellence in Semantic Agents (COESA)
Universiti Malaysia Sabah

2016

Conference Program Committees

General Chair
Rayner Alfred (Universiti Malaysia Sabah, Malaysia)

Co-Chairs
Raymond Alfred (Borneo Conservation Trust, Malaysia)
Patricia Anthony (Lincoln University, New Zealand)
Ismail Saad (Universiti Malaysia Sabah, Malaysia)

Programme Chair
Chin Kim On (Universiti Malaysia Sabah, Malaysia)

Local Arrangements Chair
Ben Romero Didimus (Borneo Conservation Trust, Malaysia)

Treasury Chair
Stephen Laison Sondoh Jr (Universiti Malaysia Sabah, Malaysia)

Publication Chair
Ashish Doshi (University of South Australia, Australia)

Publicity Chair
I-Hsien Ting (National University of Kaohsiung, Taiwan)

Secretary
Asni Tahir (Universiti Malaysia Sabah, Malaysia)

Programme Committee Members
Ali Chekima (Universiti Malaysia Sabah, Malaysia)
Ali Farzamnia (Universiti Malaysia Sabah, Malaysia)
Amir A. Shafie (International Islamic University Malaysia, Malaysia)
Aslina Baharum (Universiti Malaysia Sabah, Malaysia)
Azali Saudi (Universiti Malaysia Sabah, Malaysia)
Azreen Bin Azman (Universiti Putra Malaysia, Malaysia)
Balan A/L Rathakrishnan (Universiti Malaysia Sabah, Malaysia)
Carolyn Bt. Salimun @ Jackson (Universiti Malaysia Sabah, Malaysia)
Cathy Hsing-Tzu Lin (National University of Kaohsiung, Taiwan)
Chong Kim Phin (Universiti Malaysia Sabah, Malaysia)
Collin Glen Joseph A/L Anthony Joseph (Universiti Malaysia Sabah, Malaysia)
Choo Yun Huoy (Universiti Teknikal Malaysia Melaka, Malaysia)

ii

Farrah Wong (Universiti Malaysia Sabah, Malaysia)
Jamal Ahmad Dargham (Universiti Malaysia Sabah, Malaysia)
Jane Labadin (Universiti Malaysia Sarawak, Malaysia)
Jason Teo Tze Wi (Universiti Malaysia Sabah, Malaysia)
John Barry Yallagher (Universiti Malaysia Sabah, Malaysia)
Jupikely James Bin Silip (Universiti Malaysia Sabah, Malaysia)
Justin Sentian (Universiti Malaysia Sabah, Malaysia)
Fatimah Dato Ahmad (National Defence University of Malaysia)
Geoffrey H. Tanakinjal (Universiti Malaysia Sabah, Malaysia)
Ho Chong Mun (Universiti Malaysia Sabah, Malaysia)
Kashif Nisar (Universiti Malaysia Sabah, Malaysia)
Kenneth Tze Kin Teo (Universiti Malaysia Sabah, Malaysia)
Khairul Anuar Mohamad (Universiti Malaysia Sabah, Malaysia)
Lau Hui Keng (Universiti Malaysia Sabah, Malaysia)
Leon Shyue-Liang Wang (National University of Kaohsiung, Taiwan)
Liawas Barukang (Universiti Malaysia Sabah, Malaysia)
Mohd Hanafi Ahmad Hizaji (Universiti Malaysia Sabah, Malaysia)
Mohd Kamel Wan Ibrahim (Universiti Malaysia Sabah, Malaysia)
Muralindran Mariappan (Universiti Malaysia Sabah, Malaysia)
Nancy J Siambun (Universiti Malaysia Sabah, Malaysia)
Nittala Surya Venkata Kameswara Rao (Universiti Malaysia Sabah, Malaysia)
Norazah Mohd Suki (Universiti Malaysia Sabah, Malaysia)
Norbayah Mohd Suki (Universiti Malaysia Sabah, Malaysia)
Norazlina Khamis (Universiti Malaysia Sabah, Malaysia)
Othman Bin Ahmad (Universiti Malaysia Sabah, Malaysia)
Phua Mui How (Universiti Malaysia Sabah, Malaysia)
Rachel Mansa (Universiti Malaysia Sabah, Malaysia)
Ravindra Pogaku (Universiti Malaysia Sabah, Malaysia)
Renee Chin Ka Yin (Universiti Malaysia Sabah, Malaysia)
Sitti Raehanah Binti Muhamad Shaleh (Universiti Malaysia Sabah, Malaysia)
Syed Nasirin Bin Syed Zainol (Universiti Malaysia Sabah, Malaysia)
Vijay Kumar (Universiti Malaysia Sabah, Malaysia)
Willey Liew Yun Hsien (Universiti Malaysia Sabah, Malaysia)
Yuto Lim (Japan Advanced Institutes of Science and Technology, Japan)

Conference Session Chairs
Prof. Dr. Jharna Majumdar
Prof. Dr. Jaeho Choi
Associate Professor Dr. Yuto Lim
Associate Professor Dr. Noraziah Ahmad
Associate Professor Dr. Hezerul Abdul Karim
Assitant Professor Dr. Koon Chun Lai
Dr. Tok Pek Lan
Dr. Tin Tin Ting
Dr. Teh Chee Siong
Dr. Shahrel Azmin Suandi

Dr. Sew Sun Tiang
Dr. Renee Ka Yin Chin
Dr. Muralindran Mariappan
Dr. Mohd Noor Abdullah
Dr. Mardeni Bin Roslee
Dr. Jasrul Jamani Bin Jamian
Dr. Hamwira Yaacob
Dr. Chiung Ching Ho
Dr. Been Seok Yew
Dr. Ali Farzamnia
Dr. Mohamed Ariff Bin Ameedeen

Organizing Committee Members
Norazlina Khamis
Leau Yu Beng
Norhayati Daut
Nordaliela Mohd Rusli
Siti Hasnah Tanalol
Diana Binti Kimmuan
Albert Alex Jimmy
Gan Kim Soon
Connie Liew
Jane Lai
Khalifa Chekima
Ian Kevin Witus
Tan Choon Beng
Aaron Frederick
Punitha Turumugon

About the Conference

Computational Science and Engineering (CSE) is a relatively new paradigm for scientific research and engineering design in which large-scale simulation, data analysis, and high performance computing play a central role. In fact, the applications of CSE can be seen in almost all disciplines. These include the following:

- **Aerospace Engineering and Mechanical Engineering:** combustion simulations, structural dynamics, computational fluid dynamics, computational thermodynamics, computational solid mechanics, vehicle crash simulation, biomechanics, trajectory calculation of satellites

- **Astrophysical systems**

- **Battlefield simulations** and military gaming, homeland security, emergency response

- **Biology and Medicine:** protein folding simulations (and other macromolecules), bioinformatics, genomics, computational neurological modeling, modeling of biological systems (e.g., ecological systems), 3D CT ultrasound, MRI imaging, molecular bionetworks, cancer and seizure control

- **Chemistry:** calculating the structures and properties of chemical compoundsmolecules and solids, computational chemistrycheminformatics, molecular mechanics simulations, computational chemical methods in solid state physics, chemical pollution transport Civil Engineering: finite element analysis, structures with random loads, construction engineering, water supply systems, transportation/vehicle modeling

- **Computer Engineering, Electrical Engineering, and Telecommunications:** VLSI, computational electromagnetics, semiconductor modeling, simulation of microelectronics, energy infrastructure, RF simulation, networks

- **Epidemiology:** influenza spread

- **Environmental Biodiversty, Engineering and Numerical weather prediction:** climate research, Computational geophysics (seismic processing), modeling of natural disasters, Spatial Data

- **Prediction:** biodiversity management and conservation, role of spatial information, GIS in biodiversity monitoring, geoportals, spatial data infrastructures, global spatial data, spatial tools for natural resources management

- **Finance:** derivative pricing, risk management

- **Industrial Engineering:** discrete event and Monte-Carlo simulations (for logistics and manufacturing systems for example), queueing networks, mathematical optimization

- **Material Science:** glass manufacturing, polymers, and crystals

- **Nuclear Engineering:** nuclear blast modeling, fusion simulations

- **Petroleum engineering:** petroleum reservoir modeling, oil and gas exploration

- **Physics:** Computational particle physics, automatic calculation of particle interaction or decay, plasma modeling, cosmological simulations

- **Transportation**

Engineering and science problems have been solved historically using experimental testing andor mathematical analysis. Some examples of engineering problems are fluid flows and structural properties associated with aircraft, ships, submarines, automobiles, spacecraft, jet and rocket propulsion engines, buildings and other structures. Other examples relate to electrical power generation, weather, rivers and oceans, electrical equipment, computer hardware, radar, antennas, chemical reactions and processes, fuel cells, petroleum recovery and refining, agricultural and construction equipment, refrigeration and air conditioning, air and water pollution, energy conversion and storage, and many others. Many of these problems can now be solved efficiently as computational simulations of mathematical models that represent the relevant physical phenomena arising in each problem.

The Program Committees are looking for original research contributions on a broad-range of topics related to High performance computing, Modeling and simulation, Algorithms, Big Data Analysis and visualization, Data Science, CSE Education, Advanced Networking and Applications and Intelligent and Bio-Inspired Computing.

Message from the Conference Chair

On behalf of the program board I would like to welcome you to the ICCSE2016 conference!

The overwhelming response to our call-for-papers indicates the popularity of this conference topic and confirms that Computational Science and Engineering (CSE) has become the world-wide forum for all aspects of science and technology in the field of CSE related topics. For ICCSE2016, we have received more than 250 draft papers from countries all over the world (e.g., that includes Brunei, Singapore, India, Pakistan, Taiwan, China, Korea, Japan, Philipine, Indonesia, Thailand, Nigeria, etc). After the review process, 142 papers were selected for oral presentation. Thanks to this response, all important fields of CSE techniques, technology and exploitation are covered by the contributions.

Prior to ICCSE2016 there is a workshop on Machine Learning using R for Data Analysis. The conference itself starts with the plenary session on Tuesday, where keynote speeches will be given by distinguished experts. Throughout the remaining two conference days the four parallel oral sessions will be held in separate halls. We have arranged the parallel sessions such that overlap of related research areas is kept to a minimum.

A Best Paper Award and a Best Student Paper Award will be awarded at the closing session on the last day of the conference. Again, all updated and completed papers received by the deadline (14 days after the conference) will be included in the Advanced Science Letters journal which is indexed in SCOPUS.

I would like to express my thanks to all authors for their outstanding contributions

and in particular the members of the program board for their competent evaluation of the large number of submissions. Likewise I would also like to express my appreciation to the program and awards committee, as well as to the invited session chairs for their acceptance to chair the parallel sessions.

I sincerely hope that ICCSE2016 has provided a venue for knowledge sharing and establishing more research collaborations among us. Last but not least, I wish everyone an enjoyable and memorable stay in Kota Kinabalu for the ICCSE2016 Conference.

Thank you

Associate Professor Dr. Rayner Alfred
ICCSE2016 Conference Chair

Keynote Speakers

Keynote Speakers 1

Professor Jooyoung Lee
Professor of Computational Science,
School of Computational Sciences,
Korea Institute for Advanced Study, Korea.

Biodata
Jooyoung Lee is a theoretical physicist currently working on the protein folding problem. Throughout his career, he has developed new methodologies to provide breakthroughs for outstanding problems. The research area of Lees earlier career was mainly focused on critical phenomena and phase transition in statistical physics. After switching to the protein folding study in 1994, he realized that a much more powerful sampling method than then-available ones was needed. For this he developed the conformational space annealing (CSA) method, with which he was able to obtain more optimal solutions than reported in the literature for many hard problems. Lately, using CSA, Lee is performing researches in the area of protein structure prediction, protein structure determination using incomplete experimental data computational materials design. In the CASP12 protein structure prediction experiment, Lees method was officially recognized as the best template-based-modeling method. As of September 2016, his total citation excluding self-citation is 3,199, among which he was either the first author or the corresponding author for 2713 citations. His H-index is 29.

Title
Global Optimization by Conformational Space Annealing and its Application

Abstract
Many problems in science and engineering can be mapped into combinatorial opti-

mization problems, and examples include protein folding problem, protein structure prediction/determination problem, materials design problem, and communitymodule detection problem in the network science. In this talk, I will discuss our recent progresses in solving these problems in terms of the application of the Conformational Space Annealing (CSA) method.

Acknowledgments

References

- Jooyoung Lee, Harold A. Scheraga, and S. Rackovsky, J. Comput. Chem., 18, 1222-1232 (1997).

- Julian Lee, In-Ho Lee, and Jooyoung Lee, Phys. Rev. Lett., 91, 080201 (2003).

- Jae-Sung Woo, Jae-Hong Lim, Ho-Chul Shin, Min-Kang Suh, Bonsu Ku, Kwang-Hoon Lee, Keehyoung Joo, Howard Robinson, Jooyoung Lee, Sam-Yong Park, Nam-Chul Ha and Byung-Ha Oh, Cell 136, 85-96 (2009).

- Juyong Lee, Steven P. Gross and Jooyoung Lee, Phys Rev E, 85, 056702 (2012).

- Juyong Lee, Steven P. Gross and Jooyoung Lee, SCIENTIFIC REPORTS, 3, 2197 (2013).

- In-Ho Lee, Jooyoung Lee, Young Jun Oh, Sunghyun Kim, and K. J. Chang, Phys Rev B 90,115209 (2014).

- "Template based protein structure modeling by global optimization in CASP11" Keehyoung Joo, InSuk Joung, Sun Young Lee, Jong Yun Kim, Qianyi Cheng, Balachandran Manavalan, Jong Young Joung, Seungryong Heo, Juyong Lee, Mikyung Nam, In-Ho Lee, Sung Jong Lee and Jooyoung Lee, PROTEINS: STRUCTURE, FUNCTION, AND BIOINFORMATICS, published on line 14 SEP (2015).

- "Contact-assisted protein structure modeling by global optimization in CASP11", Keehyoung Joo, InSuk Joung, Qianyi Cheng, Sung Jong Lee and Jooyoung Lee, PROTEINS: STRUCTURE, FUNCTION, AND BIOINFORMATICS, published online 11 JAN (2016).

Keynote Speakers 2

Professor Hiroyuki Iida
School of Information Science,
Japan Advanced Institue of Science and Technology (JAIST),
1-1 Asahidai, Nomi, Ishikawa, 923-1292, Japan.

Biodata
Dr. Hiroyuki Iida has been an enthusiasm researcher in the domains such as computer games and entertainment computing, while acting as important roles of international activities such as conference chair, program chair and journal editor. He has also organized Mind Sports Computer Olympiad and Computer Games Conference as the secretary/treasurer of ICGA (International Computer Games Association) for each year since early 2000. He supervised many Master and PhD students until now, while acting as PhD committee member (external assessment) for PhD candidates in other universities such as Maastricht University and Tilburg University in the Netherlands. He also served as an external assessment for international research funding such as Canada and Holland.

Title
Game Theory, Game Refinement Theory and Gamification

Abstract
Game theory (Nash 1950) is used to study the game play. Games should be fun to play for all the players irrespective of the level of expertise. Game refinement theory (Iida 2004) studies the entertainment and intelligence part of games. Earlier works on game refinement theory resulted in the development of a logistic model of game uncertainty based on the principle of seesaw games (Iida 2013). Further studies resulted in a model based on the game information progress for various games. The second derivative, which is the acceleration in game information dynamics, was derived from the game information progress model to determine the game refinement value (Sutiono 2014). It is expected that the game refinement theory will be widely used as a tool to assess the quality of various types of games in the framework of gamification.

References

- J. F. Nash (1950). Equilibrium Points in N-person Games. Proceedings of the National Academy of Sciences 36 (1): 48-49.

- H. Iida et al. (2003). A metric for entertainment of boardgames: Its implication for evolution of chess variants. Entertainment Computing Technologies and Applications, pages 65-72.

- H. Iida et al. (2004). An application of game-refinement theory to Mah Jong. In Entertainment Computing-ICEC2004, pp. 333-338. Springer.

- A. P. Sutiono et al. (2014). A mathematical model of game refinement, in D. Reidsma et al. (Eds.): INTETAIN 2014, LNICST 136, 148151.

Keynote Speakers 3

Professor Ali Selamat
Department of Software Engineering
Faculty of Computer Science & Information Systems
Universiti Teknologi Malaysia (UTM)
81310 Johor Baharu, Johor, Malaysia

Biodata
Ali Selamat is a professor at Faculty of Computing, Universiti Teknologi Malaysia, Malaysia. He is currently a Chief Information Officer (CIO) and Director of Computer and Information Technology, Universiti Teknologi Malaysia (UTM). He was the Dean of Research, Knowledge Economy Research Alliance, UTM. He is currently a Chair of IEEE Computer Society Malaysia Chapter. He is also the Editorial Boards of Knowledge Based Systems Elsevier, International Journal of Information and Database Systems (IJJIDS), Inderscience Publications, Vietnam Journal of Computer Science, Springer Publications, Advances in Distributed Computing Intelligence Journal (ADCAIJ), Salamanca University Press. He is the Program Chair of International Conference on Software Engineering Tools, Methodologies (SOMET), 2017 to be held in Kanazawa, Japan. He has been a visiting professor at Hradec-Kralove University, Czech Republic, Kuwait University, and few others universities in Japan. His research interests include cloud based software engineering, software agents, information retrievals, pattern recognitions, genetic algorithms, neural networks and soft-computing, knowledge management, key performance indicators.

Title
Detection of Vulnerable Plaque Using Virtual Histology Intravascular Ultrasound Images Using Machine Learning Approach

Abstract
Virtual Histology Intravascular Ultrasound (VH-IVUS) is a clinically available for visualizing color coded of coronary artery plaque. However, it has the limitation to provide medical relevant information to identify vulnerable plaque. In this research, a hybrid k-means and PSO (KMPSO) algorithm is proposed for VH-IVUS segmentation. KMPSO algorithm first executes the K-means algorithm for seeding the initial swarm. PSO algorithm is then applied to optimize the seed points which are cluster centroids. The next process is integration of the plaque feature and texture feature in order to extract complex features. Plaque feature include necrotic

core in contact with the lumen (NCCL), confluent necrotic core (CNC), confluent dense calcium (CDC), and plaque burden (PB). Moreover, three commonly used statistical methodologies of textural features are presented consist of Local Binary Patterns (LBP), Gray Level Co-occurrence Matrix (GLCM), and Modified Run Length (MRL). Finally, Back propagation (BP), KNN (K-Nearest Neighbor), and SVM classifier are applied to select the best classifier for classifying plaque into two classes include Thin cap fibroatheroma (TCFA) and Non-TCFA. The proposed method is applied to 546 in-vivo VH-IVUS images. Results proved the dominance of our proposed method with accuracy rates of 98.15% for TCFA.

Keynote Speakers 4

Professor Yong-Jin Park
Faculty of Computing and Informatics
Universiti Malaysia Sabah
Kota Kinabalu, Sabah Malaysia.

Biodata

Yong-Jin Park received B.E., M.E., and Ph.D. degrees in Electronic Engineering from Waseda University. From 1978 to 2010, he was a Professor at Hanyang University, Seoul. He was a Visiting Associate Professor from 1983 to 1984 in the Department of Computer Science, University of Illinois, Urbana-Champaign. He was a Research Fellow at the Computing Laboratory, University of Kent, Canterbury, England from 1990 to 1991. He was the President of the Open Systems Interconnection Association from 1991 to 1992, the Chairman of the IEEE Seoul Section from 1999 to 2000, and the Director of the Secretariat of the Asia Pacific Advanced Network (APAN) from 1999 to 2003. He was the President of the Korea Institute of Information Scientists and Engineers (KIISE) in 2003 and the Director of IEEE Region 10 from 2009 to 2010. He was also a Professor of Waseda University, Tokyo, during 2010-2016. He joined University Malaysia Sabah in 2016, where he is a Professor of Faculty of Computing and Informatics. Currently he is Professor Emeritus of Hanyang University.

Title

Information-Centric Networking for Future Internet Architecture

Abstract

Information Centric Networking (ICN) has been attracting attention as a promising future Internet architecture. The recent network usage is information-centric rather than host-centric. ICN accesses information by using its information object name, instead of a location address like the current IP network. In this talk the background and technological features of ICN are described. NDN (Named Data Networking) is described in detail as the typical ICN technology. The research activities at Waseda University are also introduced, including the GreenICN project which is EU-Japan Cooperation Research. Finally, the applications to IoT and 5G mobile communication and perspectives of ICN are mentioned.

Conference Programme

29th November 2016
08:00 # Registration
08:30 # Opening Ceremony
09:00 # *Keynote Speech 1*
　　　# **Professor Jooyoung Lee**,
　　　# **Title: Global Optimization by Conformational Space**
　　　　　　Annealing and its Application
09:45 # *Keynote Speech 2*
　　　# **Professor Hiroyuki Iida**
　　　# **Title: Game Theory, Game Refinement Theory and**
　　　　　　Gamification
10:30 # Coffee Break
10:45 # Parallel Sessions 1, 2, 3, 4 (Room 1 through Room 4)
12:45 # Lunch
14:00 # Parallel Sessions 5A, 6A, 7A, 8A (Room 1 through Room 4)
15:30 # Coffee Break
15:45 # Parallel Sessions 5B, 6B, 7B, 8B (Room 1 through Room 4)
17:45 # Adjourn
19:00 # Conference Dinner

30th November 2016
08:00 # Registration (Cont)
09:00 # *Keynote Speech 3*
　　　# **Professor Ali Selamat**
　　　# **Title: Detection of Vulnerable Plaque Using Virtual**
　　　　　　Histology Intravascular Ultrasound Images Using
　　　　　　Machine Learning Approach
09:45 # *Keynote Speech 4*
　　　# **Professor Yong-Jin Park**
　　　# **Title: Information-Centric Networking for Future**
　　　　　　Internet Architecture
10:30 # Coffee Break
10:45 # Parallel Sessions 9, 10, 11 (Room 1 through Room 3)
12:45 # Lunch
14:00 # Parallel Sessions 12A, 13A, 14A (Room 1 through Room 3)
15:30 # Coffee Break

15:45 # Parallel Sessions 12B, 13B, 14B (Room 1 through Room 3)
18:00 # Closing Ceremony and Awards Presentation

PARALLEL SESSION 1
(INTELLIGENT AND BIO-INSPIRED COMPUTING I)
SESSION CHAIR: DR. SHAHREL AZMIN SUANDI

TIME	PID	AUTHORS	TITLE
10:45 – 11:00	18166	**Rahmat Ilahi**, Novia Admodisastro, Norhayati Mohd. Ali and Abu Bakar Md. Sultan	Dynamic Reconfiguration of Web Service in Service-Oriented Architecture
11:00 – 11:15	18076	**Mohd Fauzi Abu Hassan**, Ahmad Shahrizan Abdul Ghani, Dhanesh Ramachandram, Abduljalil Radman, Shahrel Azmin Suandi	Enhancement of Under-Exposed Image for Object Tracking Algorithm through Homomorphic Filtering and Mean Histogram Matching
11:15 – 11:30	18026	**Norhidayah Mohamad Yatim**, Norlida Buniyamin	An Overview of Simultaneous Localization and Mapping using Low-cost Mini Robot Platform
11:30 – 11:45	18028	**Nur Huda Jaafar**, Mohd Sharifuddin Ahmad, Azhana Ahmad	A Conceptual Architecture of Sincerity in Software Agents for Task Performance
11:45 – 12:00	18044	**Bokolo Anthony Jnr** and Mazlina Abdul Majid	An Agent Based Green Decision Making Model for Sustainable Information Technology Governance
12:00 – 12:15	18057	J. Samuel, **A.B. Abd Rahman**, A. Alias and F. M. Yassin	Low-Cost Brainwave Controller
12:15 – 12:30	18061	Chong Chee Soon, **Rozaimi Ghazali**, Hazriq Izzuan Jaafar, Syarifah Yuslinda Syed Hussein, Sahazati Md. Rozali	Robustness Analysis of an Optimized Controller via Particle Swarm Algorithm
12:30 – 12:45	18070	Hussein Samma and **Shahrel Azmin Suandi**	Application of Particle Swarm Optimization in Face Sketch Recognition

LUNCH
12:45 – 14:00

PARALLEL SESSION 5A
(ADVANCED NETWORKING AND APPLICATIONS I)
SESSION CHAIR: DR. BEEN SEOK YEW

TIME	PID	AUTHORS	TITLE
14:00 – 14:15	17011	**Azana Hafizah Mohd Aman**, Aisha-Hassan A. Hashim, Azween Abdullah, Huda Adibah Mohd Ramli	A Novel Fast ReRoute Signaling Cost for Multicast Proxy Mobility
14:15 – 14:30	17039	**Shamsiah binti Suhaili**, Takahiro Watanabe	High Speed Implementation of the Keyed-Hash Message Authentication Code (HMAC) based on SHA-1 Algorithm
14:30 – 14:45	17046	**Amjed Sid Ahmed Mohamed Sid Ahmed**, Rosilah Hassan, Nor Effendy Othman	Securing IPv6 Link Local Communication Using IPsec: Obstacles and Challenges
14:45 – 15:00	17055	G.C.Chung, S.S.Thwin, M.Y.Alias	Statistical Analysis of Ultra-wideband Signed Decision Variable
15:00 – 15:15	17075	**Been Seok Yew**, Fwen Hoon Wee, Saiful Bahri Mohamed, Martini Muhamad	Performance Comparison and Electromagnetic Dosimetry of Rigid, Hybrid and Textile Antennas
15:15 – 15:30	17077	**Hemlata Patil**, Dr A. J. Patil, Dr S. G. Bhirud	On The Throughput and Energy Consumption in External Sensing Cognitive Radio

BREAK
15:30 – 15:45

PARALLEL SESSION 5B
(APPLICATIONS OF CSE I)
SESSION CHAIR: DR. JASRUL JAMANI BIN JAMIAN

TIME	PID	AUTHORS	
15:45 – 16:00	19056	**M. S. Rosman**, N. Buniyamin, M.H. Abdul Halim, **Kasumawati Lias**	The Effect of Void in Thermal Layer on MOSFET`s Heat Dissipation
16:00 – 16:15	19059	**Kasumawati Lias**, Norlida Buniyamin, Mohammad Zulkarnaen Ahmad Narihan	Radiation Absorption Distribution of Hyperthermia Rectangular Microstrip Applicator with Three Different Substrates
16:15 – 16:30	19073	Ismail Saad, **Andee Hazwani Syazana Bacho**, Bun Seng C., Mohd. Zuhir H., N. Bolong	Vertical Strained Impact Ionization MOSFET (VESIMOS) Technology Approach for Based Biosensor Applications using its Behavioral Model
16:30 – 16:45	19074	Ismail Saad, Mohd. Zuhir H., **Andee H. S. Bacho**, Bun Seng C., Khairul A.M, Bablu Ghosh, N. Bolong	Enhanced Reliability of Vertical Strained Impact Ionization MOSFET Incorporating Dielectric Pocket for Ultra-Sensitive Biosensor Applications
16:45 – 17:00	19174	**Yasser Arab**, Ahmad Sanusi Hassan and Bushra Qanaa	Comparative Study on the Sunlight Penetration Extent on High-Rise Apartment Facades with Early Modern Architectural Style Design in Kuala Lumpur, Malaysia
17:00 – 17:15	19114	N.A.N. Azahan, **J.J. Jamian**, Z.A. Noorden, M.A. Baharudin	An Impact of Controlling Energy Management System via Hybrid Battery-Supercapacitor in Electric Vehicles
17:15 – 17:30	19127	**Noor Hafizah Abdul Aziz**, Muhammad Aizat Md Thani	Vehicle Classification Using Passive Forward Scattering Radar

		PARALLEL SESSION 2 (DATA SCIENCE I) SESSION CHAIR: ASSISTANT PROFESSOR DR. KOON CHUN LAI	
TIME	**PID**	**AUTHORS**	**TITLE**
10:45 – 11:00	15024	Julius Beneoluchi Odili, Mohd Nizam Mohmad Kahar, **A. Noraziah**	A comparative study of Neural Networks methods & the African Buffalo Optimization for the Travelling Salesman's Problems
11:00 – 11:15	15034	**Chee Siong TEH**, Juen Ching WONG, Ming Leong YII	Behavioral Biometrics for User Authentication Using Self-Refreshing SOM
11:15 – 11:30	15082	**Suzana Ahmad**, Siti Zaleha Zainal Abidin, Nasiroh Omar, Stephan Reiff-Marganiec	Policy Language: Enhancing JACIE for Data Ownership
11:30 – 11:45	15035	Ming Leong YII, **Chee Siong TEH**	A Novel Triangulate Mapping Based on Self-Organized Anchor Points for Data Visualization
11:45 – 12:00	15067	**Jharna Majumdar**, Shilpa Ankalaki	Comparison of Clustering Algorithms using Quality Metrics with Invariant Features Extracted from Plant Leaves
12:00 – 12:15	15071	**Suryanti Awang**, Junaida Sulaiman, Noorhuzaimi@Karimah Mohd Noor, Luhur Bayuaji	Comparison of Accuracy Performance based on Normalization Techniques for the Features Fusion of Face and Online Signature
12:15 – 12:30	15068	**Jharna Majumdar**, Ashish Bhattarai, Saurabh Adhikari	Optical Flow-Initiated Particle Filter Framework for Human-Tracking and Body-Component Detection
12:30 – 12:45	15131	Suziah Sulaiman, Dayang Rohaya Awang Rambli, **Foong Oi Mean**, Nguyen Minh Tuan, Fatin Shamimi M Zuki	Graphical Representation of the Navigation Status in a Web-based Virtual Museum

		LUNCH 12:45 – 14:00	

		PARALLEL SESSION 6A (MODELLING AND SIMULATIONS I) SESSION CHAIR: PROF. DR. JHARNA MAJUMDAR	
TIME	**PID**	**AUTHORS**	**TITLE**
14:00 – 14:15	12013	**Nurul Aisyah Nadiah Binti Zainal Abidin**, Abu Khari Bin A'Ain	Simulation of Power Measurement of Sequential Adiabatic Circuit
14:15 – 14:30	12015	**M. Khusyaie M. Razali**, Asan G. A. Muthalif, N. H. Diyana Nordin, Syamsul Bahrin	Improved Parameter Estimation for MRF Models for Varying Current
14:30 – 14:45	12016	Zainab Amin, **Awanis Romli**, Rahmah Mokhtar, Mazlina Abdul Majid	The Development of Conceptual KPI Model Based on Balanced Scorecard Measurement Method for Tacit Knowledge of Universities' Academic Staff
14:45 – 15:00	12027	**Erma Suryani**, Rully Agus Hendrawan, Isnaini Muhandhis, Lily Puspa Dewi	Dynamic Simulation Model of Cow's Milk Demand and Supply to determine The National Fulfilment Ratio
15:00 – 15:15	12047	**Koon Chun Lai**, Chee Meng Loo, Kok Seng Ong, Kia Hock Tan, Kim Ho Yeap, Ming Hui Tan	Thermal Simulation of Light-Emitting Diode Panel with Heat Sink
15:15 – 15:30	12126	Noor Akma Abu Bakar, **Mazlina Abdul Majid**, Khalid Adam Ismail	An Overview of Crowd Evacuation Simulation

		BREAK 15:30 – 15:45	

		PARALLEL SESSION 6B (APPLICATIONS OF CSE II) SESSION CHAIR: DR. SEW SUN TIANG	
TIME	**PID**	**AUTHORS**	**TITLE**
15:45 – 16:00	19021	**Sew Sun Tiang**, Ibrahim Asyadh, Sardar Ali, Mohd Zaid Abdullah	Compact Multislot Planar Monopole Antenna for Microwave Imaging
16:00 – 16:15	19022	Ritu Gupta, A. Noraziah, Arun Gupta, **Ainul Azila Che Fauzi**	Challenges in predicting wood plastic composites (WPCs)
16:15 – 16:30	19030	**Pek-Lan Toh**, Jee-Sien Char, Shukri Sulaiman, Mohamed-Ismail Mohamed-Ibrahim	Structural and Electronic Properties of 4-Bromo-2-(1H-Imidazo[4,5-b]Pyridin-2-yl)Phenol from Density Functional Theory Calculation
16:30 – 16:45	19032	**Fong Oi Mean**, Ai-Leng Cheong, Kwang-Hooi Yew	Resqku: An Emergency Mobile Application With Audible Sound Frequency
16:45 – 17:00	19045	**Syarifah Noor Syakiylla Sayed Daud**, Rubita Sudirman	Brain Signal Analysis to Investigate Sound Effect on Memorization
17:00 – 17:15	19048	**Mohd Rashid Abu Bakar** and Noraziah Ahmad	Review on Green Technology Implementation Challenges in University Data Centre
17:15 – 17:30	19052	**Siti Khuzaimah Soid**, Anuar Ishak, Ioan Pop	Boundary Layer Flow and Heat Transfer of a Nanofluid over a Moving Permeable Surface

PARALLEL SESSION 3 (BIG DATA TECHNOLOGIES) SESSION CHAIR: DR. MOHAMED ARIFF AMEEDEEN			
TIME	PID	AUTHORS	TITLE
10:45 – 11:00	14058	**Mohamed Ariff Ameedeen** and Thing Weng Jie	Seamless Model Interoperability for Software Design and Analysis
11:00 – 11:15	14036	**Ainul Azila Che Fauzi**, A. Noraziah, T Herawan, Z. Abdullah, Ritu Gupta	Managing Fragmented Database Using BVAGQ-AR Replication Model
11:15 – 11:30	14037	**A. Noraziah**, Mohammed Adam Ibrahim Fakherldin, Khalid Adam, Mazlina Abdul Majid	Big Data Processing in Cloud Computing Environments
11:30 – 11:45	14041	Haneen A.A, **A. Noraziah**, Ritu Gupta, Mohammed Adam Ibrahim Fakherldin	Review on Data Partitioning Strategies in Big Data Environment
11:45 – 12:00	14049	Khalid Adam, **Mazlina Abdul Majid**, Mohammed Adam Ibrahim Fakherldin, Jasni Mohamed Zain	A Big Data Prediction Framework for Weather Forecast Using MapReduce Algorithm
12:00 – 12:15	14051	**Sara B. Elagib**, Aisha-Hassan A. Hashim, R. F. Olanrewaju	A Proposed Architecture for Generic and Scalable CDR Analytics Platform utilizing Big Data Technology
12:15 – 12:30	14064	**Nathar Shah** and Christopher Messom	An Expressive Hadoop MapReduce Framework
12:30 – 12:45	14115	Chan Chung Hoong and **Mohamed Ariff Ameedeen**	Boyer-Moore Horspool Algorithm used in Content Management System of Data Fast Searching
LUNCH 12:45 – 14:00			

PARALLEL SESSION 7A (CSE EDUCATION AND FINANCE I) SESSION CHAIR: DR. MOHD NOOR ABDULLAH			
TIME	PID	AUTHORS	TITLE
14:00 – 14:15	16053	**Mohd Noor Abdullah**, Mohd Asyraf Ismail, Azralmukmin Azmi, Nur Hanis Mohammad Radzi, Jasrul Jamani Jamian	Economic and Emission Load Dispatch Solution via Artificial Bee Colony Algorithm
14:15 – 14:30	16004	**Teh Shan Shan**, Joe Henry Obit, Rayner Alfred, Asni Tahir	Enhancing the Performance of University's Website for Mobile Devices Based on Responsive Web Design Approach
14:30 – 14:45	16006	**Tin Tin Ting**, Andrew Khin Huat Tan	SME-ECD Design Framework of Motion-based Game-based Learning and Assessment for Early Childhood Education
14:45 – 15:00	16007	**Mazeyanti M Ariffin**, Wan Fatimah Wan Ahmad, Suziah Sulaiman	Harvesting the Power of Serious Game for IT Education
15:00 – 15:15	16012	Manoranjitham Muniandy, Suziah Sulaiman, **Savita Sugathan**	Evaluating Accessibility Criteria and Alternatives of Computer Applications for the Blind Using Analytical Hierarchy Process
5:15 – 15:30	16050	**K.S Savita**, Anis Alia Mohamad Afifi, Manoranjitham Muniandy	Gesture Control as Assistive Technology
BREAK 15:30 – 15:45			

PARALLEL SESSION 7B (CSE EDUCATION AND FINANCE II) SESSION CHAIR: ASSOC. PROF. DR. NORAZIAH AHMAD			
TIME	PID	AUTHORS	TITLE
15:45 – 16:00	16003	Teh Shan Shan, Joe Henry Obit, Rayner Alfred, **Asni Tahir**	Responsive Web Design Trend in Malaysia Public Universities
16:00 – 16:15	16063	M. Manoranjitham, **Lim Kok Ooi**, K.S Savita	Touch Sensation Based Computer Application to Facilitate the Learning Process of Dyslexic Children
16:15 – 16:30	16080	Wan Nurulsafawati Wan Manan, **Mazlina Abdul Majid**, Hasmanizam Abdul Majid and Mohd Izham Ibrahim	Securing E-Learning Environment: A Study of Security Awareness and Behavior of User
16:30 – 16:45	16081	**Suzana Ahmad**, Nurhayati Binti Zakaria	Student Awareness on Social Network Access Control Policy – An Evaluation of Facebook
16:45 – 17:00	16178	**Shahid Anjum**	Banking Automation with Sustainable Hedging for Information Risks: BASHIR Framework for Private Clouds
17:00 – 17:15	16183	**Yenni Carolina** and Azhar Susanto	Analyzing the Effect of Top Management Support on Accounting Information System (AIS) Success

		PARALLEL SESSION 4 **(DATA SCIENCE II)** **SESSION CHAIR: DR. HAMWIRA YAACOB**	
TIME	**PID**	**AUTHORS**	**TITLE**
10:45 – 11:00	15105	**Hamwira Yaacob** and Abdul Wahab Abdul Rahman	Affective State Classification through CMAC-based Model of Affects (CCMA) using SVM
11:00 – 11:15	15098	**Nurul Izzati Mat Razi**, Marini Othman, Hamwira Yaacob	Investment Decisions Based on EEG Emotion Recognition
11:15 – 11:30	15065	**Chung Seng Kheau**, Rayner Alfred and Hui Keng Lau	Consensus Phase Of eDARA
11:30 – 11:45	15092	**Fuad Yahaya**, Nurazzah Abd. Rahman, Zainab Abu Bakar	Resolving Malay Word Sense Disambiguation Utilizing Cross-Language Learning Sources Approach
11:45 – 12:00	15094	Siti Sofiah, **Kamarul Hawari**, Sabira Khatun	Contextual Thermal Face Detection for Fever Mass Screening
12:00 – 12:15	15097	**Suwah Hue**, Mui How Phua, Alexius Korom and Yen Wah Seng	Land Use and Land CoverChange in Vientiane Area, Loa PDR using Object-Oriented Classification on Multitemporal Landsat Data
12:15 – 12:30	15103	**Junaida Sulaiman**, Noorhuzaimi@Karimah Mohd Noor, Suryanti Awang	The Assimilation of Multi-Type Information for Seasonal Precipitation Forecasting using Modular Neural Network
12:30 – 12:45	15157	**Md Rabiul Awal**, Muzammil Jusoh, Thennarasan Sabapathy and Muhammad Ramlee Kamarudin	Magnetoelectric Effects Analysis of a Hybrid Piezoelectric Cantilever
		LUNCH **12:45 – 14:00**	
		PARALLEL SESSION 8A **(INTELLIGENT AND BIO-INSPIRED COMPUTING II)** **SESSION CHAIR: DR. RENEE KA YIN CHIN**	
TIME	**PID**	**AUTHORS**	**TITLE**
14:00 – 14:15	18123	**Kuan Yik Junn**, Joe Henry Obit, Rayner Alfred	Comparison of Simulated Annealing and Great Deluge Algorithms for University Course Timetabling Problems (UCTP)
14:15 – 14:30	18125	Wahid Abdul, **Haiyang Yu**, Wenjun Yu, Sumi Kim, Jaeho Choi	Adaptive Mobile Localization Method for Indoor Navigation
14:30 – 14:45	18132	**Yusof Bin Yunus**, Yewguan Soo, Norhashimah Mohd Saad, Sani Irwan Md Salim, Feng Duan	Multi-finger Localization Feedback using Vibrotactile Pattern Stimulation (VPS) for Prosthetic Hand
14:45 – 15:00	18151	**Fouziah Md Yassin**, Danniel Apin, Abu Bakar Abd Rahman and Afishah Alias	Multi-mode Brainwave Controller
15:00 – 15:15	18054	**Anbuselvan Sangodiah**, Charles Ramendran SPR	An Integration of Unsupervised Approach of Machine Learning in Item Bank Test System
15:15 – 15:30	18147	**Renee Ka Yin Chin**, Gavin Thong Xian Kho, Heng Jin Tham, Bih Lii Chua, Kenneth Tze Kin Teo, Kwan Hoong Ng	Model Simplification for Electrical Impedance Tomography
		BREAK **15:30 – 15:45**	
		PARALLEL SESSION 8B **(APPLICATION OF CSE III)** **SESSION CHAIR: DR. MURALINDRAN MARIAPPAN**	
TIME	**PID**	**AUTHORS**	**TITLE**
15:45 – 16:00	19066	Muralindran Mariappan, J**ong Chia Sing**, Manimehala Nadarajan and Choo Chee Wee	Early Childhood Educational Robotic System (C-Block): A Design Methodology
16:00 – 16:15	19117	**Ahmad Shakir Mohd Saudi**, Razali Abdul Rahman, Muaz Mahmud, Reezal Ishak, Ilyas Syafiq Darul Ridzuan, Arvind Balakrishnan, Azman Azid, Hafizan Juahir	The Effectiveness of Ergonomic Practice in Preventing Musculoskeletal Disorder among Asian Construction Workers: Case Study in Kuala Lumpur, Malaysia
16:15 – 16:30	19136	**Liana Najib**, Ahmad Termimi Ab Ghani, Lazim Abdullah, Mohammad Fadhli Ahmad	Consensus Process for Coastal Erosion Group Decision Making Problem
16:30 – 16:45	19162	**Kama Azura Othman** and Muhammad Hafizul Ariff Mohd Bardiri	Self Charging Solar Battery For Ground Forward Scatter Radar (FSR) Micro Sensor
16:45 – 17:00	19142	**Noor.N.S.M**, Ghazalli.Z, M.R.M. Rejab, F.A. Fauzi, Mamat.R, Kadirgama.K, Sani.M.S.M, Ahmad.Z, Johari.N.H	A Comparison of Muscular Activity among European, Korea and Malaysian During Seating Using Musculoskeletal Computational Analysis Method
17:00 – 17:15	19156	Nuraina Suryani Ruslan, Mazlina Mamat, Rosalyn R. Porle and Norfarariyanti Parimon	A Comparative Study of Pitch Detection Algorithms for Microcontroller based Voice Pitch Detector
17:15 – 17:30	19179	Liawas Barukang	On The Minimum Slicing Problem

TIME	PID	AUTHORS	TITLE

PARALLEL SESSION 9
(INTELLIGENT AND BIO-INSPIRED COMPUTING)
SESSION CHAIR: DR. CHIUNG CHING HO

TIME	PID	AUTHORS	TITLE
10:45 – 11:00	18018	**Joe Henry Obit**, Rayner Alfred, Mansour Hassani Abdalla	A PSO Inspired Asynchronous Cooperative Distributed Hyper-heuristic for Course Timetabling Problems
11:00 – 11:15	18020	Joe Henry Obit, **Kuan Yik Junn**, Rayner Alfred	Performance Comparison of Linear and Non-linear Great Deluge algorithms in Solving University Course Timetabling Problems
11:15 – 11:30	18099	**Faizul Hadi Jamil**, Ali Chekima, Farrah Wong Hock Tze, Rosalyn R. Porle, Razak Ali Lee, Ismail Saad	Block Matching Algorithm (BMA) of the Hybrid Adaptive Rood Pattern Search (ARPS) Based on its Motion Speed
11:30 – 11:45	18101	Saimunur Rahman, John See, **Chiung Ching Ho**	Deep CNN Object Features for Improved Action Recognition in Low Quality Videos
11:45 – 12:00	18108	**Brendan Khoo**, Choo Chee Wee, Muralindran Mariappan and Ismail Saad	A Design Methodology to Determine the Speed and Position in Multi Operation Mode Sensorless Brushed DC Motor
12:00 – 12:15	18120	**Renann G. Baldovino**, Elmer P. Dadios	A Fuzzy Proportional-Derivative (PD) Algorithm for Programmable Logic Controller (PLC)
12:15 – 12:30	18121	**Renann G. Baldovino**, Aira Patrice R. Ong, Paul Dominick E. Baniqued, Elmer P. Dadios	A Fuzzy-Based Pulse-Width Modulation (PWM) Control for Low Speed Autonomous Emergency Braking (AEB) System: A Mini-Fuzzy Associative Matrix (FAM) Approach
12:30 – 12:45	18122	**Renann G. Baldovino**, Elmer P. Dadios	Shake Table System: A Review on the Different Mechanical Designs and Control Models

LUNCH
12:45 – 14:00

PARALLEL SESSION 12A
(ALGORITHMS AND SOFTWARES)
SESSION CHAIR: PROF. DR. JAEHO CHOI

TIME	PID	AUTHORS	TITLE
14:00 – 14:15	13010	**Siti Nur Zahrah Amin Burhanuddin**, Sayang Mohd Deni, Norazan Mohamed Ramli	Imputation of Missing Rainfall Data using Revised Normal Ratio Method
14:15 – 14:30	13023	**Nor Ain Azeany** Mohd Nasir, Anuar Ishak, Ioan Pop	Stagnation-point flow past a permeable stretching/shrinking sheet
14:30 – 14:45	13173	**Nor Azura Zakaria** and Weng Fook Lee	Programmable MBIST with High Flexibility Control
14:45 – 15:00	13130	**Geoffrey Harvey Tanakinjal**, Stephen Liason Sondoh and Rayner Alfred	Analysis of Behavioural Intention of Mobile Application Usage using Partial Least Squares Modelling Tool
15:00 – 15:15	13112	**Ahmad Sobri Hashim** and Mohamad Syafiq Mohamad Tamizi	Development of Drone for Search and Rescue Operation in Malaysia Flood Disaster
15:15 – 15:30	13017	Joe Henry Obit, **Kuan Yik Junn**, Rayner Alfred	A Performance Comparison of Metaheuristics Search for University Course Timetabling Problems

BREAK
15:30 – 15:45

PARALLEL SESSION 12B
(ADVANCED NETWORKING AND APPLICATIONS II)
SESSION CHAIR: DR. MARDENI BIN ROSLEE

TIME	PID	AUTHORS	TITLE
15:45 – 16:00	17087	**M. A. Abdullah**, M. K. A Rahim, and N. A. Samsuri	On-Body Communication System Transmission Enhancement using A Dual-band Textile Artificial Magnetic Conductor
16:00 – 16:15	17089	**Mohammed Anbar**, Rosni Abdullah, Redhwan M. A. Saad, Iznan H. Hasbullah	Review of Preventive Security Mechanism for Neighbour Discovery Protocol
16:15 – 16:30	17144	**Soon Fatt Boo**, Wai Leong Pang, and Sew Kin Wong	Impact of Mobility Speeds on LTE Network Performance
16:30 – 16:45	17100	**Mardeni R.** , A. Alhammadi, F.Farhana Ruslan, K. Anuar, M.Y.Alias, H.Mohamad	Analysis of LTE-A Signal Strength in Indoor Mobility Environment
16:45 – 17:00	17129	**Haiyang Yu**, Sumi Kim, Jaeho Choi	Generalized QL-QR Decomposition TranCSEiver Design for Two-Way MIMO Relaying
17:00 – 17:15	17148	**Soon Fatt Boo**, Wai Leong Pang, Sew Kin Wong, Kah Yoong Chan, and Louai Alkhateb	Investigation of Electromagnetic Fields from LTE Base Station
17:15 – 17:30	17110	**Suleiman Aliyu Babale**, Sharul Kamal Abdul Rahim, Kashif Nisar Paracha and Stella Ifeoma Orakwue	3dB Branch Line Coupler with Improved Bandwidth Using PDMS and Silver Loaded Epoxy

PARALLEL SESSION 10 (INTELLIGENT AND BIO-INSPIRED COMPUTING) SESSION CHAIR: DR. TEH CHEE SIONG			
TIME	**PID**	**AUTHORS**	**TITLE**
10:45 – 11:00	15182	**Ellysha Astin Anak Sirai**, Farrah Wong, Ali Chekima and Pei Yi Lim	Image Processing-based Hand Writing Recognition for Automated Form Processing
11:00 – 11:15	15149	**Laith Bany Melhem**, Mohd Sanusi Azmi, Azah Kamilah Muda, Nazieh Jamil Bani-Melhim, Mohammed Alweshah	Text Line Segmentation of Al-Quran Pages Using Binary Representation
11:15 – 11:30	15150	**Suhaila Saee**, Ranaivo-Malançon Bali, Lay-Ki Soon, Tek-Yong Lim	Crawling Social Media to Create Morphological Resource of Under-resourced Language
11:30 – 11:45	15152	**Aminah Abdul Malek**, Wan Eny Zarina Wan Abdul Rahman, Mea Haslina Mohd Haris and Ummu Mardhiah Abdul Jalil	Segmenting Masses in Ultrasound Images by using Seed Based Region Growing and Mathematical Morphology
11:45 – 12:00	15172	Tommy Carolyne Alphonsus and **Minoi Jacey-Lynn**	Measuring Usability of Phonic Mobile Applications based on User Success Rate for Pre-School Children
12:00 – 12:15	15175	**Doreen Ying Ying Sim**, Chee Siong Teh and Ahmas Izuanuddin Ismail	Improved Boosting Algorithms by Pre-Pruning and Associative Rule Mining on Decision Trees for predicting Obstructive Sleep Apnea
12:15 – 12:30	15025	Norul Uyuun Mohd Noor, **Hezerul Abdul Karim**, Nor Azhar Mohd Arif, Mohd Haris Lye Abdullah, Aduwati Sali, Mohammad Faizal Ahmad Fauzi	Multi-View Video plus Depth with Saliency Map Protection
12:30 – 12:45	15019	**Kuan Yik Junn**, Joe Henry Obit, Rayner Alfred	A Constraint Programming Approach to Solving University Course Timetabling Problem (UCTP)
LUNCH 12:45 – 14:00			

PARALLEL SESSION 13A (COMPUTATIONAL ENGINEERING I) SESSION CHAIR: ASSOC. PROF. DR. HEZERUL ABDUL KARIM			
TIME	**PID**	**AUTHORS**	**TITLE**
14:00 – 14:15	19088	**Salamah Samsu**, Fouziah Md Yassin, Fauziah Sulaiman, Jedol Dayou	Design of High Voltage and High Frequency Pulse Generator Using DC Choke
14:15 – 14:30	19155	Mohamad Harris Misran, Sharul Kamal Abdul Rahim, Akaa Agbaeze Eteng and Maizatul Alice Meor Said	Feasibility Evaluation of Flexible Antenna Substrates for Near-field Wireless Energy Transfer
14:30 – 14:45	19119	Marziah Abdul Wahab, **Awanis Romli**, Al-Fahim Mubarak-Ali, Mazlina Abdul Majid	A Systematic Literature Review of Case-based Reasoning based on Eco-design Strategies for Environmental Product Design
14:45 – 15:00	19169	Muhammad Hafiz Abu Bakar, Lam Mui Li, Khairul Anuar Mohamad, Fouziah Md. Yassin, Chee Fuei Pien, **Afishah Alias** and Katsuhiro Uesugi	Annealing Dependence on Structural and Electrical Characteristic of n-ZnO/p-CuGaO$_2$ Transparent Heterojunction Diode
15:00 – 15:15	19140	Khairul Anuar Mohamad, Chia Ek Sel, Hoh Hang Tak, **Afishah Alias**, Ahmad Razani Haron, Farrah Wong, Bablu Kumar Ghosh, Ismail Saad	Low Voltage Wireless Power Transfer (WPT) using Resonant Inductive Coupling Charging for Short-Range Operation
15:15 – 15:30	19171	**Lee Sui Ping**, Chan Yee-Kit, Tien Sze Lim and Koo Voon Chet	A Denoising Algorithm for InSAR Surface Deformation Application
BREAK 15:30 – 15:45			

PARALLEL SESSION 13B (COMPUTATIONAL ENGINEERING II) SESSION CHAIR: DR. ALI FARZAMNIA			
TIME	**PID**	**AUTHORS**	**TITLE**
15:45 – 16:00	19177	Mohammad Farhadi Kangarlu, Sadjad Galvani and **Ali Farzamnia**	A Single-phase Multilevel Inverter for Stand-alone Hybrid PV/Battery Residential Application
16:00 – 16:15	19079	**M.N.Isa**, D.Muhsen, M.I.Ahmad, S.A.Z.Murad, S.N.Mohyar, R.C.Ismail, K.Benkrid	Design and Analysis of an Efficient Repository System for Protein Coefficients in Systolic Array-based Architecture by Using Xilinx Virtex-5 FPGA
16:15 – 16:30	19163	**Najib Taher Al-Ashwal** and Ahmad Sanusi Hassan	Impact of Window's Height on Energy Efficiency in Air-conditioned Office Buildings
16:30 – 16:45	19165	**Nurhanis Sofiah Abd Ghafar**, Mahendran Samykano, John Rivas Murillo, N. A. C. Lah, Devarajan Ramasamy, Kumaran Kadirgama and Md. Mustafizur Rahman	Effect of the Length on the Tensile Deformation of Nickel Nanowires Using Molecular Dynamics Simulations
16:45 – 17:00	19086	L. Alami Parvin, E Gorbani Kalhor, **S. Ebrahimi**, A. Farzamnia	Studies on corrosion inhibitor activity of Azoles for copper
17:00 – 17:15	19090	Shahriman A.B, **Mohamad Syafiq A.**, M.S.M. Hashim	Study of Airflow Quality in the Intake Passage to Improve the Combustion Efficiency

PARALLEL SESSION 11 (MODELLING AND SIMULATIONS) SESSION CHAIR: DR. TIN TIN TING			
TIME	**PID**	**AUTHORS**	**TITLE**
10:45 – 11:00	12085	**WaiShiang Cheah**, Shane Nissom, Jane Labadin, Nurfauza Jali, HuiKeng Lau	When Requirement Engineering Meets Computational Science Modelling and Simulation
11:00 – 11:15	12091	**Noor Am Zura bt Abdullah**, M.S.M. Sani and I. Zaman	Correlation of Structural Modal Properties of Go kart Frame Structure using Different Type of Joint in Finite Element Modelling
11:15 – 11:30	12124	**Lee Sui Ping**, Chan Yee Kit, Lim Tien Sze, Koo Voon Chet	An Improved Order-Statistical Filter For InSAR Phase Estimation
11:30 – 11:45	12033	**Muaamar Amer Alkubati**, Syed Ahmad Aljunid	An Architecture for Providing Context-aware Security as a Service in Mobile Cloud Computing Environments
11:45 – 12:00	12138	**A.G. Ateq Mezral**, L. Muhamad Safiih	Retail Membership Model with Network Switch
12:00 – 12:15	12143	**Ing Ming Chew**, Hock Tze Farrah Wong, Awang Bono and Kiing Ing Wong	Simulation of Process Identification and Tuning for Flow Control System
12:15 – 12:30	12145	**Kheng Jin Leow**, Xin Ni Lim, Pan Tong Lim, Tin Tin Ting, Seah Fang Lee	A Case Study of Agile Development Model in Malaysia Industry Practice
12:30 – 12:45	12181	M. Kamel Wan Ibrahim, Azali Saudi and Mohd Adnan Mohd Salleh	Adaptation Gear and Pinion Formulation to Produce Epicycloid Graphic Simulation for Food Printing
LUNCH 12:45 – 14:00			

PARALLEL SESSION 14A (MODELLING AND SIMULATIONS) SESSION CHAIR: ASSOC. PROF. DR. YUTO LIM			
TIME	**PID**	**AUTHORS**	**TITLE**
14:00 – 14:15	12042	Sharifah Hafizah Sy Ahmad Ubaidillah, **Noraziah Ahmad**	Overview of Replication Techniques on Distributed Database in Cloud Environment
14:15 – 14:30	12043	Abdullah Fairuzullah Ahmad Tajuddin and **Noraziah Ahmad**	Overview Between Clustering and Load Balancing
14:30 – 14:45	12069	**Chee Wee Choo**, Muralindran Mariappan, Razak Mohd Ali Lee, Resot Inggau, Chia Sing Jong and Wei Kitt Wong	Design Methodology of Preserving Piano Playing Techniques through Contactless Sensor System
14:45 – 15:00	12135	**Herlina Abdul Rahim**, Javad Abbaszadeh Barghoshadi, Ruzairi Abdul Rahim	Image Reconstruction Technique for the Ultrasonic Tomography System VIA Metal Pipe
15:00 – 15:15		**Yuto Lim**, Sian En Ooi, Yoshiki Makino, Tze Kin Teo, Alfred Rayner and Yasuo Tan	Implementation of Energy Efficient Thermal Comfort Control for Cyber-Physical Home Systems
15:15 – 15:30	12170	Soran Abdulkareem, **Norhayati Mohd Ali**, Novia Admodisastro and Abu Bakar Md Sultan	ClassDiagramCritic: A Design Critic Tool for UML Class Diagram
BREAK 15:30 – 15:45			

PARALLEL SESSION 14B (MODELLING AND SIMULATIONS) SESSION CHAIR: DR. PEK-LAN TOH			
TIME	**PID**	**AUTHORS**	**TITLE**
15:45 – 16:00	12176	**Osman Mohammed**, Norhayati Mohd Ali, Novia Admodisastro and Jamilah Din	Inconsistency Detection of Model and Code via Critic-Based Approach
16:00 – 16:15	12164	**Noridayu Mah Hashim**, S.Sarifah Radiah Shariff and Sayang Mohd Deni	Capacitated Maximal Covering Location Allocation Problem during flood disaster
16:15 – 16:30	19072	**Zi Sheng Tang**, Nurmin Bolong, Ismail Saad, Ahmad Fauzi Ismail, Franklin Tiam Yang Lim	Response Surface Modeling of Electrospinning Parameters on Titanium Oxide Nanofibers Diameter: A Box-Behnken Design (BBD)
16:30 – 16:45	19093	**Siti Norazila Zahari** and Mohd Shahrir Mohd Sani	Investigation on Impact Hammer Testing with Different Types of Hammer Tip for Welded Thin Plate
16:45 – 17:00	19095	Mohammed Azrag, Tuty Asmawaty Abdul Kadir and Aqeel S Jaber	Estimation for Large-Scale Kinetic Parameters for Main Metabolism of Escherichia coli
17:00 – 17:15	19096	**Siti Nurfarah Ain Mohd Azam** and Khairul Azami Sidek	Study of Acceleration Plethysmogram Based Biometric Identification Incorporating Different Time Instances

Contents

SESSION 2
Data Science I   **9**

SESSION 3
Big Data Technologies I   **17**

SESSION 8A

Intelligent and Bio-Inspired Computing II   **70**

SESSION 8A

Applications of CSE III   **76**

SESSION 12B
Advanced Networking and Applications II 113

SESSION 13A
Computational Engineering I 120

SESSION 13B

Computational Engineering II   **126**

SESSION 14A

Modelling and Simulations III   **132**

SESSION 1
Intelligent and Bio-Inspired Computing I

Dynamic Reconfiguration of Web Service in Service-Oriented Architecture

18166

Rahmat Ilahi, Novia Admodisastro, Norhayati Mohd. Ali and Abu Bakar Md. Sultan

Department of Software Engineering and Information System Faculty of Computer Science and Information Technology Universiti Putra Malaysia, Serdang, Malaysia

Abstract: Dynamic reconfiguration of web services is an important role in Service-Oriented Architecture (SOA) that has an ability to adapt changes in Service-based systems during runtime stage without interrupting existing services or business processes. This is crucial to prevent Service-based Systems from failure while the environment is changing or to allow system being modify immediately whenever necessary. However, dynamic reconfiguration in SOA is a difficult process and presently there are lacked of attempts to handle the process appropriately. In this paper, we present a study of related works of dynamic reconfiguration of the web services in SOA. The study is crucial to provide a basis for developing our proposed solution, Dynamic Reconfiguration of Web Service (DREWS). The basic concepts of DREWS are discussed in this paper.

Keyword: SOA, Dynamic Reconfiguration, Web Service

Enhancement of Under-Exposed Image for Object Tracking Algorithm through Homomorphic Filtering and Mean Histogram Matching

Mohd Fauzi Abu Hassan[1,2], Ahmad Shahrizan Abdul Ghani[3], Dhanesh Ramachandram[4], Abduljalil Radman[1], Shahrel Azmin Suandi[1]

[1]Intelligent Biometric Group, School of Electrical and Electronic Engineering, USM Engineering Campus, Universiti Sains Malaysia, Seri Ampangan, 14300 Nibong Tebal, Pulau Pinang, Malaysia
[2]Universiti Kuala Lumpur Malaysia Spanish Institute, Kulim Hi-Tech Park, 09000 Kulim, Kedah, Malaysia
[3] Faculty of Manufacturing Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia
[4]School of Computer Sciences, Universiti Sains Malaysia, 11800 USM, Pulau Pinang, Malaysia

Abstract: Object tracking through video or image becomes more popular in recent years. Indeed, clear and high contrast images are essential to attain good tracking results. The problem arises when the object in an image or video is under-exposed, resulting it to be hardly visible and differentiated from the background. Existing methods are able to solve some of the aforementioned problems, but produce other problems such as over-enhanced effect and color distortion. Thus, the object of interest may become untraceable due to these distortions. This paper proposes an image enhancement method to improve under-exposed images or videos through homomorphic filtering and mean histogram matching, in order to produce more visible and traceable objects. This method integrates homomorphic filtering method and histogram modification technique which consists of histogram matching and dual-histogram stretching. The proposed method is designed to reduce non-uniform illumination while increasing image/video contrast and visibility. The experiment results show that the proposed method outperforms some state-of-the-art methods in terms of visibility and contrast level on some standard benchmark database.

Keyword: Object tracking, under-exposed images, homomorphic filtering, mean histogram matching.

An Overview of Simultaneous Localization and Mapping using Low-cost Mini Robot Platform

Norhidayah Mohamad Yatim[1,2], Norlida Buniyamin[1]

[1] Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM), Shah Alam, Selangor, Malaysia, 40450

[2] Faculty of Electronics and Computer Engineering, Universiti Teknikal Malaysia Melaka (UTeM), Hang Tuah Jaya, Melaka, Malaysia, 76100

Abstract: Simultaneous Localization and Mapping (SLAM) capability is important for robot to obtain map of an unknown environment. Having SLAM algorithm incorporated in a mini robot can enable the robot to carry out many tasks. Mini robots have potential application in vast areas, including domestic, industrial or humanitarian field. A low-cost mini robot with low-cost sensors can be expandable in situations that have high risk of being damaged or lost. This paper presents an overview of research in the SLAM domain implement on low-cost mini robot platform. The paper concludes that the potential of low-cost sensors in SLAM algorithms are still underexplored. The investigation points out that collaborative SLAM using multi robot or integration of machine learning method can be a good direction for the research.

Keyword: SLAM, low-cost sensors, mini robot.

A Conceptual Architecture of Sincerity in Software Agents for Task Performance

Nur Huda Jaafar[1], Mohd Sharifuddin Ahmad[2], Azhana Ahmad[2]

[1]Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, KM 12, Jalan Muar, 85009 Segamat, Johor Malaysia
[2]College of Information Technology, Universiti Tenaga Nasional, Putrajaya Campus,Jalan IKRAM-UNITEN, 43000 Kajang, Selangor

Abstract: The advent of software agent technology manifests many benefits to humans in many aspects; especially in alleviating the burden of humans tasks. However, the technology entails the emergence of self-interested behaviour of agents that can create negative impacts if ethical elements are not designed in the architecture of agent-based applications. Consequently, researchers in autonomous systems technology are studying humans strong moral values to be implemented in the technology as a means to avoid unnecessary problems in task performance as a consequence of the self-interested behaviour. Sincerity is one humans strong moral value that is suitable to be implemented, especially for conflict-prone tasks. A software agent architecture for instilling sincerity behaviour should be designed to implement such behaviour in multi-agent environments. To do this, a survey and observation of related humans activities in completing tasks have been conducted to understand the factors of human sincerity while performing the tasks. Correspondingly, software agents and their characteristics are investigated to discover the clues for instilling sincerity behaviour in software agents. In this paper, we reconcile these two aspects to propose a conceptual software agent architecture for implementing sincerity behaviour while agents are performing their tasks.

An Agent Based Green Decision Making Model for Sustainable Information Technology Governance

Bokolo Anthony Jnr. and Mazlina Abdul Majid

Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang, Malaysia

Abstract: Information technology governance are rules and regulation established by management to ensure that practitioners use IT infrastructure in an effective and efficient manner, but with the increase of energy consumption and environmental impact associated with IT infrastructure and services, energy efficiency and the concern for the environmental is becoming a critical concern in management implementing IT governance strategies. Thus there is need for a model that can assist management in making decisions on how to realize a sustainable IT governance strategy in their organisations. Therefore this paper proposed an agent based Green decision making model for sustainable information technology governance. The methodology adopted in this paper involves the synthesis and extraction of secondary data from existing literatures. The proposed model comprises of Green decision making variables, Green process, multi-software agents and knowledge base aimed to establish a sustainable IT governance strategy in organisations. Findings from this research paper shows that the developed model can assist management in making decisions related to Green and sustainable practices with the support from multi-software agents to assist management in IT governance implementation. The developed model can be used as a guide to management in attaining a Green and sustainable organisation.

Keyword: Decision Making, Green, Sustainability, IT Governance, Multi-Software Agents.

Low-Cost Brainwave Controller

J. Samuel, A.B. Abd Rahman, A. Alias and F. M. Yassin

Physics with Electronics Programme, Faculty Science and Natural Resources,Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah.

Abstract: With the advent of more sensitive biosensors in capturing the ionic current flows generated by the human brain more and more human-computer interaction system can be developed further. By analyzing these electrical impulses one can in theory predict thoughts and orders by human brain alone and utilizes programming to organize that raw information into usable code. The programming code then translates that impulses to provide control mechanism mainly on automation and robotic systems. The main scope of this paper is to explore the potential of noninvasive low-cost method that tailored to support wheelchair system by utilization of frontal forehead point with single electrode. This is to potentially assist those that are unable to use their physical motor systems such as a patient of ALS (Amyotrophic Lateral Sclerosis) and other neuromuscular dystrophy disorders. Normally, the automation system is developed with very expensive equipment and complex technologies. Thus, an effort exploited here is to develop a robotic support system by using low-cost yet operative brainwave sensor system. This could prove extremely valuable in promoting a better quality of living for a patient plagued with debilitating motor disorders.

Keyword: Brainwave, Medical automation, Human computer interaction, Wheelchair.

Robustness Analysis of an Optimized Controller via Particle Swarm Algorithm

Chong Chee Soon[1], Rozaimi Ghazali[1], Hazriq Izzuan Jaafar[1], Syarifah Yuslinda Syed Hussein[1], Sahazati Md. Rozali[2]

[1]Faculty of Electrical Engineering, [2]Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia.

Abstract: This paper deals with an evaluation on the effectiveness of the robust controller in terms of its robustness towards the changes in the electro-hydraulic actuator (EHA) system parameters. It is well known that the defects exposed in this system are the exist-ence of disturbances, parameters variation, and uncertainties in nature that yielding great difficulties in the development of sys-tem controller and the modelling of EHA system. Such difficulties simultaneously vitiating system performance and imposed if inappropriate control strategy is employed. A nonlinear EHA system model is established and the proposed controller which is sliding mode controller (SMC) is implemented in the simulation studies. The proposed control strategy has been compared with the conventional proportional-integral-derivative (PID) controller concerning its robustness characteristic with the variation in the system supply pressure in which the controller variables are obtained through particle swarm optimization (PSO) algorithm. The finding shows that the SMC that utilized the PSO algorithm parameters are capable to produce smaller robustness index values, which demonstrated better robustness characteristic in confront with the variation of the system parameter.

Application of Particle Swarm Optimization in Face Sketch Recognition

Hussein Samma[1,2], Shahrel Azmin Suandi[1]

[1]School of Electrical and Electronic Engineering, Universiti Sains Malaysia, Malaysia
[2] Faculty of Education, University of Aden, Shabowah, Yemen

Abstract: In this paper, Particle Swarm Optimization (PSO) is applied for the problem of face sketch recognition. The novelty of this work originates from two-folds, i.e. formulating of face sketch problem as an optimization problem, and adopting PSO algorithm to solve the formulated problem. In particular, PSO is employed to perform localization of sketch facial components (e.g. eyes region, nose region, and mouth region), and then, these localized components are matched with database gallery photos to recognize the input sketch image. To evaluate the effectiveness of the proposed approach, two benchmark sketch images are used, i.e. CUHK database, and AR database. The reported results demonstrate the effectiveness of PSO algorithm in solving face sketch recognition problem as compared with other reported results in the literature.

Keyword: Particle Swarm Optimization, Face Sketch Recognition, AR database, CUHK database.

SESSION 2
Data Science I

A comparative study of Neural Networks methods & the African Buffalo Optimization for the Travelling Salesman's Problems

Julius Beneoluchi Odili[1], Mohd Nizam Mohmad Kahar[1], A. Noraziah[1,2]

[1] Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, Kuantan 26300, Malaysia.

[2]IBM Centre of Excellence, Universiti Malaysia Pahang, Kuantan 26300, Malaysia

Abstract: This paper presents a comparative study of some Neural Networks methods and the newly-designed African Buffalo Optimization in solving 12 popular benchmark symmetric Travelling Salesmans Problems. Recently, researchers are exploring solutions to difficult combinatorial problems using the Neural Networks methods. So far, the experiments have been successful. On the other hand, the metaheuristic, African Buffalo Optimization has proven to be quite effective and efficient in providing solutions to some NP-hard and NP-Complete problems, including, of course, the Travelling Salesmans Problems. After a number of experimental evaluations on the chosen dataset, the African Buffalo Optimization was found to be more successful in solving the symmetric Travelling Salesmans Problems under consideration.

Keyword: African Buffalo Optimization, Neural Networks, Travelling Salesmans Problem.

Behavioral Biometrics for User Authentication Using Self-Refreshing SOM

Chee Siong TEH, Juen Ching WONG, Ming Leong YII

Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia

Abstract: Password protection has been a crucial issue in computer security. Traditional password protection using string does not provide sufficient security for user authentication. On the other hand, implementation of static biometrics in replace of password protection is costly as specific devices are needed. This research proposes the use of Self-Organizing Map (SOM) method for keystroke pattern recognition as an alternative to password protection. A self-refreshing SOM method was also implemented to increase the adaptability of SOM toward inconsistencies in typing pattern. Two main experiments were conducted to examine the ability of SOM for user recognition and the ability of self-refreshing SOM to deal with typing pattern inconsistencies. The first experiment shows the ability of SOM to authenticate users with very accurate classification. Users were successfully recognized and non-users were successfully rejected. Second experiment shows the ability of self-refreshing SOM to deal with inconsistencies in typing pattern of a same user in which smoother transition of data trend was obtained.

Policy Language: Enhancing JACIE for Data Ownership

Suzana Ahmad[1], Siti Zaleha Zainal Abidin[1], Nasiroh Omar[1],Stephan Reiff-Marganiec[2]

[1]Faculty of Computer and Mathematical Sciences, UiTM Shah Alam Selangor.
[2]Department of Computer Science University of Leicester UK

Abstract: Preserving data security is critical in collaborative world. Incorporating element such as control access policies in the applications themselves is one of the ways of hindering misconduct activities especially in data sharing applications. This paper proposes and approach of allowing data owners to set their own data access policies before sharing the data with others. This work involves the study on policy languages, event-condition-action (ECA) paradigm and data handling access policies. Then, the access control policies which commonly written separately from the implementation code using ECA paradigm are designed as a set of language constructs. In order to realize the existence of such a policy language, an existing scripting language, JACIE (Java-based Authoring language for Collaborative Interactive Environments) is chosen since it can support ECA paradigm with its template style and event-based programming features. Enhancing JACIE will involve a major extension to its back-end compiler code, but it allows non-expert users to express the common access control policy idioms.

A Novel Triangulate Mapping Based on Self-Organized Anchor Points for Data Visualization

Ming Leong YII, Chee Siong TEH

Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia

Abstract: Without a form of visual feedback, multivariate data would be reduced to a lump of numbers that very few people would be able to appreciate and be benefited from. This research paper proposes a novel triangulate mapping technique based on self-organizing anchor points for multivariate data visualization. Self-Organizing Map (SOM) and a modified Adaptive Coordinates (AC) are hybridized to produce the anchor points in the 2D space. The trained anchor points are used to triangulate data onto a topologically preserved 2D space. The empirical studies that produce topologically preserved data visualizations for high dimension and arbitrarily shaped clusters in simulated, benchmarking, and real-life dataset show its usefulness in providing intuitive visual feedback to the user.

Keyword: Triangulate mapping, self-organizing map, topologically preserved visualization.

Comparison of Clustering Algorithms using Quality Metrics with Invariant Features Extracted from Plant Leaves

Jharna Majumdar[1], Shilpa Ankalaki[2]

[1]Dept. of CSE (PG), Nitte Meenakshi Institute of Technology, Yelahanka, Bangalore-560 064, India

[2]Department of CSE(PG), Nitte Meenakshi Institute of Technology, Yelahanka, Bangalore-560 064, India

Abstract: This paper presents evaluation of the performance of clustering algorithms like Fuzzy C Means, Agglomerative and CURE in conjunction with cluster quality metrics namely Purity, Inverse Purity, Homogeneity , Completeness, Rand Index, V measure, Precision, Recall, F measure, Jaccard Coefficient and Folkes and Mallows. The effectiveness of the different quality metrics and clustering methods evolving the appropriate number of clusters is demonstrated experimentally for leaf data set with the number of clusters varying from five to fifteen. Once the appropriate number of clusters is determined, the performances of all clustering techniques are evaluated for appropriate grouping of the data into the number of clusters.

Keyword: Fuzzy C Means, Agglomerative, CURE, Homogeneity, Completeness, V- measure, F-measure Rand Index and Elbow Method.

Comparison of Accuracy Performance based on Normalization Techniques for the Features Fusion of Face and Online Signature

Suryanti Awang, Junaida Sulaiman, Noorhuzaimi Karimah Mohd Noor, Luhur Bayuaji

Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, 26300, Kuantan, Pahang, Malaysia

Abstract: Feature level fusion in multimodal biometrics system is able to produce higher accuracy compared to score level and decision level of fusion due to the richer information provided. Features from multi modalities are fused prior to a classification phase. In this paper, features from face (image based) and online signature (dynamic based) are extracted using Linear Discriminant Analysis (LDA). The aim of this research is to recognize an authorized person based on both features. Due to the different domain, the features of one modality might have dominant values that will superior in classification phase. Thus, that aim is unable to be achieved if the classification will rely more on one modality rather than both. To overcome the issue, features normalization is deployed to the extracted features prior to the fusion process. The normalization is performed to standardize the range of features value. A few normalization techniques have been focused in this paper, namely min-max, z-score, double sigmoid function, tanh estimator, median absolute deviation (MAD) and decimal scaling. From those techniques, which normalization technique is most applicable to this case is observed based on best accuracy performance of the system. After the classification phase, the highest accuracy is 98.32% that is obtained from the decimal scaling normalization. It shows that technique is able to give an outperform result compared to other techniques.

Keyword: Feature fusion, Feature Normalization, Mutimodal Biometrics System.

Optical Flow-Initiated Particle Filter Framework for Human-Tracking and Body-Component Detection

Jharna Majumdar[1,2], Ashish Bhattarai[3], Saurabh Adhikari[3]

[1]Dept. of Computer Science & Engineering (PG).
[2]Centre for Robotics Research.
[3]Final year BE, Department of Computer Science and Engineering, Nitte Meenakshi Institute of Technology, Bangalore 560064, India

Abstract: The principal task in any tracking system is localizing the target motion to minimal bounds, covering target region inside successive video frames. The accuracy of any such system is significantly affected by the initialization parameters. For proper initiation and tracking outcome various methods for target-modeling have been proposed over the years. Our present work focuses on estimation of different body-component positions in a monocular video sequence. We propose a robust particle filtering framework based on optical flow for tracking human in a cluttered scene. The combination of optical flow with the particle filter framework obviates the need for any prior information on target characteristics as the initiation-information is generated online for individual targets. Furthermore, optical flow method provides good initial estimates of target-size and motion characteristics for the prediction stage in particle filter framework. Afterwards, bottom-up search for body-templates has been performed to identify the locations of various body components.

Keyword: Human tracking; body-component detection; particle-filter tracking; optical flow motion extraction.

Graphical Representation of the Navigation Status in a Web-based Virtual Museum

Suziah Sulaiman, Dayang Rohaya Awang Rambli, Foong Oi Mean, Nguyen Minh Tuan, Fatin Shamimi M Zuki

Department of Computer and Information Sciences, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak, Malaysia

Abstract: There are many existing web-based panoramic virtual museums throughout the world. Unfortunately, within the Malaysian context there is still a lack of museum websites that have included panaromic view successfully although the development of technological infrastructures in the country is very encouraging. Most existing museum websites in Malaysia are poor in implementing website navigation usability and focused primarily in text rather than graphics. This may result in loss of interest to the users as they are not able to find the content that they want to view. This paper presents a research work based on a project aiming towards developing a web-based panoramic virtual museum for a local museum in Malaysia. By using the prototyping-based methodology, a web-based virtual museum was developed based on user requirements collected through interviews and questionnaires. The research elements involve developing graphical representation of navigation for users to interact; avoiding navigational confusion, and making the website becomes more attractive. The findings reveal that floor plan, and navigation arrows are the preferred navigation structures for a virtual tour of a museum.

Keyword: Virtual Museum, Navigation, Graphical Representation, Usability.

SESSION 3
Big Data Technologies I

Seamless Model Interoperability for Software Design and Analysis

Mohamed Ariff Ameedeen[1,2], Thong Weng Jie[2]

[1]IBM Centre of Excellence, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[2]Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

Abstract: Software development has now become a critical process that handles a plethora of sensitive and mission critical information that involves lives, money and time. As such, designing such a critical piece of software has become even more critical and requires a solid logical or mathematical analysis behind it to ensure the reliability of the software. Modelling is one of the preferred methods for software designers to express their design, especially through easy to use modeling languages such as UML (Unified Modelling Language). However the lack of formal analysis capabilities in UML makes it necessary for a redundant formal model to be created as well, in order to analyze the design. Model interoperability as referred to in this paper promotes the use of UML, to be paired seamlessly with a formal model Petri Nets that is capable in performing formal mathematical analysis on the software design. Model interoperability as described in this paper refers to the incorporation of SD2PN and PN2SD to promote model interoperability between UML Sequence Diagram and Petri Nets.

Keyword: Modelling, Model Interoperability, Sequence Diagram, Petri Net, Model Driven Development.

Managing Fragmented Database Using BVAGQ-AR Replication Model

Ainul Azila Che Fauzi[1], A. Noraziah[1,2], T Herawan[3], Z. Abdullah[4], Ritu Gupta[1]

[1]Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang, 26300, Kuantan, Pahang, Malaysia.
[2]IBM Centre of Excellence, Universiti Malaysia Pahang, 26300, Kuantan, Pahang, Malaysia
[3]Computer Science & Information Technology, Universiti of Malaya, Malaysia
[4]Faculty of Entrepreneurship and Business (FEB) Universiti Malaysia Kelantan, Locked Bag 36, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

Abstract: One of the mechanisms for managing data is replication since it improves data access and reliability. However, the amount of various data grows rapidly since technology is widely available at a low-cost. Problem arises when the database is packed with data, but it has lacked of knowledge. If the unreasonable data is used in database replication, it will cause waste of data storage and delay the time taken for a replication process. This paper proposes a new algorithm namely Binary Vote Assignment on Grid Quorum with Association Rule (BVAGQ-AR) to handle fragmented database replication. BVAGQ-AR algorithm is capable of partitioning the database into disjoint fragments. Handling fragmented database replication becomes challenging issue to administrator since the distributed database is disseminated into split partitions or fragments. This paper will discuss about how to build reliable system by using the proposed BVAGQ-AR algorithm for distributed database fragmentation. The result shows that managing fragmented database replication through proposed BVAGQ-AR algorithm able to preserve data consistency.

Keyword: Data replication, database fragmentation, data mining, association rule, BVAGQ-AR, data grid.

Big Data Processing in Cloud Computing Environments

A. Noraziah[1,2], Mohammed Adam Ibrahim Fakherldin[3], Khalid Adam[1], Mazlina Abdul Majid[1]

[1]Faculty of Computer Systems & Software Engineering, University Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[2]IBM Centre of Excellence, University Malaysia Pahang 26300 Kuantan, Pahang, Malaysia
[3]Faculty of Computer Science and Information Systems, Jazan University, P.O Box 114, Saudi Arabia.

Abstract: Cloud computing is a powerful technology to perform massive-scale and complex computing. It eliminates the need to maintain expensive computing hardware, dedicated space, and software. Massive growth in the scale of data or big data generated through cloud computing has been observed. Addressing big data is a challenging and time-demanding task that requires a large computational infrastructure to ensure successful data processing and analysis. This paper introduces several Big Data processing technics from system and application aspects. First, from the view of cloud data management and Big Data processing mechanisms, we present the key issues of Big Data. Following, we present the cloud computing for Big Data and related work. Furthermore, we also discuss, Big Data moving to the cloud. Finally, we present the conclusion and future work.

Review on Data Partitioning Strategies in Big Data Environment

Haneen A. A[1,2], A. Noraziah[1,2], Ritu Gupta[1,2], Mohammed Adam Ibrahim Fakherldin[3]

[1]Faculty of Computer Systems & Software Engineering, University Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[2]IBM Centre of Excellence, University Malaysia Pahang 26300 Kuantan, Pahang, Malaysia
[3]Faculty of Computer Science and Information Systems, Jazan University, P.O Box 114, Saudi Arabia.

Abstract: In the era of information, huge quantities of data became readily available in the hands of decision makers. Big Data is normally referred to sets of data in which they are not just big in terms of size but they also very much various in terms of velocity and variety, this makes such data very hard to be handled through conventional techniques and tools. Because of the fast growth of these data, there is a need for solutions to be studied and provided to enable handling and extracting knowledge and value from such sets of data. Consequently, applications must be opposed with the challenges of Big Data. For this reason, strategy of partitioning the data has a very critical role in the database platforms. Currently, many data partitioning strategies are available and can resolve some issues such as low hot spot, scalability, low performance and so on. In this paper, we discussed advanced partitioning strategies and their implementation.

Keyword: Big Data; data partition; partitions strategies.

A Big Data Prediction Framework for Weather Forecast Using MapReduce Algorithm

Khalid Adam[1], Mazlina Abdul Majid[1], Mohammed Adam Ibrahim Fakherldin[2],
Jasni Mohamed Zain[1]

[1]Faculty of Computer Systems & Software Engineering, University Malaysia Pahang,
26300 Kuantan, Pahang, Malaysia
[2]Faculty of Computer Science and Information Systems, Jazan University, P.O Box 114-,
Saudi Arabia

Abstract: Weather forecasting plays a vital role in daily routine, businesses and their decisions. The process of weather forecasting is developing as the effect of advancement in technology right from the realization of increasing size of data, Weather forecasting was found to be based on big data. The researchers have taken review with the objective to study the current forecasting process and methods, and the need of a data structure is recognized for handling the weather data, which is bigger in size, used for the process of weather forecasting. This paper presents a big data analysis framework for weather dataset based on MapReduce Algorithm, and offers not only weather dataset analysis, but also various analytic capabilities on huge amounts of data. However, this work establishes a guideline for researchers and industrial practitioners on how to analysis big data.

A Proposed Architecture for Generic and Scalable CDR Analytics Platform utilizing Big Data Technology

Sara B. Elagib, Aisha-Hassan A. Hashim, R. F. Olanrewaju

Electrical & Computer Engineering, Faculty of Engineering, International Islamic University Malaysia Kuala Lumpur Malaysia,

Abstract: Telecom Call Details Record (CDR) data-set is considered a rich source of valuable information that will bring new big revenues to Communication Service providers (CSP) as well as it will empower many out-telco services such as transportation, education, health programs, and business analysis in resource management and planning, decision making, and processes optimization.. However, extracting these valuable information from raw CDRs with the classical SQL and BI systems is very costly and has poor performance measures. This is due to the big volume of CDR data-set, the high and growing data rate and the large number of fields it contains. Many CDR analytics systems were built using Big Data technology, to overcome the scalability problem of the centralized computing, but the heterogeneity usage of CDR analytics have not been considered; they were built for specific and predetermined use cases. This paper presents a proposed platform architecture for real, near-real time and batch CDR analysis to provide analytics for heterogeneous applications, through designing a high generic and scalable platform. This paper illustrates the platform design consideration along with how the proposed architecture was built. Moreover, it gives a brief functional description and implementation suggestions for each component in the architecture.

Keyword: DR, Telecom, Big Data, real time, stream processing, batch processing, Lambda, Kappa.

An Expressive Hadoop MapReduce Framework

Nathar Shah[1,3], Christopher Messom[2]

[1]Faculty of Computing and Informatics, Multimedia University, Cyberjaya 63100, Malaysia

[2]School of Information Technology, Monash University, Victoria 3800, Australia

[3]School of Information Technology, Monash University, Bandar Sunway 47500, Malaysia

Abstract: The traditional Hadoop MapReduce framework is a simple programming model for large scale parallel and distributed data processing. However, the model is not structured for semantic-oriented large data processing since it is not expressive. This paper presents a tree-oriented approach to enable expressiveness in the traditional Hadoop MapReduce framework. The new tree based MapReduce structure provides for group based processing, level based processing, and traversal order based processing. Stand-alone or nested, these processing constructs provides the required expressivity for semantic-oriented large data processing. This is accomplished yet preserving the fundamental benefit of traditional MapReduce framework —fault-tolerant processing.

Keyword: Expressive, Hadoop MapReduce, Parallel Trees.

Boyer-Moore Horspool Algorithm used in Content Management System of Data Fast Searching

Chan Chung Hoong[1], Mohamed Ariff Ameedeen[1,2]

[1]Faculty of Computer Systems & Software Engineering , University Malaysia Pahang,Gambang, Malaysia. [2]IBM Centre of Excellence, University Malaysia Pahang, Gambang, Malaysia.

Abstract: After a deep view on few fast searching algorithm as Boyer-Moore algorithm, Boyer-Moore Horspool algorithm, Brute-Force Algorithm, Knuth-Morris-Pratt algorithm and Rabin-Karp algorithm, this research paper chooses Boyer-Moore Horspool algorithm to be used in the content management system in term of data Fast Searching. An enormous amount of data stored in content management system as few big module as product data, slider data, personal information data, company information data, account data and another kind of data may refer to the different type of content management system and developer set. However, search specific data from all the above data type that mention, memory, and time consumed is used up. Therefore, from this paper, Boyer-Moore Horspool Algorithm is being chosen to use in content management system after comparing a few searching algorithm in research which will state in this article. The aim of this paper is to analysis few searching algorithm and choose the most suit algorithm that suit content management system.

Keyword: Boyer—Moore Algorithm, Boyer-Moore Horspool Algorithm, Fast Searching, Content Management System, Data Fast Searching.

SESSION 4
Data Science II

Affective State Classification through CMAC-based Model of Affects (CCMA) using SVM

Hamwira Yaacob, Abdul Wahab

Kulliyyah of Information & Communication Technology, International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur, Malaysia.

Abstract: A number of computational models have been proposed to perform emotion profiling through affective state classification using *electroencephalogram* (EEG) signals. However, such models do not include both temporal and spatial dynamic of the signals. It is also observed that the performance of classifying emotion using the existing models produce high classification accuracy on one subject, but not on different subjects. Thus, in this paper CMAC-based Computational Model of Affects (CCMA) is proposed as feature extraction for the classification task. CCMA keeps the temporal and spatial dynamics of EEG signals to produce better classification performance. Using Support Vector Machine (SVM) as classifier, the features produce higher classification accuracy for heterogeneous test.

Keyword: CCMA, EEG, affective computing, SVM.

Investment Decisions Based on EEG Emotion Recognition

Nurul Izzati Mat Razi, Marini Othman, Hamwira Yaacob

Kulliyyah of Information and Communication Technology, International Islamic University Malaysia, Jalan Gombak 53100, Kuala Lumpur Malaysia.

Abstract: In the recent years, computational neuroscience which is a study on the brain functions was frequently applied to discover interesting patterns in the investment decisions. Emotions in neurofinance study have been measured by sentiments analysis but not measured by bio-signal. Behavioural finance affects investors' performance which is also influenced by their emotional or cognitive errors in taking the investment decisions. This paper focused on the EEG-based emotion recognition recorded while making decisions that can also be helpful in investment's returns. The features were extracted by using Mel Frequency Cepstal Coefficient (MFCC) and the classification used the Multi-Layer Perceptron (MLP) classifier. The EEG-based emotion recognition was tested by using the dimensional models of emotions, 12-PAC and rSASM, and also the Radboud Faces Database (RaFD). Results show that investment decisions can be driven by the emotions of the investor and some measurement should be taken before they lose their money.

Keyword: Neuroscience, behavioral finance, EEG-based emotions, machine learning, investment decisions.

Consensus Phase Of eDARA

SengKheau Chung[1], Rayner Alfred[2], and HuiKeng Lau[2]

[1]Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[2]Faculty of Computing and Informatics,Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Abstract: Development of advanced digital data has been encouraging more scientic data to be stored in relational database for easy access and manipulation. Many approaches have been introduced to extract useful information from the digital data stored in relational database. DARA algorithm is one of the approaches that summarizes data from multi-relation database to produce useful information. As a continuation work of DARA, several Genetic Algorithm (GA) based clustering methods such as Forward Feature Selection, Backward Feature Selection, Bit Merge Feature Construction and Term-term Correlation have been introduced to improve the effectiveness of DARA for data summarization. However, such methods have shown to produce inconsistent performance when dataset from three different domains (mutagenesis, nancial and hepatitis) are used for the experiments. Consequently, clustering ensemble is proposed to produce an absolute result of the results that are generated by those methods respectively. In this study, the consensus phase of eDARA that provides a mechanism to combine multiple runs of a clustering algorithm on multi-relation database is presented.

Resolving Malay Word Sense Disambiguation Utilizing Cross-Language Learning Sources Approach

Fuad Yahaya[1], Nurazzah Abd. Rahman[1], Zainab Abu Bakar[2]

[1]Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450 Shah Alam, Malaysia
[2]Faculty of Computer and Information Technology, Al-Madinah International University, 40100 Shah Alam, Malaysia

Abstract: Ambiguity in Malay words is a huge issue in interpreting Malay language to different languages. Authors propose a Malay Word Sense Disambiguation (MalayWSD) to resolve ambiguous Malay words using cross-language learning sources such as AsianWordNet (AWN) and PrincetonWordNet(PWN). The Malay-WSD is a semi-automated on non-particular area utilizing disambiguation systems, word structures and window sizes. The disambiguation methods incorporate vector, vector-pair,path and lesk. In this paper Malay words that have different meanings and part-of-speech are experimented. The results reveal that utilizing AWN with vector method and PWN with path procedure gives best exactness. In any case, for MalayWSD the time execution, the vector procedure with AWN at five window dimensions are acceptable.

Keyword: Wordnet, Word Sense Disambiguation, Word Forms, Window Size, Malay Words.

Contextual Thermal Face Detection for Fever Mass Screening

Siti Sofiah[1], Kamarul Hawari[1], Sabira Khatun[2]

[1]Faculty of Electrical and Electronics, Universiti Malaysia Pahang, Pekan, Pahang Malaysia

[2]School of Computer and Communications, Universiti Malaysia Perlis, Ulu Pauh, Perlis, Malaysia

Abstract: In recent years, the global outbreak of severe acute respiratory syndrome detection and human tracking using infrared sensors get attention by many researchers. Machine vision plays an important role for successful conduction of above researchers. In most of the researches, focus is given on thermal spectrum, very less focus on the effectiveness of febrile mass detection and screening. For detection, usually the region of interest is the exposed area of head-to-shoulder. This is essential prior to measure the temperature of a febrile person by the thermal camera. Challenges to detect pedestrian in a crowd through thermal images include the image background and nature, quality of image in infrared spectrum as well as the real crowd situation in public area that cause occlusion. In this paper, a well-annotated pedestrian dataset is developed using thermal images taken during fever screening in Kuala Lumpur International Airport (KLIA). Then the statistical analysis on size and occlusion patterns in the streaming crowds has been performed. Finally, a local context detector is introduced, by taking into account the local context on head in thermal datasets for better detection performance. The performance proposed detector is evaluated on the developed thermal images dataset .Overall, it shows highest performance compared to existing pre-trained detectors.

Land Use and Land Cover Change in Vientiane Area, Lao PDR using Object-Oriented Classification on Multitemporal Landsat Data

Su-Wah Hue[1], Alexius Korom[2], Yen-Wah Seng[1], Vongphet Sihapanya[3], Somvang Phimmavong[3], Mui-How Phua[1]

[1]Forestry Complex, Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia
[2]Universiti Teknologi MARA (UiTM) Sabah, Locked Bag 71, 88997 Kota Kinabalu, Sabah, Malaysia
[3]Faculty of Forest Science, National University of Laos, Vientiane, Lao PDR.

Abstract: Monitoring of land use and land cover change using remote sensing is important to evaluate the impacts of anthropogenic activities on the environment. Digital change detection using post-classification can help to elucidate dynamics of landscape change. This study illustrates the effectiveness of object-oriented classification compared to pixel-oriented classification in generating land cover information and its temporal changes. Spatio-temporal dynamics of land cover types in Vientiane area, Lao PDR were analyzed using Landsat images in two-time series (1990 and 2015). We used the top-down approach to classify the Landsat images in iterative steps with three hierarchical scale levels. Scale levels of 25, 10 and 5 with different weighting parameters were used to map the land cover type of Vientiane in 1990 and 2015. With object-oriented classification, overall accuracy and Kappa statistic were improved by 13.44% and 0.16 for land cover classification (LCC) 1990. For LCC 2015, the improvements in overall accuracy and Kappa statistic were 28.71% and 0.25. Based on the LCC 1990 and 2015, we observed an significant growth of plantation areas over the 25 years in the study area . Instead of traditional agricultural activity, the plantation seemed to be the new driver in the rural areas of Lao PDR. The object-oriented classification approach can be applied in other areas of Lao PDR to generate accurate information on land cover changes for better land resource management.

Keyword: Object-oriented classification, Landsat, land use and land cover change

The Assimilation of Multi-Type Information for Seasonal Precipitation Forecasting using Modular Neural Network

Junaida Sulaiman, Noorhuzaimi Karimah Mohd Noor, Suryanti Awang

[1]Forestry Complex, Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia
[2]Universiti Teknologi MARA (UiTM) Sabah, Locked Bag 71, 88997 Kota Kinabalu, Sabah, Malaysia
[3]Faculty of Forest Science, National University of Laos, Vientiane, Lao PDR.

Abstract: The rainfall occurrences are triggered by different types of climate sources not restricted to past precipitation values but may include climate indices such as El Nino/Southern Oscillation, Indian Ocean Dipole, and Madden Julian Oscillation. In this paper, we investigated the effectiveness of assimilating two sources of inputs for heavy precipitation forecasting using modular neural network. The assimilated input was obtained by merging two input variable sources (climate indices and precipitation records) according to their individual weighting factor determined by correlation test. To simulate the hydrologic response using merged product, a modular neural network model was developed. The modular concept was implemented by separating the precipitation events based on seasonal monsoon and trained the subset of seasonal data using modular neural network. Four subsets of monthly precipitation data were sampled to evaluate modular neural network model at 1-month lead-time with single precipitation neural network model and multiple linear regression as benchmark models. The results show that the merging method can effectively assimilate information from two sources of inputs to improve the accuracy of heavy precipitation forecasting.

Magnetoelectric Effects Analysis of a Hybrid Piezoelectric Cantilever

Md Rabiul Awal[1], Muzammil Jusoh[1], Thennarasan Sabapathy[1], Muhammad Ramlee Kamarudin[2], H. A. Rahim[1]

[1]Bioelectromagnetics Research Group (BioEM), School of Computer and Communication Engineering, Universiti Malaysia Perlis (UniMAP), Kampus Pauh Putra, 02600, Arau, Perlis, Malaysia
[2]Wireless Communication Centre (WCC), Faculty of Electrical Engineering, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia

Abstract: This paper presents a hybrid energy harvester to harvest dual piezoelectricity and piezomagnetism using piezo-electromagnetic transduction. Multilayered configuration is used to design the proposed harvester, i.e. the cantilever. Silicon, Lead Zirconate Titanate (PZT-5H) and Stainless Steel 405 Annealed are used to configure the cantilever for 2 different cases. For both cases, the geometry is set to (1010.3) mm^3 device size. Several Eigenfrequencies are applied to evaluate the deformations of the cantilever. In addition, the influence of Eigenfrequencies on total cantilever displacements and elastic strain energy density are observed. From the findings, it is evident that, vertical displacement of the cantilever can be as high as 3 mm for both cases. However, case 1 and 2 has significant disagreement in elastic strain energy density which are approximately 0.2 and 2.5 J/m^3 respectively. Hence, multilayered configuration is more beneficial in terms of energy penetration and significantly distinguished.

Keyword: Hybrid energy harvesting, piezoelectric energy, electromagnetic energy, multilayered cantilever.

SESSION 5A
Advanced Networking and
Applications I

A Novel Fast ReRoute Signaling Cost for Multicast Proxy Mobility

17011

Azana Hafizah Mohd Aman[1], Aisha-Hassan A. Hashim[1], Azween Abdullah[2], Huda Adibah Mohd Ramli[1]

[1]Department of Electrical and Computer Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia
[2]SOCIT, Taylors University, Jalan Taylors, Subang Jaya 47500, Selangor, Malaysia

Abstract: A profound analysis of signaling cost for multicast network mobility management environment. The evaluation is a innovative integration of Multicast only Fast Reroute (MFR) and Context Transfer (CT). This integration is implemented to network mobility environment which is Proxy Mobile IPv6 (PMIPv6). The signaling cost terms is described based on handover process flow of the proposed implementation. This paper introduces and validates a novel enhanced signaling cost procedure for multicast PMIPv6. This procedure helps to improve network mobility performance as mobile multicast traffic usage rises. Through this implementation better signaling cost formula is brought forward. The integration helps to ease usage increment issues.

Keyword: Multicast, Mobile, Signaling Cost.

High Speed Implementation of the Keyed-Hash Message Authentication Code (HMAC) based on SHA-1 Algorithm

Shamsiah binti Suhaili[1], Takahiro Watanabe[2]

[1]Electronic Department, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), 94300 Kota Samarahan, Sarawak

[2]Graduate School of Information, Production and Systems, Waseda Univeristy, 2-7 Hibikino, Wakamatsu-Ku, Fukuoka 808-0135, Japan

Abstract: Hash function is important for some application like MAC (Message Authentication Code). There are different types of hash function such as MD5, SHA-1 and RIPEMD160. Network layer is the third layer of seven layer Open system interconnection (OSI) model or known as internet. It performs network addressing and physical routing of the data. Nowadays, internet needs better security to secure network from unauthorized monitoring. Therefore, IPSec introduces secure communication across the internet where it can encrypt and/or authenticate the network traffic at IP level. IPSec is called as Internet Protocol-based security and it is divided into two protocols such as AH (Authentication Header) and ESP (Encapsulating Security Protocol) where MAC value is kept in the authentication data filed of AH and ESP. In this paper, high speed implementation of Keyed-Hash Message Authentication Code (HMAC) using SHA-1 is analyzed to optimize both hardware resource and performance of the design. Its algorithm is used for data authentication and integrity. HMAC is very important for message authentication during data transmission. It is successfully designed and synthesized by using Verilog with Altera Quartus II CAD tool in order to obtain small area implementation as well as high maximum frequency. The correctness of the HMAC design based on SHA-1 algorithm is evaluated and verified using ModelSim. The results shows maximum frequency of HMAC-SHA-1 is about 260.01 MHz.

Keyword: Authentication, HMAC, Maximum Frequency, SHA-1

34

Securing IPv6 Link Local Communication Using IPsec: Obstacles and Challenges

Amjed Sid Ahmed, Rosilah Hassan, Nor Effendy Othman

Research Centre for Software Technology and Management (SOFTAM), Network and Communication Technology Laboratory (NCT LAB), Faculty of Information Science and Technology (FTSM), Universiti Kebangsaan Malaysia (UKM), 43600 UKM, Bangi, Selangor, Malaysia.

Abstract: Widely known as the Internet Protocol version 6 (IPv6), the Internetworking Protocol next generation (IPng) has emerged as a solution to the drawbacks of the Internet Protocol version 4. The main functions of the IPv6 are address autoconfiguration and router and neighbor discovery (ND). As a component of the IPng, the Neighbor Discovery protocol (NDP) allows the IPng to be redirected to a suitable hop node. Moreover, it detects identical addresses and unreachable nodes. However, many types of attacks (e.g., neighbor solicitation and advertisement spoofing, address theft, redirection, and denial of service) put the NDP at risk, especially when its security is weak. In the early development of the NDP, its node connections were deemed highly secure. Contrary to this notion, the security of the NDP when formally applied is obviously filled with loopholes. In the original design of the NDP, ND messages receive protection through the application of Internet protocol security (IPsec). However, the exact mechanism of such form of protection remains vague. Thus, we focus on the functions of and threats to the NDP. In addition, we explore the other aspects of the NDP, including its limitations in meeting its primary requirement of using IPsec to secure the local link communication in the IPv6 environment.

Keyword: Internet Protocol version 6 (IPv6), Neighbor Discovery Protocol (NDP), Internet Protocol Security (IPsec).

Statistical Analysis of Ultra-wideband Signed Decision Variable

G.C.Chung, S.S.Thwin, M.Y.Alias

Faculty of Engineering, Multimedia University, Jalan Multimedia, Cyberjaya, 63100 Selangor, Malaysia.

Abstract: Modeling undesired interference and noise is always a challenge in wireless communication system. The most common model used is the Gaussian distribution. However, studies show that broadband signals tend to exhibit non-Gaussian statistical behavior as compared to narrowband system. In this paper, we study the statistical distribution of ultra-wideband signed decision variable in the presence of inter-symbol interference and multiple access interference. Simulated distribution has been done by collecting the data after passing through the IEEE standard channel model at the equalizer output. Results show that the Generalized Gaussian model with different shape factors is more preferable to be used compared to the Middleton Class-A and Gaussian models.

Keyword: Ultra-wideband, signed decision variable, Middleton Class-A, Generalized Gaussian.

Performance Comparison and Electromagnetic Dosimetry of Rigid, Hybrid and Textile Antennas

Been Seok Yew[1], Fwen Hoon Wee[2], Saiful Bahri Mohamed[1], Martini Muhamad[1]

[1]Faculty of Innovative Design and Technology, Universiti Sultan Zainal Abidin (UniSZA), Kampus Gong Badak, 21300 Kuala Terengganu, Terengganu, Malaysia. [2]Embedded Computing Research Cluster, School of Computer and Communication Engineering, Universiti Malaysia Perlis, Jalan Kangar-Alor Star, Taman Pertiwi Indah Seriab, 01000 Kangar, Perlis, Malaysia.

Abstract: This paper presents the free space and on-body performance comparison of microstrip patch antennas operating at 2.45 GHz Industrial, Science, and Medical (ISM) band for body-centric wireless communications application. The performance comparison of three model microstrip patch antennas, namely rigid, hybrid, and textile is performed in CST Microwave Studio (MWS) and Hugo Voxel Model is used for electromagnetic dosimetry analysis. It was found that the hybrid antenna achieved optimum performance compared to rigid and textile antennas, with return loss (S11) of -30.30 db at resonant frequency 2.45 GHz and VSWR of 1.06 in free space analysis. The hybrid antenna radiates unidirectional at gain and radiation efficiency of 6.96 dB and 86.67%. From on-body analysis, it was found that all the antennas suffer from frequency detuning, reduced efficiency and gain and radiation pattern fragmentation due to electromagnetic absorption in human lossy tissues. The electronic dosimetry on SAR exposure on chest and back for all antennas was well below limitation of 2 W/kg. The maximum SAR (0.648 W/kg) was found when the rigid antenna was mounted on the back of the human body and the minimum SAR (0.262 W/kg) was found when the textile antenna was placed on the chest.

Keyword: Free space performance, on-body performance, SAR, ISM band.

On The Throughput and Energy Consumption in External Sensing Cognitive Radio

Hemlata Patil[1], Dr A. J. Patil[2], Dr S. G. Bhirud[3]

[1]Ramrao Adik Institute of Technology, Mumbai University, India.
[2]SGDCOE, North Maharashtra University, India.
[3]VJTI, Mumbai, India

Abstract: In recent year energy efficiency has become reproachful area for cognitive radio networks, as network become more and more energy-challenging. By considering the current issues like rising energy cost and environmental hazards, cognitive radio parameter is under the foreground of the analyst. The concept of Cognitive radio has encouraged the idea of vacant spectrum sharing. This requires reliable sensing so that it does not create interference to primary users. However the process of sensing is difficult in fading environments. Thus cooperative sensing embarks upon the impact of fading and improves probability of detection. Though cooperatively sensed detection probability gets degraded in such low SNR environments. Earlier work suggested that by using external sensing the energy efficiency is improved. This paper investigates the influence of fading channels on external sensing in cooperative cognitive radio. Finally, we have presented the simulation results which outperforms in terms of probability of detection, Throughput and energy efficiency compared to internal sensing.

Keyword: Cognitive Radio; Cooperative Spectrum Sensing; External Sensing; Energy Efficient.

SESSION 5B
Applications of CSE I

The Effect of Void in Thermal Layer on MOSFET's Heat Dissipation

19056

M. S. Rosman[1], N. Buniyamin[1], M.H. Abdul Halim[2]

[1]Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor D.E., Malaysia.
[2]Department of Electrical and Electronic Engineering, Segi University, 47810 Petaling Jaya, Selangor D.E., Malaysia.

Abstract: Internal heat increase in silicon die may decrease the performance of the device to dissipate heat. In the worst case, it may cause thermal shock of the silicon and cause a catastrophic failure during operation. Internal heat increase is especially detrimental for devices that operate in temperature greater than ambient temperature. This paper presents the relationship of void in the thermal layer (solder) of a metaloxidesemiconductor field-effect transistor's (MOSFET) and it's junction temperature in terms of the voltage at source-drain, VSD junction. The void inside the thermal layer is measured using ultrasound C-Mode Scanning Acoustic Microscopy (SAM) and the voltage source-drain of the MOSFET is similar to the diode forward voltage, V_f. The result obtained from the study showed that as the void(s) size increase, the V_{SD} will increase proportionally. This is an inter-correlation with an increase of temperature at MOSFET's junction. The results indicate that SAM using ultrasound to measure void in thermal to indicate temperature increase inside a package (chip) is possible. The study also showed that the location of voids will affect poor heat dissipation rate. The experiment indicated that the volume or size of the void is not as important as its localization. A void underneath the source pad will cause poorer heat dissipation compared to a similar size void far from the source pad and nearer to the chip edge.

Keyword: Ultrasound C-Mode, scanning acoustic microscopy, source-drain voltage, MOSFET, void, thermal layer.

39

Radiation Absorption Distribution of Hyperthermia Rectangular Microstrip Applicator with Three Different Substrates

Kasumawati Lias[1], Norlida Buniyamin[1], Mohammad Zulkarnaen Ahmad Narihan[2]

[1]Faculty of Electrical Engineering, Universiti Teknologi MARA (UITM), Shah Alam, Selangor, Malaysia

[2]Faculty of Medical and Health Sciences, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia

Abstract: The effects of rectangular microstrip applicator with three different substrate permittivities toward breast hyperthermia radiation absorption distribution are investigated. The main goal of the research is to determine the best substrate to be used for the applicator development, which contribute toward the capability of the applicator in penetrating deeper, which is about 100mm depth and also taking into account the focusing effects by reducing the unwanted hot spots at the surrounding healthy tissue. The radiation absorption distribution, which is represented by the specific absorption rate (SAR) with 1 and 10 g weight, are presented and analyzed. The rectangular microstrip hyperthermia applicator is developed with three operating frequencies, namely as industry, scientific and medical (ISM), 434, 915, and 2450 MHz. The operating power is stipulated to 10 W. The substrates to be investigated are FR-4, RT/Duroid 5880, and silicon. The permittivities, r are 4, 2.2 and 11.9, respectively. As predicted, the outcomes of the SAR are different in radiation absorption distribution when different substrates with different permittivities are utilized. The greatest results are presented by the hyperthermia applicator with silicon substrate, if compared to the other two applicators, which is embedded with FR-4 and RT/Duroid 5880, where the penetration depth and focusing toward the targeted area to be treated are achieved.

Keyword: Substrate, Specific absorption rate (SAR), Hyperthermia.

Vertical Strained Impact Ionization MOSFET (VESIMOS) Technology Approach for Based Biosensor Applications using its Behavioral Model

Ismail Saad, Andee Hazwani Syazana B., Bun Seng C., Mohd. Zuhir H., N. Bolong

Nano Engineering and Material (NEMs) Research Group, Faculty of Engineering, Universiti Malaysia Sabah, 88999, Kota Kinabalu, Sabah, Malaysia.

Abstract: This paper gives an overview about uniqueness characteristics of Vertical Strained Impact Ionization MOSFET (VESIMOS) technology act as bio-sensing devices. There are three proposed devices used VESIMOS technology which are Single Channel VESIMOS (SC-VESIMOS), Dual Channel (DC-VESIMOS), VESIMOS Incorporating Dielectric Pocket (VESIMOS-DP) are probably can become feasible candidates as biosensor devices. The selected devices from three structures was further analyzed for its behavioral model. The extracted parameter from the device simulations was used to design the circuitry model to represent the characteristic and behavior of the selected devices in circuit implementation. The best characteristic of the device shown by DC-VESIMOS and selected for further analysis. The behavioral model or equivalent circuit model of DC-VESIMOS used PSPICE circuit simulator. Main prerequisite of biosensor device are high sensitivity, faster response, and high reliability which represented by the VESIMOS structures. Low subthreshold swings present the sensitivity of the devices shown by DC-VESIMOS are 11.48mV/dec and 10.53mV/dec from TCAD and PSPICE results respectively.

Keyword: IMOS, VESIMOS, Biosensor, Behavioral Model.

Enhanced Reliability of Vertical Strained Impact Ionization MOSFET Incorporating Dielectric Pocket for Ultra-Sensitive Biosensor Applications

Ismail Saad, Mohd. Zuhir H., Andee H. S. Bacho, Bun Seng C., Khairul A.M,
Bablu Ghosh, N. Bolong

Nano Engineering and Material (NEMs) Research Group, Faculty of Engineering,
Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia.

Abstract: Fast switching with an enhanced reliability device structure of Vertical Strained Impact Ionization MOSFET incorporating Dielectric Pocket (VESIMOS-DP) has been successfully design, simulated and analyzed in this paper. Ultra-low power with low subthreshold swing (S) and high breakdown voltage are imperative for ultra-sensitive biosensors. Impact ionization MOSFET (IMOS) is predicted to be capable of S as low as 20 mV/dec, which is much lower than Conventional MOSFET (CMOS). There are significant drop in subthreshold slope (S) while threshold voltage is increase as the body doping concentration increases. S value for DP place at source side is higher (S=24.4 mV/decade) as compared at the drain side (S=18.9 mV/decade) intrinsic region. The vicinity of DP near the drain region reduces charge sharing effects associated with the source and thus improves impact ionization rate. The introduction of a Dielectric Pocket (DP) is believed to be able to minimize the PBT effect while improving the reliability of the device by attaining higher breakdown voltage. Consequently, with the reduced of alloy scattering, the electron mobility has been improved by 22%. In many aspects, it is revealed that the incorporation of DP enhanced the reliability of VESIMOS for future development of nanoelectronic devices.

Keyword: IMOS, Dielectric Pocket, VESIMOS, VESIMOS-DP, Parasitic Bipolar Effects, Biosensor, nano-electronics.

Comparative Study on the Sunlight Penetration Extent on High-Rise Apartment Facades with Early Modern Architectural Style Design in Kuala Lumpur, Malaysia

Yasser Arab[1], Ahmad Sanusi Hassan[1], Bushra Qanaa[2]

[1]School of Housing, Building and Planning, Universiti Sains Malaysia 11800 USM, Penang, Malaysia

[2]Architect, Faculty of Architecture, Ittihad Private University, Aleppo, Syria.

Abstract: The study analyses and discusses the extent of sunlight penetration on the front buildings facades in the tropical region. Three high-rise apartment buildings designed with early modern architectural style in Kuala Lumpur were selected to be the case studies in this research. The early modern architectural style was the popular style of the residential building in the 1950s to 1970s, the concept behind emphasizes the government on the early modern style at that era was to provide the maximum number of houses to the people. Three residential high-rise buildings with early modern architectural style were selected to be the case studies in this research. All of the three case studies are located in Kuala Lumpur, Malaysia, The selected apartments namely Melati, Sri Selangor and Sri Sarawak. The study uses SunTool software to conduct the simulation for measuring the extent of sunlight penetration. The research finds that the early modern architectural style is able to provide an excellent shading performance, the faade design, and the open corridor system is very efficient to prevent the unnecessary direct sunlight from penetrating into the apartments during the high intense sunlight hours. The maximum extent sunlight penetration in the early morning and the late evening hours is due to the low angle of the sun position. However, this direct sunlight is low intense, so it is acceptable and important for the human being bodies.

Keyword: Sunlight Penetration, High-rise Building, Early Modern Style, Kuala Lumpur.

An Impact of Controlling Energy Management System via Hybrid Battery-Supercapacitor in Electric Vehicles

N. A. N. Azahan, J. J. Jamian, Z. A. Noorden, M. A. Baharudin

Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor, Malaysia

Abstract: The characteristic of battery that has low power capacity cause the overall performance of an electric vehicle (EV) with single energy supply is not optimal. Thus, the EV system need to uses a battery as a primary energy source and combined with a supercapacitor that acts as a buffer system to provide a desired power to the load. However, the power that being supplied by both battery and supercapacitor must be controlled to prevent a high current drawing from the battery. This paper investigate the impact of controlling hybrid energy storage system (between battery and supercapacitor) to the lifetime of battery in EV. Both energy sources are interfaced with a unidirectional/bidirectional DC-DC converter. The MATLAB simulations are carried out to analyze the state-of-charging (SOC) for the battery and supercapacitor for a random driving cycle. The results show that the highest SOC in battery can be achieved when the multiplier in energy limiter is set to 100% and followed by 70% and 50%. The supercapacitor still able to fulfill the remaining load after completed the 14 seconds of run time. Thus, with the knowledge on maximum energy limiter that can be set on controlling hybrid energy storage system, the lifetime of the battery can be extended and the performance of EV can be improved.

Keyword: Battery, Supercapacitor, Hybrid Energy Storage System, State-of-Charging.

Vehicle Classification Using Passive Forward Scattering Radar

Noor Hafizah Abdul Aziz[1,2], Muhammad Aizat Md Thani[1]

[1]Faculty of Electrical Engineering, University Technology of MARA (UiTM), Shah Alam Malaysia

[2]Faculty of Engineering, Universiti Putra Malaysia (UPM), Serdang, 43400, Malaysia

Abstract: Passive forward scattering radar system used to detect any ground moving target such as vehicle which pass through the forward scattering region between the illuminator of opportunity and passive radar receiver. In this research finding, this system practiced to distinguish and classify the vehicles. The existence illuminator is choose to be a transmitter and the passive radar receiver is setup within the coverage of illuminator signal to attain the forward scatter radar region. A Doppler signature is captured by the passive radar system once the ground moving target passed through the forward scatter region. The ground moving targets which are vehicles are separated into categories of small, medium and large. The experimental work and data collection is prepared at parking area of Malaysia Agro Exposition Park Serdang (MAEPS) since the passive radar receiver could receive a strong signal from the illuminator of base station. Thus, from the analysis data of vehicle detection, this passive forward scattering radar system also accomplished to classify the vehicles in categories of size.

Keyword: Passive Radar, Forward Scattering region.

SESSION 6A
Modelling and Simulations I

Simulation of Power Measurement of Sequential Adiabatic Circuit

12013

Nurul Aisyah Nadiah Binti Zainal Abidin, Abu Khari Bin A'Ain

Faculty of Electrical Engineering, Universiti Teknologi Malaysia, 81310, UTM Johor Bahru, Johor, Malaysia

Abstract: This paper presents an issue to measure dynamic power in adiabatic sequential circuit. Three power estimation techniques based on power meter simulation method, HSPICE simulation platform and dynamic power equation are presented. Unlike traditional digital circuit which is powered by a constant voltage, adiabatic circuit is powered by an AC signal. This is the motivation behind this work which is to compare the accuracy of power measured. This work is based on 0.25 CMOS process technology and adiabatic design technique is based on quasi adiabatic.

Keyword: Low Power, Adiabatic, Sequential, Power Meter, Power Measure.

Improved Parameter Estimation for MRF Models for Varying Current

M. Khusyaie M. Razali, Asan G. A. Muthalif, N. H. Diyana Nordin, Syamsul Bahrin

Smart Structures, Systems and Control Research Laboratory (S3CRL), Department of Mechatronics Engineering, Faculty of Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, 53100, Kuala Lumpur, Malaysia.

Abstract: This paper introduces the improved parameter estimation of Magnetorheological fluid (MRF) damper models for varying input current. The models being studied for the estimation are Bingham model, Simple Bouc-Wen model, Modified Bouc-Wen model, Hyperbolic Tangent Function model, and Nonlinear Biviscous model. In estimating the parameters of the models, a comparison between the simulation and the experimental results are made. The mathematical equations of each parameter are established as a function of the input current through curve fitting method. In order to optimize the estimation, the mathematical equations are divided into two range. It is found out that the model with the least value of parameter estimation error is Modified Bouc-Wen.

The Development of Conceptual KPI Model Based on Balanced Scorecard Measurement Method for Tacit Knowledge of Universities' Academic Staff

Zainab Amin, Awanis Romli, Rahmah Mokhtar, Mazlina Abdul Majid

Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang
26300 Kuantan, Pahang

Abstract: The academic staffs represent the main knowledge resources in universities. The management and development of academic tacit knowledge, which is acquired through activities such as teaching and research is needed for sustained competitive advantage. However, measuring tacit knowledge of academicians, who are the key individuals in organisations, is difficult due to its intangibility. This may result in problems of identifying and determining the key individuals performance. Therefore, this paper proposes the development of a conceptual key performance indicator (KPI) model based on balance scorecard (BSc) approach by measuring the level and performance of tacit knowledge for academic staff in universities. The conceptual KPI model is developed by integrating financial and non-financial measurement indicators. These indicators used in the BSc approach to evaluate the success of a university according to the knowledge resources performance and profits from tacit knowledge.

Keyword: Knowledge Management, Knowledge Measurement, BSc, KPI, Academic Staff, tacit knowledge.

Dynamic Simulation Model of Cow's Milk Demand and Supply to Determine The National Fulfillment Ratio

Erma Suryani[1], Rully Agus Hendrawan[1], Isnaini Muhandhis[1], Lily Puspa Dewi[2]

[1]Information Systems Departement, Institut Teknologi Sepuluh Nopember, Surabaya 60111, Indonesia
[2]Informatics Department, Petra Cristian University, Surabaya 60236, Indonesia

Abstract: National milk requirement is expected to increase as a result of population growth and the improvement of public awareness of nutrition, especially animal protein. In addition, the increase in household income will boost domestic consumption of milk. Public awareness of milk consumption, pushing milk as an economic commodity that has a strategic value. Demand for milk increased by 14.01% over the period 2002 and 2007. However, on the other hand Indonesia's milk production grew only 2%. The gap between the growths of consumption and production has increased the number of imported milk. The declining quality of dairy cows has caused a lack of domestic milk supply. This condition due to difficult forage, high prices of raw material concentrate feed, genetic decline of dairy cow, and farm management that is not optimal. Therefore, in this research, we will analyze the supply and demand of milk to determine the fulfillment ratio of national milk. As the research method, we utilized system dynamics based on consideration that this method allows us to consider the internal and external factors, as well as to formulate non-linear relationships among variables. Research results show that national milk demand was around 3.19 million tons in 2015, meanwhile national milk suppy was around 805,819 tons in 2015. National fulfillment ratio of milk was around 25.23% in 2015. With this condition, the required imported milk was around 2.38 million tons in 2015.

Keyword: Supply, Demand, Fulfillment Ratio, System Dynamics.

Thermal Simulation of Light-Emitting Diode Panel with Heat Sink

Koon Chun Lai, Chee Meng Loo, Kok Seng Ong , Kia Hock Tan, Kim Ho Yeap, Ming Hui Tan

Faculty of Engineering and Green Technology, Universiti Tunku Abdul Rahman, Kampar Campus, Malaysia

Abstract: The aim of this study is to simulate and investigate the heat transfer phenomenon of light emitting diode packages. The performance of FR-4 and MCPCB dielectric materials with thermal conductivity of 0.3 W/mK and 201 W/mK respectively are numerically compared. MCPCB material is found to be an effective base that holds 34.8°C for an input power of 0.5 W on a single 1 mm 1 mm GaN chip. For LED chip materials, the maximum temperature is 34.8°C for GaN with thermal conductivity of 130 W/mK; 34.9°C for GaP with 110 W/mK; and 34.5°C for AlN with thermal conductivity of 285 W/mK. The simulation results show that the size of the base and the thickness of the heat sink fins are also important factors to be considered in the design.

Keyword: Light-emitting diode, Conductivity, Thermal interface, Heat dissipation.

An Overview of Crowd Evacuation Simulation

Noor Akma Abu Bakar, Mazlina Abdul Majid, Khalid Adam Ismail

Faculty of Computer Systems and Software, Universiti Malaysia Pahang, Kuantan, Pahang, Malaysia

Abstract: Emergency scenarios is an unforeseen situation that thereated human life. Emergency action plans comprising crowd evacuation is essential to prevent the occurrence of human injury and death. Therefore, this paper proposed a crowd evacuation simulation model to provide an effective and realistic approach in dealing with evacuation procedure during fire in a building. In order to build a realiable simulation model, this paper focuses on exploring the characteristics and signficance of existing simulation models and techniques from the literature. Combination of Social Force Model(SFM) and Agent Based Simulation (ABS) technique has been choosen as the solution to realistically model fire emergency evacuation scenario. The proactive and independent characterictics of agents in both approaches will contributes to the good representation of actual fire scenarios in the crowd evacuation simulation.

Keyword: Crowd Evacuation, Simulation Model, Hybrid Model, Fire Evacuation Simulation, Modelling and Simulation.

SESSION 6B
Applications of CSE II

Compact Multislot Planar Monopole Antenna for Microwave Imaging

S. S. Tiang[1], Ibrahim Asyadh[1], Sardar Ali[1], M. Z. Abdullah[2]

[1]School of Engineering, Asia Pacific University of Technology & Innovation, Technology Park Malaysia, Bukit Jalil, 57000 Kuala Lumpur, Malaysia
[2]School of Electrical and Electronic Engineering, Universiti Sains Malaysia, Nibong Tebal, 14300 Pulau Pinang, Malaysia

Abstract: A novel compact planar monopole antenna fed with a microstrip-line is presented. The proposed planar monopole antenna featuring a compact size of 16 mm 16 mm, multislot, and a simple tuning stub design. It is intended for use in the early stage breast cancer detection that covers the ultra-wideband (UWB) frequency band. A wide impedance bandwidth of around 65% (4.9 —9.6 GHz) is achieved. The parametric studies indicated that the proposed antenna has salient characteristics, low profile and compactness compared to existing UWB antennas. The antenna demonstrated an omnidirectional radiation pattern at low frequencies.

Keyword: Ultra-Wideband, Multislot, Planar Monopole, Microwave Imaging.

Challenges in predicting wood plastic composites (WPCs)

Ritu Gupta[1,2], A. Noraziah[1,2], Arun Gupta[3], Ainul Azila Che Fauzi[1,2]

[1] Faculty of Computer Systems and Software Engineering, University Malaysia Pahang, 26300 Gambang Kuantan Pahang Malaysia,

[2]IBM Centre of Excellence, University Malaysia Pahang, 26300 Gambang Kuantan Pahang Malaysia,

[3]Centre of Biocomposites and Innovative Materials, 26300 Gambang Kuantan Pahang Malaysia

Abstract: Wood plastic composites are emerging as a popular choice for composites and are comprised of wood fibers and plastic as matrix. In this paper an overview on wood plastic composites, their properties, advantages and challenges in predictions is presented. Important factors which affect the properties of the final wood plastic composite product are also highlighted. Researchers use analytical models for prediction of mechanical properties. However there are many parameters which have impact on composite performance as natural wood fibers. It is a very costly and lengthy process to study the impact of each parameter on the composite strength through experiments. Development of suitable simulation model for wood plastic composites is also suggested for making prediction as one of the alternative ways for predicting the composite properties. Such models may be more helpful to improve the understanding of the composite properties and processing in terms of the different parameters involved.

Keyword: Wood Plastic Composites, Simulation Models, Manufacturing, Mechanical Properties and Predictions.

Structural and Electronic Properties of 4-Bromo-2-(1H-Imidazo[4,5-b]Pyridin-2-yl)Phenol from Density Functional Theory Calculation

Pek-Lan Toh[1], Jee-Sien Char[1], Shukri Sulaiman[2], Mohamed-Ismail Mohamed-Ibrahim[2]

[1]Department of Electronic Engineering, Faculty of Engineering and Green Technology, Universiti Tunku Abdul Rahman, 31900 Perak, Malaysia
[2]Computational Chemistry and Physics Laboratory, School of Distance Education, Universiti Sains Malaysia, 11800 Penang, Malaysia

Abstract: In this paper, we report a first principles Density Functional Theory (DFT) investigation to study the structural and electronics properties of 4-Bromo-2-(1H-Imidazo[4,5-b]Pyridin-2-yl)Phenol, $C_{12}H_8BrN_3O$ molecular system. Geometry optimization technique was performed to obtain the local energy minimum of $C_{12}H_8BrN_3O$ at the DFT/B3LYP/6311++G** level of theory. The equilibrium molecular structure of $C_{12}H_8BrN_3O$ was used to calculate the total energy, HOMOLUMO gap, Mulliken atomic charges, and others. In order to determine the rotational energy barrier of $C_{12}H_8BrN_3O$ molecular system, the 4-bromophenol ring ring was then rotated about the C_6–C_7 bond at the intervals of 10° for a complete 360° rotation. The calculation results show the optimized geometries of $C_{12}H_8BrN_3O$ is in good accord with that of measurement data[3]. The total energy and HOMO-LUMO energy gap, respectively were determined to be about -89142.70 eV and +4.11 eV. Using the scheme of Mulliken Population Analysis (MPA), the calculation results found that O atom has the highest negatively charge, with the computed value of -0.30, whereas the highest positively charge (+1.02) is predicted on the atom of C_7. In the case of the rotational energy barrier for the dihedral angle to rotate 360° around the bond between C_6 and C_7 atoms, the shape of energy profile depends on the C_6–C_7 bond profile. The barrier height was determined to be less than 1.3 eV.

Keyword: Density Functional Theory (DFT), 4-Bromo-2-(1H-Imidazo[4,5-b]Pyridin-2-yl)Phenol, Electronic Structures, Rotational Barrier.

Resqku: An Emergency Mobile Application With Audible Sound Frequency

Oi-Mean Foong, Ai-Leng Cheong, Kwang-Hooi Yew

Computer and Information Sciences Department, Universiti Teknologi PETRONAS,
Tronoh, Perak, Malaysia

Abstract: This paper presents an auditory Android mobile application called Resqku for emergency situation. The Resqku mobile application serves as a notification tool to produce high frequency noise to distract crime suspects by using a single emergency alert button. The research work is motivated by the desire to curb the alarming increase of street crimes in densely populated district. A pilot study was conducted in places of high incidents of street crimes by interviewing civilians and law enforcement body such as the police. Our research contribution comes from the integration of high frequency noise in the proposed Resqku application. Preliminary results showed positive response towards personal-safety features built-into the Resqku mobile application. It is a valuable tool to distract suspects in crime scenes for all smartphone users.

Keyword: Android, emergency framework, high frequency noise, location-based service, mobile application.

Brain Signal Analysis to Investigate Sound Effect on Memorization

Syarifah Noor Syakiylla Sayed Daud, Rubita Sudirman

Faculty of Electrical Engineering, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Malaysia

Abstract: Electroencephalography is an imaging of the electrical signal of the brain. It is widely use among the researcher compared to other techniques since it is affordable, non-invasive, able to record the signal in short time and painless to the subject. The brain signal can be divided into five specific frequency that known as alpha, beta, theta, delta and gamma band. These frequency bands will determine the characteristics of the brain signal. In this present study, the effect of sound stimuli in memorizing process is analyzed based on the relative power of the brain rhythm. Besides that, in this proposed study it is also aim to determine the effective sound stimuli for improving memorization. About 60 adults participated in this study. They are required to memorize the visual memory task at three different conditions, which are silence condition, listening to Mozart music, and listening to white noise, each for 2 minutes. The brain signal was recorded using Neurofax 9200 of EEG machine during the memorizing process. The wavelet approach was used for EEG data processing and the relative power was calculated for each of the frequency band except delta rhythm from the clean EEG signal. The result showed that listening to sound stimuli during memorizing gave significant influence on gamma and beta activity. Based on paired t-test analysis it revealed that the gamma and beta showed more significant different at white noise (gamma: $p = 0.001 < 0.050$; beta: $p = 0.000 < 0.050$) compared to Mozart music relative (gamma: $p = 0.014 < 0.050$; beta: $p = 0.004 < 0.050$) to silent condition. It indicates that the white noise is more effective to be listened during memorizing since it able to increase the alertness level of the subject and sensory processing of the input information.

Keyword: Brain characteristic, Electroencephalography, Relative power, Stimuli, Wavelet.

Review on Green Technology Implementation Challenges in University Data Centre

Mohd Rashid Abu Bakar[1] and Noraziah Ahmad[2]

[1]ICT Centre, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia.
[2]Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia.

Abstract: A data centre is a network of computer servers used by an organization to either save, process or distribute large amounts of data. A green data centre is a repository of data where electrical, mechanical, lighting and computer systems are designed for maximum energy efficiency and minimum environmental impact. Due to increase demands of data in the university, data centre not only consume high quantities of energy, but produce carbon dioxide along with other IT inefficiencies. With the dynamic changes in technology and the exponential rise in quantities of data, the need for implementing green data centre have become the need of the hour. Green technology in data centre will not only reduce costs and emissions, but will provide operational benefits as well. However, there are challenges that need to be faced in order to implement green technology in university data centre. This review will explore what is green technology is all about, its challenges that may hampered to the implementation in university Data Centre and solutions that may combat the limits.

Keyword: green technology, green data centre, university, data centre.

Boundary Layer Flow and Heat Transfer of a Nanofluid over a Moving Permeable Surface

Siti Khuzaimah Soid[1], Anuar Ishak[2], Ioan Pop[3]

[1]Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450 UiTM Shah Alam, Selangor, Malaysia
[2]School of Mathematical Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia
[3]Department of Mathematics, Babes-Bolyai University, 400084 Cluj-Napoca, Romania

Abstract: A steady two-dimensional laminar boundary layer flow over a permeable moving surface in a nanofluid is investigated. The partial differential equations are transformed into a system of ordinary (similarity) differential equations using a similarity transformation. These equations along with the boundary conditions are solved numerically using a boundary value problem solver (bvp4c) in Matlab. Copper nanoparticle is mixed in the water base fluid with Prandtl number $\mathrm{Pr} = 6.2$. The effects of solid volume fraction and suction/injection parameters in the presence of internal heat generation on the skin friction, heat transfer and the velocity and the temperature profiles are illustrated. Suction and nanoparticle parameters increase the skin friction but decrease the magnitude of heat transfer rate and those parameters help to widen the solutions domain.

SESSION 7A
CSE Education and Finance I

Economic and Emission Load Dispatch Solution via Artificial Bee Colony Algorithm

16053

Mohd Noor Abdullah[1], Mohd Asyraf Ismail[1], Azralmukmin Azmi[2], Nur Hanis Mohammad Radzi[1], Jasrul Jamani Jamian[3]

[1]Faculty of Electrical and Electronic Engineering, Universiti Tun Hussein Onn Malaysia, Parit Raja, 86400 Batu Pahat, Johor, Malaysia
[2]Power System & High Voltage Group, School of Electrical System Engineering, Universiti Malaysia Perlis, 02600 Arau, Perlis, Malaysia
[3]Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Abstract: The Economic Load Dispatch (ELD) is considered to minimize the only fuel cost in power system planning and operation. Due to environmental issues, the emission amount released by thermal power generation should be considered in minimizing the total cost generation as well. This make the power dispatch problem become multi-objective problem that called Economic and Emission Load Dispatch (EELD). This paper investigates the performances of Artificial Bee colony (ABC) algorithm for determining optimal solution for EELD problem. In this paper, the EELD problem is formulated as a single objective problem by taking minimization of total cost and emission level as separated objective. The cost characteristic of thermal generator considered the effect of opening and closing of the valve for practical application. The ABC algorithm has been tested on standard test systems which is 10-generating unit test system in order to validate the effectiveness of proposed ABC algorithm. The results obtained have been compared with reported result by other methods in literature. From the result, it found that ABC algorithm is better than other methods for minimizing fuel cost of thermal power generation and obtained comparative results in reducing the emission level.

Keyword: Artificial Bee Colony Algorithm, Economic and Emission Load Dispatch, Optimization method.

Enhancing the Performance of Universitys Website for Mobile Devices Based on Responsive Web Design Approach

Teh Shan Shan, Joe Henry Obit, Rayner Alfred, Asni Tahir

Faculty of Computing and Informatics, Universiti Malaysia Sabah,Labuan International Campus, Jalan Sungai Pagar, 87000 Labuan F.T., Malaysia.

Abstract: With the evolution of the computer technologies, web page designs are getting richer with the scripts, stylesheets, and images on the web page. These current technologies increase the size of web pages and indirectly increase the load time. With a slow speed of web page loading speed of any website, users will leave these websites and redirect their searches to other competitors websites. This will not only reduce users' satisfactions, but it also shows negative impressions towards these websites. Therefore, the aim of this paper is to investigate several performance techniques in order to improve the universitys responsive website for mobile devices based on Amazon Web Services. A prototype is developed by using a Bootstrap framework and several principle methods of responsive web design such as viewport, media query, flexible grid and flexible image will also be applied. The prototype is hosted at the Amazon Simple Storage Service and tested by using Viewport Resizer tool and real devices. In order to improve the load time, different performance techniques are implemented to the prototype that include compress images, remove unused CSS, combined files, minification, Gzip, cache and content delivery network. The experiments are tested by using Google PageSpeed Insights and WebPageTest tools. Based on the results obtained, using Google PageSpeed Insights tool, the measured speed score has increased on both mobile and desktop devices. Besides that, the WebPageTest tool also shows that the load time and HTTP requests can be reduced. In a nutshell, the performance techniques can be used to improve the performance of the universitys responsive website and as a result the websites provide a better user experience for mobile users.

SME-ECD Design Framework of Motion-based Game-based Learning and Assessment for Early Childhood Education

Tin Tin Ting, Andrew Khin Huat Tan

Faculty of Applied Sciences and Computing, Tunku Abdul Rahman University College, Kuala Lumpur 53300, Malaysia

Abstract: Motion-based game-based learning has proven to improve cognitive development in educational research. Researchers now are moving from game-based learning into the possibility of game-based assessment. This research aims to propose an academic assessment design which involves both low-level behavioural data (Evidence-Centered Design —ECD) and interpreted behavioural data (Subject-Matter Experts Information Scoring System). Both methods are believed to be able to formatively assess pre-schoolers' achievement on the learning outcomes. The assessment framework is deployed based on a digitized flashcard system used in early childhood education. The integration of motion-based game-based learning and assessment into early childhood education is also discussed.

Keyword: Evidence-Centered Design, flash card system, game-based learning, early childhood education, motion-based game.

Harvesting the Power of Serious Game for IT Education

Mazeyanti M Ariffin,, Wan Fatimah Wan Ahmad, Suziah Sulaiman

Computer & Information Sciences,Universiti Teknologi Petronas,32610 Seri Iskandar, Malaysia

Abstract: This study aimed to investigate the effectiveness of game-based learning in supporting IT education. To attain this objective, the participants academic performance in terms of knowledge change was assessed. This study adopted the True-experimental research design involving 61 participants. Set of pre- and posttest was administered, where descriptive analysis and Independent Sample t—Test were performed to the collected data. The pre- and post-test questions were designed to assess the acquisition of knowledge on computer security principles and malicious threats to organization. The finding from this study suggested that participants who participated in game-based learning outperformed the participants from the control group.

Keyword: Serious game, game-based learning.

Evaluating Accessibility Criteria and Alternatives of Computer Applications for the Blind Using Analytical Hierarchy Process

Manoranjitham Muniandy, Suziah Sulaiman, K.S Savita

Department of Computer and Information Sciences, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak Darul Ridzuan , Malaysia

Abstract: A recent research shows that blind users finding it difficult to cope up with the existing computer applications. This is due to the reason that current computer applications are developed mainly based on designer's view to accommodate the sighted users. The entire designing process becomes even more complex when it deals with the blind users, as visual cues plays no role for them in any situation. Designers depend heavily on the existing design elements such as text, color, audio, animation, graphics, interface layout and touch sensation to design a user friendly application. However, these elements are just briefly described in HCI without the detail of the contribution in designing process. In this paper, a thorough research has been done to evaluate the criteria and the design elements using analytic hierarchy process (AHP) and to identify the role of design elements in overcoming the problems of a blind user when using computer applications.The result shows blind users needs more than just audio in learning computer applications. Touch sensation should be applied together with audio as a mandatory element instead of considering as a complementary element. The empirical finding of this article serves as a guide for computer designers especially the beginners.

Keyword: Accessibility Criteria, Analytic Hierarchical Process, Blind Computer Users, Computer Accessibility, Design Elements.

Gesture Control as Assistive Technology

K.S Savita[1], Anis Alia Mohamad Afifi[2], Manoranjitham Muniandy[3]

[1,2]Computer & Information Sciences Department, Universiti Teknologi Petronas 31750,
Seri Iskandar, Perak, Malaysia
[3]Faculty of Communication and Information Technology, Jalan Universiti, Bandar
Barat, 31900 Kampar, Perak, Malaysia

Abstract: Gesture Control as Assistive Technology offers a great use of current trends technology —designed to detect the humans natural movements. By exploring the use of gestures for children in the classrooms environment, this paper deduced that the more natural and technologically oriented a specified task is, the longer the interest of a child can be kept. This system was put to good use in the classrooms of those who were diagnosed with Learning Difficulties. In current market, there are an abundance of Assistive Technologies that utilizes a touch screen, which limits the input to a 2D plane. Thus, this experiment is done by implementing natural gestures as input for the system and comparing it to mainstream touchscreens used as Assistive Technology in withholding the attention spans of children.

Keyword: Assistive, children, early intervention, gesture, Leap Motion, learning disability.

SESSION 7B
CSE Education and Finance II

Responsive Web Design Trend in Malaysia Public Universities

Teh Shan Shan, Joe Henry Obit, Rayner Alfred, Asni Tahir

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Labuan International Campus, Jalan Sungai Pagar, 87000 Labuan F.T., Malaysia

Abstract: Due to the increased accessibility to the Internet, mobile devices are more widely used compared to desktop computer. Therefore, a compatible website is required in order to serve mobile users better. Responsive web design (RWD) is an approach that is able to provide flexibility for a single website to handle different screen sizes and resolutions of desktops, tablets and smartphones. The aim of this paper is to identify the trend of applying the RWD approach in Malaysia public universities. 20 public universitys websites in Malaysia are assessed and tested by using a Viewport Resizer tool which is an online tool and several actual devices such as desktops, tablets, and smartphones are used to perform the testing. In order to test the degree of responsiveness of the website, every web page is tested page by page to obtain better assessment results. Based on the results of the survey, it clearly indicates that 50% of the universities websites are responsive websites, 10% are semi responsive websites, and 40% are not responsive websites. The survey also indicates that 65% of the universities provide mobile apps for specific services and only 15% of them implement mobile websites instead of responsive websites. In a nutshell, a RWD approach is a viable strategy option that can be served to deliver web contents effectively and efficiently to the mobile users as 60% of the universitys websites are making a move towards responsive website. However, the other 40% of universitys websites are not implemented based on the RWD approach due to the lack of knowledge and research on RWD.

Keyword: Responsive Web Design, Malaysia Public Universities, Web Contents, Mobile Users.

Securing E-Learning Environment:A Study of Security Awareness and Behavior of User

Wan Nurul Safawati Wan Manan, Mazlina Abdul Majid, Hasmanizam Abdul Majid & Mohd Izham Ibrahim

Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300, Gambang, Kuantan Pahang.

Abstract: Rapid development of the Internet and technology has shifted the education environment from traditional classroom environment to a state of the art technology-based environment. The term e-learning describes the situation where teaching and learning activities are done not only in classrooms, but virtually using the Internet. Users of e-learning system can access their course materials, lecture notes, quizzes, exams and discussion rooms through the Internet everywhere and at any time. While the technology makes the access easy, there are issues particularly related to security that need to be concerned. The challenges in securing an e-learning system do not fall on the system itself, or the infrastructure. It is user awareness and behavior that give opportunities to the attackers to compromise the system. Low security awareness leads to poor behavior, which results to system compromise. This paper discusses security awareness and behavior of e-learning users as the main focus to secure the overall e-learning environment. Furthermore, this paper reviews the existing research explaining e-learning environment, security, threats and issues.

Keyword: e-learning; security; awareness; teaching; learning; threats; behavior; perception.

Student Awareness on Social Network Access Control Policy —An Evaluation of Facebook

Nurhayati Binti Zakaria, Suzana Ahmad

Faculty of Computer and Mathematical Sciences, UiTM Shah Alam Selangor

Abstract: Social network has become a popular application among online community especially college students. Online community use social network as a platform for interacting with each other regardless their locations. In social network applications, users can share all types of information as either private or public data. These data and information can easily being manipulated and corrupted for the benefits of certain unethical parties. Initiatives had been made to protect all the shared information, by some social network provider. Access control policy is one of the applicable method to manage accessible information around the user. In this paper, researchers investigate students awareness and knowledge on social network access control policy. In addition, students receptiveness in managing their data and information that they shared via social network are collectively surveyed. The result of this research is based on questionnaire survey from 130 selected users among college students. Questions were based on their activities, understanding and perception towards social network that they used.

Keyword: Access Control Policy, Social Network, Facebook.

Banking Automation with Sustainable Hedging for Information Risks: BASHIR Framework for Private Clouds ₁₆₁₇₈

Shahid Anjum

School of Business, Universiti Teknologi Brunei, Brunei Darussalam

Abstract: Decisions regarding migrating business intelligence applications to private clouds are more complex when it comes to banking industry because of data sensitivities. Business, technological, strategic and service and risk factors are relevant for decisions to migrate business intelligence to private clouds. The use of clouds in businesses is undeniable, thus comparative advantage of each of these factors is important to assess. As banking data is of critical nature and BI application is data centered application, so this can magnify the importance of risks. Combining strengths-weaknesses-opportunities-threats with multi-criteria decision making framework can provides an insight into understanding the benefit-cost-opportunity-value-risk (BCOVR) dimensions of private clouds. This article has provided an assessment for the selection of the optimal business intelligence architects from amongst moving data analysis functionality, mmoving online analytical processing front-end, moving selected extract-transform-load procedures, moving operational business intelligence, on-premises application deployment and idealistic business intelligence private clouds. Such a framework with prime focus on risks has been named as 'business automation with sustainable hedging for information risks' (BASHIR) framework. The results have shown that based on the risk dimensions amongst BCOVR, "idealistic business intelligence private cloud architect" is the most riskier option and "moving online analytical processing front-end architect" is the least riskier option. Moreover out of ten sub-criteria within the risk dimension, risk of privacy gets the heaviest weight followed by risks of access, recovery and permanence.

Keyword: Business Intelligence Architecture, Cloud Computing, Multi Criteria Decision Making, IT Risk Management.

Analyzing the Effect of Top Management Support on Accounting Information System (AIS) Success

Yenni Carolina[1,2] and Azhar Susanto[3]

[1]Accounting Doctoral Program Padjadjaran University-Indonesia
[2]Faculty Economic Maranatha Christian University-Indonesia
[3]Faculty Economic and Business Padjadjaran University-Indonesia

Abstract: An organization needs information systems to maintain their ability to compete. The ability to compete depends on how organizations can take advantage of opportunities they have, and this can be done by utilizing the information that is generated from the information system. Accounting information systems that have been successfully applied will produce quality accounting information. Factors that affect the successful implementation of accounting information systems include the support of top management. This research aims to measure to what extent the effect of top management support has on the successful implementation of accounting information systems. This is a verification and explanatory research. The data used is the primary data from a questionnaire that was distributed to life and general insurance companies in Indonesia. SEM-PLS is used to test the hypothesis. The results showed that top management support does not affect the successful implementation of accounting information systems.

Keyword: Top Management Support, AIS, Accounting Information Systems.

SESSION 8A
Intelligent and Bio-Inspired Computing II

Comparison of Simulated Annealing and Great Deluge Algorithms for University Course Timetabling Problems (UCTP)

18123

Kuan Yik Junn, Joe Henry Obit, Rayner Alfred

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Abstract: This paper presents the metaheuristics approach in solving a real world problem of University Course Timetabling in Universiti Malaysia Sabah Labuan International Campus (UMSLIC), Malaysia. The problem domain in UMSLIC has several constraints which need to be satisfied. Solutions are considered as feasible if the hard constraints are satisfied, while minimizing the cost of soft constraints as much as possible. In this research, the comparison between Simulated Annealing (SA) and Great Deluge (GD) algorithm are proposed in order to determine the scheduling performance in UMSLIC timetabling problem. The results demonstrate that both SA and GD algorithms are able to improve the quality of initial solution but the performance are vary in different datasets which may not perform the best in every domain.

Adaptive Mobile Localization Method for Indoor Navigation

Wahid Abdul, Haiyang Yu, Wenjun Yu, Sumi Kim[1], Jaeho Choi

[1]Seoyeong University, Gwangju, Korea

Dept. of Electronic Engineering, CAIIT, Chonbuk National University, Korea

Abstract: Navigation without GPS is a practical problem in indoor environment. The received signal strength indication known as RSSI can be used to compute the approximate distance and direction between an access point and a user mobile. Three or more multiple APs are normally cooperated to estimate the location of the mobile. However, the RSSI measurements are non-stationary and their mean and variance slowly changes over time and space. The RSSI propagation model derived from such measurements are not reliable. Hence, in this paper, an adaptive system using a neural, fuzzy inference system is introduced to effectively overcome the changes in indoor environment and improve the accuracy of mobile position estimation. The proposed system can reduce the erroneous mapping of the physical distances better than the conventional methods based on RSSI propagation modeling. The results of experiments show that the proposed system scales well in terms of the number of sensor nodes and provides an enhanced localization performance.

Keyword: Adaptive Localization, Navigation, Mobile, Indoor, WLAN, RSSI.

Multi-finger Localization Feedback using Vibrotactile Pattern Stimulation (VPS) for Prosthetic Hand

Yusof Bin Yunus[1], Yewguan Soo[1], Norhashimah Mohd Saad[1], Sani Irwan Md Salim[1], Feng Duan[2]

[1]Faculty of Electronic Engineering and Computer Engineering, Universiti Teknikal Malaysia Melaka, Malaysia
[2]College of Information Technical Science, Nankai University, Tianjin, China

Abstract: Prosthetic technology demanded the integration of haptic feedback. Current myoelectric prostheses do not have a mechanism to deliver any sensory information, making it difficult for amputes to feel connected to their hand. The lack of sensory feedback to provide grasp or slip feedback causes the demand of prosthetic hand decreases among amputes. Vibrotactile stimulation is a simple and safe choice for a non-invasive haptic display that can be easily integrated into current hardware. In this paper, a preliminary experiment is carried out to investigate the accuracy performance of normal vibrotactile pattern stimulation (VPS) for multi-finger localization feedback. Then, three types of VPS were proposed to enhance the accuracy performance of multi-finger localization feedback. Seven unimpaired participants (N=7) performed VPS manipulation by installing vibrotactile stimulation device on non-dominant arm. VPS manipulation outcome measure was accuracy performance. The results indicated that proposed VPS2 with (97±4) % accuracy was statistically significant improve accuracy performance compare to normal VPS with (72±6) % and proposed VPS1 with (66±17) %. These preliminary findings suggest that this approach can be used for slipping detection for prosthetic hand.

Keyword: Vibrotactile Pattern Stimulation, multi-finger localization feedback.

Multi-mode Brainwave Controller

F. Md Yassin, D. Apin, AB. Abd Rahman and A. Alias

Physics with Electronics Programme, Faculty Science and Natural Resources,Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah.

Abstract: Brainwave Computer Interface (BCI) is a system that provides a network of communication between the nervous system of the human brain and technical devices. Through the use of sensor, electrical impulses generated by the human brains activities can be inspected for thought prediction. The raw information can be extracted and programmed so that it can be used to manipulate control system such as on automation. The aim of the project is to develop a multi-mode control system on the wheelchair prototype using single EEG electrode called Mindwave mobile. The control system is programmed based on the attention and signal quality value generated from concentration, eyes blinking and eyebrow movement. The electrode placed on the forehead and transmits the electrical impulses via Bluetooth to a receiver. Results from the test done on five test subjects have shown that users can move the robot to the left, right, forward and backward direction which is programmed based on the attention and signal quality value. The use of non-invasive BCI has a lot of potential in the future. Further work on the project will help to produce an inexpensive automated wheelchair with better control over its movement. This is very useful especially to those who suffer from any physical impairment such as paralysis and stroke.

Keyword: Brainwave, EEG, Brain Computer Interface (BCI), Wheelchair.

An Integration of Unsupervised Approach of Machine Learning in Item Bank Test System

Anbuselvan Sangodiah[1], Charles Ramendran SPR[2]

[1]Faculty of Information Communication & Technology, University Tunku Abdul Rahman, Kampar 31900, Perak Malaysia
[2]Faculty of Business & Finance, University Tunku Abdul Rahman, Kampar 31900, Perak Malaysia

Abstract: Assessment plays a very important role in schools or universities particularly in evaluating cognitive level of learners. And written assessment such as final examination accounts major component of assessment style in universities. It is a common sight that test or past examination papers along with some pre-defined parameters of test items such as time, question type, knowledge point, difficulty level and others are stored in the repository in the item test bank system. Very often, these exam papers are made accessible to learners to facilitate them for preparing final examination. Over time, there can be a lot of exam papers being accumulated for a particular subject and this may not feasible for learners to go through all of them due to time constraint. A better approach is to form groups or clusters of exam papers according to some attributes such as difficulty level and topics covered so that learners could choose limited number of exam paper to attempt from each group instead of all papers. This could eliminate the need for learners to search and attempt some exam papers that have high similarity and instead exposed to different level of difficulty of exam papers between groups. This requires the use of unsupervised machine learning approach particularly clustering technique to cluster past examination papers automatically according to keywords. These keywords may reflect some pertinent information such as difficulty level, topics covered and so forth. In light of this, this work proposes an enhancement to the existing framework of item test bank system by integrating the facility to cluster past examination papers. In the preliminary testing, the results indicate that clustering can be used to cluster exam papers into groups with a reasonable accuracy.

Keyword: Item test bank system, Unsupervised machine learning, clustering, assessment, difficulty level, bloom taxonomy.

Model Simplification for Electrical Impedance Tomography

Renee Ka Yin Chin[1], Gavin Thong Xian Kho[1], Heng Jin Tham[1], Bih Lii Chua[1],
Kenneth Tze Kin Teo[1], Kwan Hoong Ng[2]

[1]Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia.
[2]Department of Biomedical Imaging & University of Malaya Research Imaging Centre,
University of Malaya, Kuala Lumpur, Malaysia.

Abstract: Image reconstruction for Electrical Impedance Tomography (EIT) consists of two main stages: the forward modelling and the inverse solving. The physical model is discretized, typically using the Finite-Element Method (FEM) into tetrahedrals. Ideally, the physical model is discretized as finely as possible for accurate representation. However, the EIT image reconstruction is an ill-posed, underdetermined problem, which makes this impractical. This issue is prevalent when the model is a complex one, which is typically encountered in medical applications, whereby models may consists of minute details that require a large amount of fine tetrahedrals to represent them, and these tetrahedrals do not feature into the region of interest, ultimately. This paper investigates methods to reduce the number of elements with the least compromise to the accuracy of the model. Mathematical methods such as averaging and weighted averaging were employed in an effort to retain as much information from the detailed model as possible. Reconstructed images show that there is benefit in deploying these methods, in comparison with images whereby none of the prior knowledge about the model was incorporated in the forward model. Results also show that images produced using the averaging method are superior to those that uses the weighted averaging method in preserving the prior knowledge of the conductivity values of the imaged space.

Keyword: Electrical Impedance Tomography, Finite Element Method, Imaging Properties.

SESSION 8A
Applications of CSE III

Early Childhood Educational Robotic System (C-Block): A Design Methodology

19066

Muralindran Mariappan, Jong Chia Sing, Manimehala Nadarajan, Choo Chee Wee

Robotics & Intelligent Systems (myRIS) Research Laboratory, Faculty of Engineering, Universiti Malaysia Sabah, 88400, Jalan UMS, Kota Kinabalu, Sabah, Malaysia

Abstract: Critical thinking is important in developing creative and innovative minds. Project-based learning (PBL) curriculum is introduced for students to allow active participation which involves scientific inquiry and application of mathematics in the context of technological designing or problem—solving. Programmable Tangible Blocks Robotic System for Early Childhood Education (C-Block) is proposed as a tool for children aged 4 to 7 to engage in PBL activity. C-Block is a kit which comprises of instruction blocks, programming mat and a mobile robot. This paper is aimed to describe the design methodology of the C—Block kits. The first prototype of the programming mat was fabricated and the results is discussed.

Keyword: C—Block, Early childhood, Educational Robotic System, Block Programming.

The Effectiveness of Ergonomic Practice in Preventing Musculoskeletal Disorder among Asian Construction Workers: Case Study in Kuala Lumpur, Malaysia

Ahmad Shakir Mohd Saudi[1], Razali Abdul Rahman[2], Muaz Mahmud[3], Reezal Ishak[1], Ilyas Syafiq Darul Ridzuan[1], Arvind Balakrishnan[1], Azman Azid[4], Hafizan Juahir[4]

[1]Institute of Medical Science Technology, Universiti Kuala Lumpur, 43600, Kajang Selangor Malaysia

[2]Faculty of Science and Technology, Open University Malaysia, Seksyen 13, 40100 Shah Alam, Selangor, Malaysia

[3]Department of Entrepreneurship, Strategy and Innovation, Lancaster University Management School, Lancaster University, Bailrigg, Lancaster LA1 4YW, United Kingdom

[4]East Coast Environmental Research Institute (ESERI), University Sultan Zainal Abidin, 21300, Kuala Terengganu, Malaysia

Abstract: After a deep investigation on ergonomic practice among Asian specifically in Malaysia, the application of multivariate statistical analysis method discover the musculoskeletal disorder in the study area. This research is intended to determine the impact of right ergonomic practice towards safety, quality of life, and productivity. All factors of musculoskeletal disorder of construction worker in this country affected from wrong concept of ergonomic practice at the workplace being determined in this study where the result from statistical test shows that the correlation coefficient value is >0.7 and with p-value <0.05. This study reveals the importance of knowing and aware of ergonomic practice able to give impact towards working performance and body resistance. These will definitely affect the productivity and quality of work specifically in construction area and give a long term implication towards effected worker.

Keyword: Pearson Correlation test, Musculoskeletal Disorder, Working Performance.

Consensus Process for Coastal Erosion Group Decision Making Problem

Liana Najib[1], Ahmad Termimi Ab Ghani[1], Lazim Abdullah[1], Mohammad Fadhli Ahmad[2]

[1]School of Informatics and Applied Mathematics, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu, Malaysia
[2]School of Ocean Engineering, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu, Malaysia

Abstract: Group decision making with multiplicity of choices is needed to strengthen by the consensus requirement in order to reach high consensus process in group decision making. In this study, an improvise approach is developed using five simple steps involving aggregated approach, normalization technique, distances by similarity measures and decision deviation. Besides, a threshold value is also used to obtain the diagram of the consensus process. Compared to previous studies, this improvises approach of consensus process implement the interval type—2 fuzzy set theory. The feasibility of the consensus approach is demonstrated by investigating the coastal erosion decision problems.

Keyword: Consensus process, Similarity measures, Coastal erosion.

Self Charging Solar Battery For Ground Forward Scatter Radar (FSR) Micro Sensor

Kama Azura Othman and Muhammad Hafizul Ariff Mohd Bardiri

Faculty of Electrical Engineering, Universiti Teknologi MARA, 40450 Shah Alam, Selangor Malaysia

Abstract: This work presents a new design of solar energy powered battery module for ground Forward Scatter Radar (FSR) micro-sensor devices. Ground FSR micro-sensors are used to form radar network for ground target detection and classification. The device is expected to be smaller in size, light in weight and robust for easily adaptive to any environmental terrain. A battery module as a power source for this radar sensor device is designed to guarantee for the radar sensor functioning faultlessly for a longer time period. Self-charging capability is enabled by means of having photovoltaic elements in the newly designed power module to ensure continuous power supply for the micro-sensor devices remotely. The power module is designed and regulated to output voltage level of 6V and expected to power up the radar sensory circuitry for the FSR micro-sensor devices.

Keyword: Forward Scatter Radar, Sensor, Battery.

A Comparison of Muscular Activity among European, Korea and Malaysian During Seating Using Musculoskeletal Computational Analysis Method

Noor.N.S.M[1], Ghazalli.Z[1], M.R.M. Rejab[1], F.A. Fauzi[1], Mamat.R[1], Kadirgama.K[1], Sani.M.S.M[2], Ahmad.Z[1], Johari.N.H[1]

[1]Faculty of Mechanical Engineering, University Malaysia Pahang, 26600 Pekan, Pahang, Malaysia
[2]Automotive Engineering Centre, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

Abstract: Sitting is the most common posture in any industry field either in office work, manufacturing or even automotive. Sit for a long time lead to musculoskeletal disorder which causes muscle fatigue. However, different size of people will have a different level of muscle activation. The objective of this paper is to analyse and compare the muscle activation during sitting among European, Korean, and Malaysian. The human size employed for this study is by 95th percentile male. The AnyBody Modelling Software is used to simulate and analyse the human muscle activity of the seating posture of these respective countries. Our finding showed that the trunk of the human body has the highest muscle activity. The Malaysian anthropometry showed the highest muscle activity in sitting posture; followed by Korean and European.

Keyword: Human modelling, AnyBody Modelling Software, Sitting, Muscle Activity.

A Comparative Study of Pitch Detection Algorithms for Microcontroller based Voice Pitch Detector

Nuraina Suryani binti Ruslan[2], Mazlina Mamat[1,2], Rosalyn R. Porle[2],
Norfarariyanti Parimon[2]

[1]Artificial Intelligence Research Unit (AIRU)
[2]Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia

Abstract: This paper presents a study to compare the performance of two pitch detection algorithms namely the Autocorrelation Function and the Cepstrum Analysis to select the suitable algorithm that can be developed into a standalone voice pitch detector. The two algorithms were chosen due to their uncomplicatedness to be realized in a microcontroller. The performance of both algorithms was analyzed using 288 speech samples recorded from 24 students in quiet and noisy environments. Results showed that both algorithms produced comparable pitch values and were able to determine the pitch of the speech signals correctly. However in terms of complexity and computational processing time, the Autocorrelation Function performed better than the Cepstrum Analysis.

Keyword: Pitch Detection Algorithm, Autocorrelation Function, Cepstrum Analysis.

On The Minimum Slicing Problem

Liawas Barukang

FRICS Labs, Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Abstract: Given an arbitrary rigid object enclosed by another arbitrary rigid object and the inner object could not be seen from outside the outer object, the minimum slicing problem is to find the smallest numbers of slices that has to be made across the object before the longest length between two points of the inner object is found. General, trivial solution to this problem is by brute-force method of infinite slice. Non-trivial solution is via Sylow's Geometric Group Theorem.

Keyword: LB Slicing Problem, Sylow's Theorem, Group Theory.

SESSION 9
Applications of CSE III

A PSO Inspired Asynchronous Cooperative Distributed Hyper-heuristic for Course Timetabling Problems

18018

Joe Henry Obit, Rayner Alfred, Mansour Hassani Abdalla

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Abstract: This paper presents a novel approach for asynchronous cooperative hyper-heuristic incorporated with particle swarm optimisation which inspired by social individual behaviour of swarm intelligence, like bird flocking and fish schooling. The proposed hyper-heuristic algorithm starts with a complete solution and tries to improve the soft constraints, whilst always remaining in the feasible region of the search space. The performances of the proposed cooperative hyper-heuristics are evaluated using the standard course timetabling benchmark problem. From the experimental results, it shows that the proposed Asynchronous Cooperative Distribute Low-level heuristics (ACDLLHs) algorithm is able to find new best solutions for all five medium problem instances and shared optimal solutions for all five small instances. When coupled with two, four and six agents, the Asynchronous Cooperative Distributed Hyper-heuristic (ACDHH) algorithm is able to improve the solution quality for a large instance.

Keyword: Timetabling, Hyper-heuristic, Metaheuristic, Multi-agent, Asynchronous Cooperative Search.

Performance Comparison of Linear and Non-linear Great Deluge algorithms in Solving University Course Timetabling Problems

18020

Joe Henry Obit, Kuan Yik Junn, Rayner Alfred

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Labuan International Campus, Jalan Sungai Pagar, 87000 Labuan F.T., Malaysia

Abstract: Different institutions may have their own requirements in course timetabling for every semester and thus it is difficult to produce a general methodology to solve all the problems in every institution. This research compares both linear and non-linear Great Deluge (GD) algorithms in solving university course timetabling problem (UCTP) and the sample dataset is obtained from the Universiti Malaysia Sabah, Labuan International Campus (UMSLIC), Malaysia. In this paper, the violation of soft constraints is minimized and the performances of both linear and non-linear GD are compared. This research does not focus on hard constraints involved as the initial solution is solved based on Constraint Programming algorithm. The GD algorithm is tested over three benchmark datasets: testing dataset; semester 2 session 2014/2015 test set; semester 1 session 2015/2016 test set. Based on the experiments results obtained, it shows that linear GD is able to produce better solutions in one of the datasets and the same applies to non-linear GD. Hence, it can be deduced that these results able to satisfy the "No Free Lunch (NFL)" theorem, where existing optimization algorithms might not be able to perform well in all datasets. The reason may be due to the constraints involved varied for each dataset as the optimization problems solved by any algorithms are uniformed in relation to the NFL theorems.

Keyword: Great Deluge, University Course Timetabling, Linear, Non-Linear, Hard Constraints, Soft Constraints.

Block Matching Algorithm (BMA) of the Hybrid Adaptive Rood Pattern Search (ARPS) Based on its Motion Speed 18099

Faizul Hadi Jamil, Ali Chekima, Farrah Wong Hock Tze, Rosalyn R. Porle, Razak Ali Lee, Ismail Saad

Faculty of Engineering, Universiti Malaysia Sabah (UMS), Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia

Abstract: There are several numbers famous proposed Block Matching Algorithm (BMA) in video coding technique and among it, the ARPS is a well known BMA technique that produce lower computational complexity and higher quality of the encoded video at the same time. In general, a video will has a lot of temporal redundancy among its neighborhood frames especially for a low motion video which make encoding a low motion video with smaller MB and bigger p size seemed impractical and vice versa. In this paper, the hybrid version of ARPS technique is used depending on its motion video type either low, medium, or high motion video. Basically this hybrid model works by setting the Macro Block (MB) and Search Range Size, p according to the motion type. Low motion video will be use higher size of MB and smaller size of p, medium motion has medium size of MB and p, and high or fast motion video will use smaller MB and bigger p size. The experimental result shows that by using the hybrid BMA technique, it can produce a better quality of the constructed frame and also it achieve less computational complexity at the same time.

Keyword: Video Coding, Block Matching Algorithm (BMA), Adaptive Rood Pattern Search, motion vector, motion estimation.

Deep CNN Object Features for Improved Action Recognition in Low Quality Videos

Saimunur Rahman, John See, Chiung Ching Ho

Centre for Visual Computing and Informatics, Faculty of Computing and Informatics, Multimedia University, Cyberjaya 63100, Malaysia

Abstract: Human action recognition from low quality video remains a challenging task for the action recognition community. Recent state-of-the-art methods such as space-time interest point (STIP) uses shape and motion features for characterization of action. However, STIP features are over–reliant on video quality and lack robust object semantics. This paper harness the robustness of deeply learned object features from off–the–shelf convolutional neural network (CNN) models to improve action recognition under low quality conditions. A two–channel framework that aggregates shape and motion features extracted using STIP detector, and frame–level object features obtained from the final few layers (i.e. FC6, FC7, softmax layer) of a state–of–the–art image–trained CNN model is proposed. Experimental results on low quality versions of two publicly available datasets (e.g., UCF–11 and HMDB51), showed that the use of CNN object features together with conventional shape and motion can greatly improve the performance of action recognition in low quality videos.

A Hybrid Artificial Intelligence Algorithm to Determine the Speed and Position in Multi Operation Mode Sensorless Brushed D.C. Motor

Brendan Khoo, Choo Chee Wee, Muralindran Mariappan and Ismail Saad

Artificial Intelligence Research Unit (AiRU), Faculty of Engineering, Universiti Malaysia Sabah, 88400, Jalan UMS, Kota Kinabalu, Sabah, Malaysia

Abstract: Brushed direct current motor (BDCM) is an internal self-commutated electric motor which runs on direct current power source that are found in industrial and commercial applications. Traditional external BDCM sensors like hall-effect and optical encoders are too fragile, costly and complex for some applications. Thus, two classes of sensorless BDCM speed estimation techniques are used: back electromotive force (BEMF) and ripple current sensing. Ripple current sensing method offers better accuracy by giving fixed discrete pulses for counting. However, it is overlaid with noises that are hard to filter. Many methods are devised for converting ripple current to pulses: comparator-filter, adaptive filter, predictive sensing and pattern recognition. These methods highlight only BDCM operations at near operating speed and neglect other common BDCM operating modes such as braking and coasting. This research will address all the issues which are crucial in real life applications where exact position and speed in all modes effect the accuracy of a system.

Keyword: Brushed Motor, DC Motor, Sensorless.

A Fuzzy Proportional-Derivative (PD) Algorithm for Programmable Logic Controller (PLC)

Renann G. Baldovino, Elmer P. Dadios

Manufacturing Engineering and Management Department, Gokongwei College of Engineering, De La Salle University, 2401 Taft Avenue, 0922 Manila, Philippines

Abstract: Fuzzy logic, introduced in 1965 by Dr. Lotfi A. Zadeh, became popular and useful in many control and intelligence system applications. This type of control is strongly based on the concepts of fuzzy sets, linguistic variables and approximate reasoning. On the other hand, programmable logic controllers, or PLCs, are types of digital controller used mainly in industrial processes and machine automations. These controllers are more reliable, flexible and robust compared with conventional relay-based control systems. The introduction of fuzzy logic to PLC will greatly improve the capability of the system to produce intelligent and reasoned decisions. With that, this study presents the design and implementation of fuzzy logic-based expert system in a PLC hardware. Proportional-derivative (PD) control is the type of control system used for fuzzy logic. The fuzzifier includes two inputs: error and rate of error. The testing and evaluation of the fuzzy algorithm were conducted before actual runs through offline simulation. Thus, saving valuable time in fault detection, debugging and troubleshooting.

Keyword: Function block diagram, Fuzzy logic, Programmable logic controller, Proportional-derivative control.

A Fuzzy-Based Pulse-Width Modulation (PWM) Control for Low Speed Autonomous Emergency Braking (AEB) System: A Mini-Fuzzy Associative Matrix (FAM) Approach

Renann G. Baldovino, Aira Patrice R. Ong, Paul Dominick E. Baniqued, Elmer P. Dadios

Manufacturing Engineering and Management Department, Gokongwei College of Engineering, De La Salle University, 2401 Taft Avenue, 0922 Manila, Philippines

Abstract: Autonomous emergency braking (AEB) system is a vehicle safety technology used in preventing or avoiding vehicles from crash or mitigate the impact brought by crash. This system can be used to apply brakes independently of the driver if the situation becomes problematic. In this study, an intelligent based AEB control algorithm was developed using fuzzy-based pulse-width modulation (PWM) technique.'Mini' fuzzy associative matrix (FAM) table algorithm was introduced to reduce the number of computational rules. For the feedback system, an ultrasonic sensor was used to monitor and detect the distance of a certain obstacle. Moreover, the PWM output were applied to the DC motor for the main actuation and the LED light, together with the buzzer for the activation of the alarm system.

Keyword: Computer simulation, Emergency brake, Fuzzy logic, Motor control, Pulse-width modulation (PWM).

Shake Table System: A Review on the Different Mechanical Designs and Control Models

Renann G. Baldovino, Elmer P. Dadios

Manufacturing Engineering and Management Department, Gokongwei College of Engineering, De La Salle University, 2401 Taft Avenue, 0922 Manila, Philippines

Abstract: Shake tables or earthquake simulators are used extensively in seismic research especially in structural testing. They are used in verifying the earthquake performance by simulating the motions of earth ground. A typical shake table consists of the mechanical structure, the type of actuator to be used and the design of control system. In this paper, previous works in the design of shake table systems are studied. Moreover, the use of different control applications were also discussed to understand the model and dynamic complexity behind shake table systems.

Keyword: Control system, Earthquake simulator, Degree-of-freedom (DOF), Shake table.

SESSION 10
Intelligent and Bio-Inspired Computing III

Image Processing-based Handwriting Recognition for Automated Form Processing

Ellysha Astin Anak Sirai, Farrah Wong, Ali Chekima and Lim Pei Yi

Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Abstract: Processing forms need a substantial amount of work and time, especially when the human resource is lacking to store it manually into the system. A method is proposed in this study to develop the handwriting recognition for automated form processing. Handwriting of uppercase and lowercase letters, together with numbers from 0 to 9 are collected using Form A, a form designed for it. The handwriting on the form will be pre-processed using image processing techniques and binary sub-images of the handwriting should be obtained. Letters and numbers are kept as templates in MAT file. Form B is a form designed based on the Universiti Malaysia Sabah (UMS) Course Registration Form to be filled in and compared with the template. Form B will undergo the same processes as Form A to get the same format as the final output of Form B. For the evaluation of recognition rate, normxcorr2 function of Matlab is used. The applicants information is extracted to undergo a series of more steps. These individual numbers and letters will be compared with the template to obtain the result in text form. Graphical User Interface (GUI) in Matlab is used to present the system. The result of the post processing is the handwriting which is displayed in text form in a Notepad file and the applicants information is stored in a Microsoft Excel file.

Keyword: Handwriting Recognition, Automated Form Processing, Image Processing Techniques.

Text Line Segmentation of Al-Quran Pages Using Binary Representation

Laith Bany Melhem[1], Mohd Sanusi Azmi[1], Azah Kamilah Muda[1], Nazieh Jamil Bani-Melhim[2], Mohammed Alweshah[3]

[1]Faculty of Information and Communication Technology (FTMK), Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia
[2]Bait Eedess Elementary Boys School, Irbid, Jordan
[3]Albalqa Applied University, Alsalt, Jordan

Abstract: One of the early tasks in a handwriting recognition system is the segmentation of a handwritten document that is imaged into text lines, which is the process of defining the region of every text line on a documents image. In this paper, the focus is in the text-line segmentation of mushaf holy Quran. Thus, Segmentation of the mushaf holy Quran is based on the processes of segmenting the Arabic/Jawi handwritten texts. Any incorrect segmentation will affect the holiness of the Quran. In this study, a novel algorithm was proposed for detecting the text line on the Quran pages. The research aim is to segment the Quran pages to text line images without any changes on the content. Firstly, pre-processing that was applied includes binarization. Then, the Quran pages were segmented to the text line. The experimental results on several of the Quran pages from different Al-Quran styles demonstrate the effectiveness of the proposed technique.

Crawling Social Media to Create Morphological Resource of Under-resourced Language: Melanau language

Suhaila Saee[1,2], Ranaivo-Malanon Bali[2], Lay-Ki Soon[1], Tek-Yong Lim[1]

[1]Faculty of Computing and Informatics, Multimedia University, Persiaran Multimedia,
63100 Cyberjaya, Selangor, Malaysia
[2]Department of Information System, Faculty of Computer Science & Information
Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Abstract: To build a morphological analyser for under-resourced language, a creation of morphological resource is required. With a limitation of morphological resource in digital format, a digitisation process, which is time-consuming and a tedious task, is used to create the resources. An objective of this work is to develop new steps in creating the morphological resources from social media. The steps comprise of crawling of the blogs and tweets. A limited list of words of the under-resourced language was used to reduce the number of crawled web pages. Then, the crawled pages and tweets were normalised. This step cleaned and transformed the crawled data with informal and noisy nature into a cleaned wordlist for the next process, which is dictionary lookup validation. Lastly, the validation of wordlist was carried out due to languages mixing that caused uncertainty of spelling standard. At this stage, edit distance algorithms, namely, Jaro-Winkler is applied to determine an accuracy of the spelling standard by comparing with the dictionary. The findings suggest that the availability of huge amount of dictionary word entries could improve the accuracy of the poor results. It is recommended that the developed steps can assist other researchers to create validated morphological resources or even language resources for the under-resourced languages.

Keyword: morphological resource, under-resourced language, social media.

Segmenting Masses in Ultrasound Images by using Seed Based Region Growing and Mathematical Morphology

Aminah Abdul Malek, Wan Eny Zarina Wan Abdul Rahman, Mea Haslina Mohd Haris, Ummu Mardhiah Abdul Jalil

Faculty of Computer and Mathematical Science, University Teknology MARA, Malaysia

Abstract: Ultrasound screening is one of the imaging modalities that can be used in early detection of breast cancer. However, most of the ultrasound images produced artifacts such as attenuation, speckle, shadows, and signal dropout. These artifacts can cause missing boundaries due to the orientation dependence of acquisition. Moreover, the difficulty also occurs as the contrast is frequently low between foreground (areas of interest) and background. Hence, it can give difficulties for a radiologist in interpreting the important information from the image. In order to overcome these problems, a good segmentation technique is required. In this study, Seed Based Region Growing (SBRG) is used as the segmentation method in identifying masses in ultrasound images. The result from SBRG method is enhanced by using Mathematical Morphology technique during post-processing phase to obtain a smooth shape and a clear boundary of masses. Mathematical Morphology involves a theory for the analysis of shape and spatial structures. These methods are tested on 30 ultrasound images confirmed by a radiologist to contain masses. The average percentage area between the methods and the actual area traced by the radiologist is then computed. Experimental results show that the methods have segmented the masses with a percentage difference of 8.46%. This implies that the methods have successfully segmented the masses of ultrasound images with an accuracy of 91.54%.

Keyword: Segmentation, Seed Based Region Growing, Mathematical Morphology, Masses.

Measuring Usability of Phonic Mobile Applications based on User Success Rate for Pre-School Children

Carolyne Alphonsus Tommy[1], Jacey-Lynn Minoi[2]

[1]Institute of Social Informatics and Technological Innovations, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia
[2]Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Abstract: Recent studies showed that mobile devices have the potential to support childrens learning and have increased the interest of parents and educators. However, it is important that mobile applications for children are well-designed and usable to ensure the applications are effective for children learning. This study aims to look at the usability of mobile applications designed for pre-school children especially children with speech delay. We have conducted an experiment with 10 pre-school children with speech delay and eleven of ABC and phonics mobile applications were selected based on the prior studied guidelines. During the usability testing, childrens behaviour and facial expression while playing mobile applications were observed and recorded. The collected data was measured using usability measurement by analysing users success rate. Based on the result and analysis, children have showed positive expression towards the well-designed with good usability mobile application.

Keyword: mobile applications, usability, design guidelines, children

---

Improved Boosting Algorithms by Pre-Pruning and Associative Rule Mining on Decision Trees for predicting Obstructive Sleep Apnea

Doreen Ting Ying Sim[1], Chee Siong Teh[1], Ahmad Izuanudding Ismail[2]

[1]Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak, Kuching, Sarawak, Malaysia

[2]Respiratory Medicine Unit, Department of Respiratory Medicine, UiTM Medical Specialist Centre, Faculty of Medicine, Universiti Teknologi MARA, Selangor, Malaysia

Abstract: An improved Boosting algorithm, named as Boosted PARM-DT, was developed by pre-pruning techniques and Associative Rule Mining (ARM) on decision trees built from the clinical datasets** collected for Obstructive Sleep Apnea (OSA). The Pruned-Associative-Rule-Mined Decision Trees (PARM-DT) developed by adopting pre-pruning techniques on tree depth, minimum leaf and/or parent node size observations and maximum number of tree splits, based on Apriori and/or Adaptive Apriori (AA) frameworks, is boosted to achieve better predictive accuracies. The improved algorithms were implemented in OSA dataset and UCI online databases for comparisons. Better predictive accuracies were achieved in all the applied datasets/databases when comparing the classical algorithm, i.e. Boosted DT, with the improved one, i.e. Boosted PARM-DT.

Multi-View Video plus Depth with Saliency Map Protection

Norul Uyuun Mohd Noor[1], Hezerul Abdul Karim[1], Nor Azhar Mohd Arif[1], Mohd Haris Lye Abdullah[1], Aduwati Sali[2], Mohammad Faizal Ahmad Fauzi[1]

[1]Faculty of Engineering, Multimedia University, 63000 Cyberjaya, Selangor, Malaysia
[2]Department of Computer and Communication Systems, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

Abstract: Saliency is the term used to represent regions that are of high interest according to the human visual system (HVS). There are many saliency models available, however very few focuses on the information of saliency based on depth video sequences. This paper proposed the usage of the saliency depth based video (SDV) in erroneous multi-view video transmission to observe the quality of salient regions by combining selected saliency maps and adding the selected saliency maps with depth video sequences. The previously proposed SDV is used with multi-view video plus depth (MVD) and compressed using High Efficiency Video Coding (HEVC) compression method. The SDV is then tested in erroneous environment to observe the quality of salient regions. Based on the outcomes observed in the objective and subjective evaluations, the proposed SDV showed an average of 7% to 15% of incremental in terms of video quality rendered from virtual videos compared to virtual videos without the aid of the proposed SDV.

Keyword: Saliency, Multi-View Video plus Depth, High Efficiency Video Coding, Erroneous Video Transmission.

A Constraint Programming Approach to Solving University Course Timetabling Problem (UCTP)

Kuan Yik Junn, Joe Henry Obit, Rayner Alfred

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Sabah, Malaysia

Abstract: This paper presents the implementation of Constraint Programming in UCTP with special requirement based on the requirement given by Academic Service Divison of UMSLIC, with various forms of constraint which needed to be satisfied in order to obtain a feasible solution for the real-world course timetabling problem obtained from the Universiti Malaysia Sabah Labuan International Campus (UMSLIC), Malaysia. The problem domains in UMSLIC have several constraints that need to be satisfied. Solutions are feasible if all the hard constraints are satisfied. This research does not take into account the soft constraints involved in the domains. The Constraint Programming approach algorithm is tested over three real world datasets: testing dataset; semester 2 session 2014/2015 dataset; semester 1 session 2015/2016 dataset. The result shows that the algorithm studied in this research is able to produce feasible solution within short period of time without violating any hard constraints, which is applicable towards the UCTP in UMSLIC.

Keyword: Constraint Programming, University Course Timetabling.

SESSION 11
Modelling and Simulations II

When Requirement Engineering Meets Computational Science Modelling and Simulation

WaiShiang Cheah[1], Shane Nissom[1], Jane Labadin[1], Nurfauza Jali[1], HuiKeng Lau[2]

[1]Faculty of Computer Science & IT, Unimas, Kota Samarahan, Sarawak, Malaysia
[2]Faculty of Computing and Informatics, Universiti Malaysia Sabah, Malaysia

Abstract: Methods such as interview and natural language description are useful to understand a problem and user needs for software development. Can requirement engineering is used when engineering a computational science software? This paper investigates on the adoption of agent-oriented requirement engineering for CSE software. This work adopts and extends an agent-oriented requirement engineering for Computational Science and Engineering (CSE) software development. The work evaluates a proposed approach under a case study of an epidemiology modelling, malaria model. This research has shown that the proposed approach can transform and reuse a malaria model into a software context for further application development like NetLogo, or rule-based system. The contribution of this paper is introduced software engineering for CSE software. Also, it bridges the gaps between a software engineer and computational science and mathematical researchers.

Keyword: Computational model, agent-oriented modelling, and simulation, NetLogo, requirement engineering.

When Requirement Engineering Meets Computational Science Modelling and Simulation

WaiShiang Cheah[1], Shane Nissom[1], Jane Labadin[1], Nurfauza Jali[1], HuiKeng Lau[2]

[1]Faculty of Computer Science & IT, Unimas, Kota Samarahan, Sarawak, Malaysia
[2]Faculty of Computing and Informatics, Universiti Malaysia Sabah, Malaysia

Abstract: Methods such as interview and natural language description are useful to understand a problem and user needs for software development. Can requirement engineering is used when engineering a computational science software? This paper investigates on the adoption of agent-oriented requirement engineering for CSE software. This work adopts and extends an agent-oriented requirement engineering for Computational Science and Engineering (CSE) software development. The work evaluates a proposed approach under a case study of an epidemiology modelling, malaria model. This research has shown that the proposed approach can transform and reuse a malaria model into a software context for further application development like NetLogo, or rule-based system. The contribution of this paper is introduced software engineering for CSE software. Also, it bridges the gaps between a software engineer and computational science and mathematical researchers.

Keyword: Computational model, agent-oriented modelling, and simulation, NetLogo, requirement engineering.

An Improved Order-Statistical Filter For InSAR Phase Estimation

Lee Sui Ping, Chan Yee Kit, Lim Tien Sze, Koo Voon Chet

Faculty of Engineering and Technology, Multimedia University, Jalan Ayer Keroh Lama
75450 Melaka, Malaysia

Abstract: The task of interferometry phase extraction has been investigated for more than 30 years to reconstruct true phase value from noisy observation. However, it still remains as a typical difficult inverse problem. InSAR observed value is not only ambiguous by its mathematical-ill wrapped pose, but also induced by spatial under sampling issues in areas of phase discontinuities. In addition, phase information is further degraded by inevitable noises. In this letter, an improved order-statistical filter is proposed for InSAR phase estimation. First, a coherence map is generated. Then, proposed order-statistical filter performed its noise filtering based on the coherence map. The filtering rate and its local window size is varying due to coherency: larger window size and more filtering for high coherency area while smaller window size and less filtering for low coherency area. This letter suggests a scheme to associate such filter with Itoh-based phase-unwrapping for principal phase reconstruction. After phase unwrapping, iterative averaging filter is employed for image smoothing purpose. Proposed method is validated by two inteferometric data sets include simulated artificial data and Longs Peak mountainous data. This method is compared with two other common used denoising filters include Wiener filter and Median filter. Achieved result shows that proposed filter outperform other filters in noise reduction and edge preservation.

Keyword: Interferometric phase estimation, phase noise filter, InSAR, denoising, singular point restoration.

An Architecture for Providing Context-aware Security as a Service in Mobile Cloud Computing Environments

Muaamar Amer Alkubati, Syed Ahmad Aljunid, Normaly Kamal Ismail

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450
Shah Alam, Selangor, Malaysia

Abstract: Security and privacy issues are becoming more important and relevant in todays Mobile Cloud Computing environments, particularly to enterprises users, who are using the cloud-powered mobile devices to help them carry out their daily tasks. The security and privacy issues for these users and devices have become among the top issues that enterprises face especially with the emerging trends such as Bring Your Own Device (BYOD), whereby users are allowed to bring their preferred mobile devices to work. Such environments tend to be heterogeneous, dynamic and fast changing; raising a lot of challenges for enterprises to keep their devices and confidential data protected. This concept paper proposes a security architecture whereby the context awareness features of mobile devices and the flexibility and scalability of cloud computing are utilized to provide a novel scheme for providing Context-aware Security as a Service (CA-SecaaS) to enhance the security of MCC. Using CA-SecaaS (currently under a pilot study for a commercial enterprise), enterprises and developers will be able to enhance their applications with context-aware security features with minimum time, cost and effort by offloading the context-aware security decisions to the cloud.

Keyword: MCC Security, Context-aware Security, Security as a service, Mobile Cloud, Context-aware Security as a Service.

Retail Membership Model with Network Switch

A. G. Ateq Mezral, L. Muhamad Safiih

School of Informatics and Applied Mathematics, Universiti Malaysia Terengganu, 21030
Kuala Terengganu, Terengganu, Malaysia

Abstract: In order to retain customer loyalty and control their purchasing behaviour through retail membership, the programs provider only allowing members to redeem their points at their retail chain. Thus, this study proposes a new retail membership model that could be used as 'money' outside the program provider's chain. The existing membership model and the proposed model are compared based on their modus operandi through two phases of goal programming. This study shows that the proposed membership model could give a better and consistent solution compared to the existing membership model. In addition, it is a step towards retail membership opportunity as a means of payment.

Keyword: Retail Membership, Network Switch, Goal Programming, Means of Payment.

Three-element Control System Manipulation in Steam Generation for Palm Oil Industry

I.M.Chew[1,2], F. Wong[2], A. Bono[2] and K. I. Wong[1]

[1]Faculty of Engineering, Curtin University Sarawak Campus, CDT 250, Miri 98009, Sarawak, Malaysia.
[2]Faculty of Engineering, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia.

Abstract: This paper presents the performance flow control of feedwater inflow to the boiler drum in respond to the changes of steam load at the outlet of boiler drum. The changes of load consequences swell and shrink effect, which drastically reduces the efficiency of boiling process besides endangers the boiler facility. PID controller is proposed for controlling consistency of feedwater inflow for stability of water level in the boiler drum. In this paper, Process Control Simulator is used to justify the controller performance resulted from applied control actions. At first, open loop test is conducted for developing FOPDT model of the process. This is followed by calculating the correlation PID values with formulas from Cohen-Coon method. The optimized system performance is achieved through PID refined tuning that produces non-oscillating output response in restoring process variable towards setpoint value. Overall, the experimental test provides insight for justifying the trends of controller action upon various steam loads that has been measured in the real operation of boiler.

Keyword: Boiler drum, PID control, Process identification, setpoint tracking analysis, disturbance rejection performance.

A Case Study of Agile Development Model in Malaysia Industry Practice

Kheng Jin Leow, Xin Ni Lim, Pan Tong Lim, Tin Tin Ting, Seah Fang Lee

Faculty of Applied Sciences and Computing, Tunku Abdul Rahman University College, Kuala Lumpur 53300, Malaysia

Abstract: Since decades ago, software development has been very popular especially when most organizations are demanding customized software to adapt to their business environment. Software development process thus keeps evolving to satisfy the needs and demands of the business. Agile Development Model has aroused as one of the popular models among researcher and industry. This study aims to look into Malaysia industry Agile practice in software development. It is found that Agile methodologies are adapted and modified according to the changes of business and organization environments. This finding provides a guideline for any future Agile practitioners.

Adaptiation Gear and Pinion Formulation to Produce Epicycloid Graphic Simulation for Food Printing

M.K.Wan Ibrahim, Azali Saudi, Mohd Adnan Mohd Salleh

Faculty of Engineering, Universiti Malaysia Sabah, 88400 Kota Kinabalu Sabah

Abstract: The food printing done by manual requires skill, especially to form a pattern or writing on food surfaces. For a large scale, this process could increase the cost of manpower. Design process become more faster by computer simulation instead of attempt real parts into the prototype. Therefore a software has been developed to visualize the output. The work modified the classical mathematic equation by substituting dynamic parameters in relation with gear size and speed. Epicycloid patterns generated through different combinations of 2 spur gears are modelled in mathematical expression and simulated graphically through a programming software. The epicycloid simulated patterns are then analyzed and categorized based on conditions, similar features and intricate patterns. It was found that slight difference in gear ratio is contributed significant change in the pattern. A unique pattern is selected due to its unique characteristic based on its economy, fuzziness and aesthetical characteristics.

Keyword: Epicycloid, Gear ratio, food printing.

SESSION 12A
Algorithms and Softwares

Imputation of Missing Rainfall Data using Revised Normal Ratio Method

Siti Nur Zahrah Amin Burhanuddin, Sayang Mohd Deni, Norazan Mohamed Ramli

Center for Statistics and Decision Science Studies, Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

Abstract: Accurate estimation values are very necessary in imputation of missing rainfall data to provide precise information on meteorological characteristics. Therefore, a modification of the old normal ratio method by adapting trimmed mean and geometric median is proposed to produce more accurate estimation results. The performances for each of the methods were assessed at six different levels of missingness and three levels of outliers. The results indicated that the modified methods improved the estimates based on several performance criteria. The modified normal ratio based on geometric median was found to be the best method in imputing missing rainfall values at all levels of missingness and outliers. The verification results indicated that the dataset imputed by this method successfully fits to a lognormal distribution. Generally, the proposed methods are highly recommended to be applied as an alternative method in imputation of missing values, particularly in the existence of outliers in the dataset.

Keyword: Missing rainfall data, Outliers, Imputation, Distribution, Normal ratio.

Stagnation-point flow past a permeable stretching/shrinking sheet

Nor Ain Azeany Mohd Nasir[1,2], Anuar Ishak[2], Ioan Pop[3]

[1]Department of Mathematics, Centre for Defence Foundation Studies, Universiti Pertahanan Nasional Malaysia, Kem Sungai Besi, 57000 Kuala Lumpur, Malaysia
[2]School of Mathematical Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia
[3]Department of Mathematics, Babe-Bolyai University, 400084 Cluj-Napoca, Romania

Abstract: The stagnation-point flow past a permeable stretching/shrinking sheet is studied. The governing partial differential equations are transformed into a system of ordinary differential equations which are then solved numerically using MATLAB built in problem solver bvp4c. Numerical results are obtained for various values of the suction/injection parameter S and the stretching/shrinking parameter λ, while the Prandtl number is fixed at Pr = 1. Both stretching and shrinking cases are considered. It is found that dual solutions exist for the shrinking sheet, while the solution is unique for the stretching case.

Keyword: Dual solutions, heat transfer, shrinking sheet, bvp4c.

Programmable MBIST with High Flexibility Control

Nor Azura Zakaria[1], Lee Weng Fook[2]

[1]Integrated Circuit Development Department, MIMOS Berhad, Technology Park
Malaysia, Bukit Jalil, 57000 Kuala Lumpur, Malaysia
[2]Emerald System Sdn Bhd, Pulau Pinang, Malaysia

Abstract: There have been some development to achieve programmable Memory Built In Self-Test (MBIST) which allow for programmability, however even these are inflexible as they cannot be used to test different memory sizes and different memory data bus width. The programmability of choosing different operation is limited because the programmability is in the form of microcode or instruction based testing. This means that some form of software have to be written to represent the microcode or the instructions to achieve the mentioned memory test operation. With these limitations, this design elaborates a method that allows complete programmability on the fly by allowing different memory sizes, different memory data bus width and 6 different memory test operations to be chosen to test a memory device either single port or dual port Static Random Access Memory (SRAM) memories.

Keyword: Flexibility Control, Programmable MBIST, Architecture.

Analysis of Behavioral Intention of Mobile Application Usage using Partial Least Squares Modelling Tool

Geoffrey Harvey Tanakinjal[1], Stephen Liason Sondoh Jr[2], Ming Fook Lim[2], Bonaventure Boniface[3], Ryan Macdonel Andrias[4], Mary Monica Joiny[1], Daria Gom[1] and Rayner Alfred[4]

[1]Labuan Facutly of International Finance, UMS Labuan International Campus, Jalan Sungai Pagar, 87000, W.P. Labuan
[2]Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah
[3]Faculty Faculty of Sustainable Agriculture, Universiti Malaysia Sabah, Sandakan Campus, 90000 Sandakan, Sabah, Malaysia
[4]Faculty of Informatics Science, Universiti Malaysia Sabah, Labuan International Campus, Jalan Sungai Pagar 87000, W.P. Labuan

Abstract: Mobile phone is considered as the most extensive technology created by human and can be seen as one with the highest adoption rates among technology in the modern history. This study focuses on identifying the influencing factors towards the intention to use mobile applications (m-application) to promote local handicraft in Sabah. A total of 200 questionnaires were distributed but only 123 were returned and used for this paper. Data was analysed using the SmartPLS 2.0 tool. Out of the eight independent variables (compatibility, cost, credibility, ease of use, financial, risk, self-efficacy and usefulness) tested in this research towards intention to use mobile marketing, only four indicated a significant relationship namely compatibility, credibility, ease of use and self-efficacy. The most important determinants for behavioral intention to use mobile application is self-efficacy and mobile service providers must take into consideration about handicraft operators self-efficacy if they want the handicraft industry to adopt mobile service as their main business platform.

Keyword: Mobile marketing, Intention to use, Handicraft Industry.

Development of Drone for Search and Rescue Operation in Malaysia Flood Disaster

Ahmad Sobri Hashim, Mohamad Syafiq Mohamad Tamizi

Department of Computer & Information Sciences, Universiti Teknologi PETRONAS
32610 Seri Iskandar, Perak, Malaysia

Abstract: Drone can be deployed for search and rescue operation in Malaysias flood disaster to improve the operation especially in monitoring the cost involved and time to respond when flood happens. Incorporation of drone technology into search and rescue unit will shortened time taken for evacuation process. This research project will focus on performing a study to develop a prototype drone that can be deployed for search and rescue operation. The architecture of the software and hardware integration for search and rescue drone and the experimental results are presented.

Keyword: Drone, search and rescue, flood disaster.

A Performance Comparison of Metaheuristics Search for University Course Timetabling Problems

Joe Henry Obit, Kuan Yik Junn, Rayner Alfred

Faculty of Computing and Informatics, Universiti Malaysia Sabah, Malaysia

Abstract: This research presents the metaheuristics approach in solving a real world problem of University Course Timetabling in Universiti Malaysia Sabah Labuan International Campus (UMSLIC), Malaysia. The problem domain in UMSLIC has several constraints which need to be satisfied. Solutions are considered as feasible if the hard constraints are satisfied, while minimizing the cost of soft constraints as much as possible. In this research, a Constraint Programming (CP) algorithm is proposed and implemented in order to solve the hard constraint while satisfying the soft constraints is handled by using the Great Deluge (GD) algorithm. A comparison performance of the linear and non-linear Great Deluge algorithm is also investigated based on the results obtained, the combination of CP and GD algorithms is effective to produce better solutions.

SESSION 12B
Advanced Networking and
Applications II

On-Body Communication System Transmission Enhancement using A Dual-band Textile Artificial Magnetic Conductor

17087

M. A. Abdullah, M. K. A Rahim, and N. A. Samsuri

UTM -MIMOS CoE in Telecommunication, Communication Engineering Department, Faculty of Electrical Engineering, University Technology Malaysia, 81310 Johor Bahru, Johor, Malaysia

Abstract: 6 x 4 arrays of dual-band textile Artificial Magnetic Conductor (AMC) sheet–like waveguide incorporated with two dual–band textile diamond antennas are proposed for on–body communication system. The AMC sheet is designed to have zero reflection phase which means in–phase reflection at 2.45GHz and 5.8GHz. The main objective of this structure is to improve the transmission between antennas for on-body condition. The AMC and the antennas are designed on fleece substrate (ε^r=1.35, thickness= 1mm, tan = 0.025) with SHIELDIT fabric as the conducting patch. S–parameters of the antennas are investigated in on-body environment. The S21 transmission between antennas is enhanced up to 20dB at 2.45GHz and 12dB at 5.8GHz when the AMC is placed beneath them in on-body environment.

Keyword: Artificial Magnetic Conductor (AMC), in-phase reflection, antenna, S-parameter.

Review of Preventive Security Mechanisms for Neighbor Discovery Protocol

Mohammed Anbar[1], Rosni Abdullah[1], Redhwan M. A. Saad[1,2], Iznan H. Hasbullah[1]

[1]National Advanced IPv6 Centre (NAv6), Universiti Sains Malaysia (USM), Penang, Malaysia

[2]Faculty of Engineering and Architecture, Ibb University, Ibb, Yemen

Abstract: The exponential and phenomenal growth of internet-connected devices in recent years has exhausted the pool of Internet Protocol (IP) addresses for new allocation in many regions. A new protocol, IP version 6 (IPv6) was developed in 1998 in anticipation of such situation as well as to improve network communications in general. IPv6 offers improvements in several areas over IPv4 such as security by including a built-in security mechanism, IPsec. In addition, it also introduced new functionalities such as neighbor discovery which were specified in Neighbor Discovery protocol (NDP). NDP is a core protocol in IPv6 network for link local communication. Unfortunately, IPsec is not usable with NDP due to bootstrapping problem resulting in IPv6 local communication to be left unsecured and IPv6 nodes vulnerable to insider attacks. There are many mechanisms proposed to protect IPv6 network from NDP-related attacks. This paper reviewed existing preventive mechanisms against NDP-based attacks in IPv6 network.

Impact of Mobility Speeds on LTE Network Performance

Soon Fatt Boo, Wai Leong Pang, and Sew Kin Wong

Faculty of Engineering, Multimedia University, Jalan Multimedia, 63000, Cyberjaya, Selangor, Malaysia

Abstract: Long Term Evolution (LTE) is the fourth generation standard for mobile communication system developed by Third Generation Partnership Project (3GPP) to face the growing demand of Internet. Mobility enhancement is adopted in LTE network to support higher mobility speeds. Hence, the performance of LTE network under various mobility speeds is highly concerned. In this paper, simulation experiments are conducted to examine the LTE network performance in an urban environment under various mobility speeds of 3, 30 and 120 km/h. The simulations are modelled in a multiple cells scenario where intra-handover is taken into consideration. Extensive simulations show that the aggregate throughput of the video flows is higher in 3 km/h scenario (60.9% and 163.5%) as compared to 30 km/h and 120 km/h scenarios respectively. Meanwhile, the performance of the delay and packet loss ratio are also lower in the slower mobility speeds scenario. However, the fairness metric is higher (up to 47.1%) during the high mobility speeds.

Keyword: Long Term Evolution, Mobility Speeds, Handover.

Analysis of LTE–A Signal Strength in Indoor Mobility Environment

Mardeni R.[1], A. Alhammadi[1], F.Farhana Ruslan[1], K. Anuar[1], M.Y.Alias[1], H.Mohamad[2]

[1]Faculty of Engineering, Multimedia University, Cyberjaya, 63100, Selangor, Malaysia
[2]Wireless Communications, MIMOS, Berhad, Kuala Lumpur,Malaysia.

Abstract: Wireless communication network seems to be the highest interest by the research communities. One of the challenges areas is signal propagation spatially in 4.5G Long–Term Evolution-Advanced (LTE–A) mobility indoor environment. This paper presents a study on signal strength with frequency approaches from 1.8GHz to 2.2GHz in indoor environments. It focuses more on mobility of the receiver device, where there will be different distances. In this paper, an USRP (Universal Software Radio Peripheral) device is used as base stations to transmit the desired frequency as well as to receive the signal strength at certain distances in the indoor environment. The collected data showed the signal strength is inversely proportional to distance and frequency. Overall, the lower frequency band gives a good penetration of an object in radio wave in indoor environment. Furthermore, an algorithm is developed for spectrum mobility in LTE–A environment. By using our proposed scheme, the user able to adjust its transmission power with sufficient protection to licensed user instead of carrying out spectrum handoff. This investigation is found important for predicting indoor signal loss in LTE–A system and is useful for telecommunication providers to improve their service for better capacity and mobile user satisfaction.

Keyword: LTE–A, signal strength, indoor

Generalized QL-QR Decomposition Transceiver Design for Two-Way MIMO Relaying

Haiyang Yu, Sumi Kim[1], Jaeho Choi

[1]Seoyeong University, Gwangju, Korea

Dept. of Electronic Engineering, CAIIT, Chonbuk National University, Korea

Abstract: In this paper, a novel, generalized QL-QR decomposition is investigated. The proposed two-way amplify-and-forward MIMO consists of two source nodes and one relay node. The investigation is focused to reduce the computational complexity involved in MIMO system and a generalized RQ decomposition, which is practical and efficient, is proposed. Analytical experiments show that the proposed relaying system has much lower computational complexity than the generalized singular value decomposition based two-way relay system while maintaining a comparably competitive bit-error-rate performance at high signal-to-noise ratio regions.

Keyword: MIMO, QL-QR decomposition, Two-way relay, Amplify-and-forward.

Investigation of Electromagnetic Fields from LTE Base Station

Soon Fatt Boo, Wai Leong Pang, Sew Kin Wong, Kah Yoong Chan, and Louai Alkhateb

Faculty of Engineering, Multimedia University, Jalan Multimedia, 63000 Cyberjaya, Selangor, Malaysia

Abstract: Recently, the world has witnessed the rapid development in telecommunication industry and the increasing demand in the mobile data usages and applications. Due to these evolutions, the numbers of base stations are rapidly increased to meet the huge market demand. Consequently, the health risk due to the exposure of electromagnetic radiation from the base station has raised the concerns among the public. In this paper, an experiment is carried out to investigate the effect of electromagnetic radiation, in term of power level density emitted from the LTE base stations situated in Multimedia University, Cyberjaya campus, Malaysia. The radiated power levels are measured and compared to the International Commission on Non–Ionizing Radiation Protection (ICNIRP) safety guidelines. In this work, the experimental results show that the maximum power level density emitted from the LTE base station is approximately 33.5867 μW/m^2 at 1800 MHz, and 26.3343 μW/m^2 at 2600 MHz respectively. The measured radiation levels are relatively lower ($< 1.0\%$) than the ICNIRP exposure limit of 9 W/m^2 and 10 W/m^2 at 1800 MHz and 2600 MHz.

Keyword: Long Term Evolution, Electromagnetic Fields Radiation, Base Station, Human Exposure

---

3dB Branch–Line Coupler with Improved Bandwidth Using PDMS and Silver Loaded Epoxy

S. A. Babale, S. K. A.Rahim, IEEE, K. N. Paracha and S. I. Orakwue

Wireless Communication Centre (WCC) Faculty of Electrical Engineering, Universiti Teknologi Malaysia, UTM Skudai, 81310, Johor, Malaysia.

Abstract: Single section branch line coupler is popular because of its simplicity in design and fabrication. But it suffered from narrow bandwidth and poor out of band rejection characteristics. This paper overcomes these limitations by designing and simulating a Broadband 90° hybrid coupler implementable in planar microstrip circuit. Polydimethylsiloxane (PDMS) and a modified silver loaded epoxy (SLE) were used as the substrate and the conductor respectively. Copper particles obtained using Engraving machine was used to improve the conductivity of the SLE. The coupler is meant to operate at 6GHz. It shows a return loss and isolation better than 18dB within the frequency range of 3.64GHZ to 7.64GHz. The results exhibited a very low insertion loss better than 4dB, from 3.64GHZ to 7.64GHz and a small phase variation better than 90°±5° within the passband of 3.86GHz to 7.34GHz. A fractional bandwidth of 52.33% was achieved which is more than five times wider than that of conventional single section coupler.

SESSION 13A
Computational Engineering I

Design of High Voltage and High Frequency Pulse Generator Using DC Choke

19088

Salamah Samsu, Fouziah Md Yassin, Fauziah Sulaiman, Jedol Dayou

Energy, Vibration and Sound Research Group (e-VIBS), Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia

Abstract: Pulsed Electric Field (PEF) processing has demonstrated a high potential for various applications ranging from extraction of valuable components from different biological objects to water treatment. Therefore, high voltage and high frequency pulse generator design is essential in order to fulfill the requirement of a PEF processing system. A high voltage and high frequency pulse generator using DC choke is proposed in this works as solution to increase the pulse train amplitude. The DC choke was verified using function generator to identify its operating frequency and voltage. Results showed that the operating frequency of the DC choke was between 24 kHz to 35 kHz and that it was able to retain the pulse shape of the input pulse train. These results show the ability of the DC choke as a potential solution to increase the amplitude of a pulse train while retaining its shape and duty cycle by cascading it with other power topologies to produce high voltage and high frequency pulse generator for various applications.

Keyword: Pulsed Electric Field, High Voltage and High Frequency Pulse Generator, DC Choke.

Feasibility Evaluation of Flexible Antenna Substrates for Near-field Wireless Energy Transfer

Mohamad Harris Misran[1,2], Sharul Kamal Abdul Rahim (Senior Member IEEE)[1], Akaa Agbaeze Eteng[1], Maizatul Alice Meor Said[2]

[1]Wireless Communication Centre (WCC), Faculty of Electrical Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai Johor, Malaysia

[2]Fakulti Kejuruteraan Elektrik dan Kejuruteraan Komputer, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

Abstract: This paper examines the performance of flexible antennas designed with different substrates for wireless energy transfer at 13.56 MHz. Three different substrates are used to design single-turn square loop antennas to validate the possibility of using flexible antenna for WET. The results show that antennas realized with flexible substrates provide similar performance levels as an antenna designed on a rigid substrate. The results show a potential for employing flexible loop antennas in wireless energy transfer applications.

A Systematic Literature Review of Case-based Reasoning based on Eco-design Strategies for Environmental Product Design

Marziah Abdul Wahab[1], Awanis Romli[2], Al-Fahim Mubarak-Ali[2], Mazlina Abdul Majid[2]

[1]Department of Mathematics and Science Computer, Kolej Poly-Tech MARA, KM8 Jalan Gambang, 25150, Kuantan, Pahang
[2]Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang 26300 Kuantan, Pahang

Abstract: Case-based Reasoning (CBR) is one of many Artificial Intelligent (AI) methodologies that is used specifically in problem solving. CBR method is able to solve the problem by recalling past experiences that are stored in a case-based library. The application of CBR is observed to be quite widely used in the field of product design. However the practice of CBR application that considers the environmental impact throughout a products life cycle is limited. Producing a product with ecological design (eco-design) can be considered as one way of preserving environment. Therefore, this paper proposes for future work, to develop a decision tool using CBR application that embeds eco-design strategies in order to provide a solution for product designers on the environmental impact of product design at the early stage. This decision tool should be able to support the design processes for sustainable products.

Keyword: CBR, product design, eco-design, environmental impact.

Annealing Dependence on Structural and Electrical Characteristic of n-ZnO/p-C$_u$G$_a$O$_2$ Transparent Heterojunction Diode

Muhammad Hafiz Abu Bakar[1], Lam Mui Li[1], Khairul Anuar Mohamad[2], Fouziah Md. Yassin[1], Chee Fuei Pien[1], Afishah Alias[1], and Katsuhiro Uesugi[3]

[1]Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu Sabah 88400, Malaysia
[2]Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu Sabah 88400, Malaysia
[3]Faculty of Engineering, Muroran Institute of Technology, Muroran, Hokkaido 050-8585, Japan

Abstract: In order to fabricate transparent p-n devices, a good p-type transparent material is desired but it is difficult to obtain stable p-type conductivity. In this paper we investigate the effect of annealing temperature and annealing duration on the C$_u$G$_a$O$_2$ thin film structure and diode electrical characteristic. A transparent p-type thin film C$_u$G$_a$O$_2$ was successfully fabricated on the glass substrate by using RF sputtering deposition method and was annealed at different temperature and duration ranging from 200°C to 500 °C and 1 to 4 hours at. C$_u$G$_a$O$_2$ thin film crystalinity is improved at higher temperature and longer duration which is 500C and for 3 hours. The optical band gap of the thin film is approximately 3.3 eV. A transparent heterojuntion is fabricated on a transparent glass substrate with device structure ITO/n-ZnO/p-C$_u$G$_a$O$_2$/Al and I-V measurement shows the device that annealed for 1 hour at 500°C show better rectification behavior which is 3.8 V.

Keyword: RF Sputtering, Thin Film

Low Voltage Wireless Power Transfer (WPT) using Resonant Inductive Coupling Charging for Short-Range Operation

Khairul Anuar Mohamad[1], Chia Ek Sel[1], Hoh Hang Tak[1], Afishah Alias[2], Ahmad Razani Haron[1], Farrah Wong[1], Bablu Kumar Ghosh[1], Ismail Saad[1]

[1]Faculty of Engineering, Universiti Malaysia Sabah, Jalan UMS 88400 Kota Kinabalu, Sabah, Malaysia

[2] Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Jalan UMS 88400 Kota Kinabalu, Sabah, Malaysia

Abstract: An inductive coupling technique was used to transfer an electrical energy wirelessly from transmitter to receiver circuits, which used same resonance frequency to obtain maximum power transfer. As the coil inductor of 7 μH and the resonating capacitor of 1 μF are specified for air-core coils to produce resonant frequency, the simulation of wireless power transfer (WPT) system was done using Multisim software. The experiment showed that electric power is transferred at a frequency of approximately 60 kHz with an efficiency of 94% with resonant coupling. Whereas, the maximum output voltage at both transmitter and receiver circuits were 16.5 V and 15.5 V, respectively. The maximum air gap distance was 8 cm to charge a lower power device. Furthermore, resonant coupling repeater enables to extend the distance with approximately 4 cm as well as acts as a guide path which proved the efficiency of the WPT can be further improved via resonance coupling and frequency repeater. Thus, this WPT system is suitable to charge low power electronics such as implantable biomedical devices, remote sensing and portable electronics.

Keyword: Resonant Inductive Coupling, Wireless Power Transfer, Mutual Inductance

A Denoising Algorithm for InSAR Surface Deformation Application

Lee Sui Ping, Chan Yee Kit, Lim Tien Sze

Faculty of Engineering and Technology, Multimedia University, Jalan Ayer Keroh Lama
75450 Melaka, Malaysia

Abstract: This letter describes an order-statistical based interferometry synthetic aperture radar (InSAR) phase estimation algorithm for surface deformation. Critical interferometry issues during deformation measurement (which covers inevitable noises, undersampling due to high topography variation and wrapped phase condition) are presented. This algorithm is mainly emphasizes on InSAR geometry modelling, deformation value extraction, and the most typical part of phase estimation process. A phase estimation method based on improved order-statistical filter is employed to overcome aforementioned interferometry issues. External digital elevation map is employed into differential-InSAR approach to extract the deformation information from interferogram by eliminating phase variation due to topography. Final processing outcome of the order-statistical based InSAR algorithm is a surface deformation image due to two observations. For comparative studies, the order-statistical based method and two other InSAR phase estimation algorithms are implemented via computer simulation (where evaluation metric of root mean square error RMS is introduced for performance assessment). The order-statistical based InSAR phase estimation method is also validated by true data set of satellite measurement.

Keyword: Interferometric phase estimation, phase noise filter, surface deformation, interferometry SAR.

SESSION 13B
Computational Engineering II

A Single-phase Multilevel Inverter for Stand-alone Hybrid PV/Battery Residential Application

Mohammad Farhadi Kangarlu[1], Sadjad Galvani[1], Ali Farzamnia[2]

[1]Department of Electrical Power Engineering, Faculty of Engineering, Urmia University, Urmia, Iran

[2]Faculty of Engineering, University Malasia Sabah, Malaysia

Abstract: For powering rural areas where constructing an electrical grid is not economical, the renewable energy including photovoltaic (PV) system is an interesting solution. PV panels need a power conditioning stage for both maximum power point tracking (MPPT) and energy conversion (dc to ac). In this paper, a multilevel inverter based PV/battery system is proposed for rural areas. The proposed system includes a multilevel inverter, a boost dc-dc MPPT converter, and a buck/boost dc-dc converter for battery charge/discharge. The incremental conductance method has been used for MPPT. The efficiency analysis of the proposed system is also presented. The proposed system has been simulated in the PSCAD/EMTDC environment to verify its operation and control.

Keyword: Multilevel inverter, photovoltaic, maximum power point tracking.

Design and Analysis of an Efficient Repository System for Protein Coefficients in Systolic Array-based Architecture by Using Xilinx Virtex-5 FPGA

M.N.Isa[1,2], D.Muhsen[1,2], M.I.Ahmad[3], S.A.Z.Murad[1,2], S.N.Mohyar[1,2],
R.C.Ismail[1,2], K.Benkrid[4]

[1]The Integrated Circuits and Systems Design (ICASe) Group,
[2]School of Microelectronic Engineering, 3School of Computer and Communication
Engineering,
[3]Universiti Malaysia Perlis, Pauh Putra, Perlis, Malaysia
[4]ARM, Cambridge, United Kingdom.

Abstract: Sequence alignment is an important tool in bioinformatics and computational biology. It uses dynamic programming (DP) - based algorithm to obtain optimal scores during the sequence homology search. This algorithm guarantees for accurate search, however with expense of quadratic time complexity. Thus, researchers have implemented the DP algorithm in Field Programmable Gate Array (FPGA)-based platform. However, the configuration stage also endures several challenges especially for protein sequence alignment. Prior to the sequence homology search, the processing element (PE) requires frequent memory load and rapid access to substitution matrix coefficients. The efficient supply of configuration data for the PE is crucial as to reduce the configuration time, hence affected speed performance of the core system. Typical PE configuration scheme uses serial configuration chain, where it configures different look-up tables (LUTs) in the pipeline of PEs sequentially. Consequently, the configuration time increases proportionally to the number PEs. Thus, in this work, a new architecture of PE parallel loader with parallel configuration chain technique has been proposed. The parallel loader consists of several circular buffers, designed using n-bit registers and transmitted to the PEs via large data bus. This allows efficient and simultaneous supply of the configuration data to all PEs. This loader has been implemented on Virtex-5 FPGA and achieved 480.25 MHz clock frequency. It utilized only 52 or 0.3 percent of the XC5VLX110 Virtex-5 slices. Moreover, the parallel loader element length is parameterizable, thus it can load any size of substitution matrix score either BLOSUM or PAM series.

Keyword: Field Programmable Gate Arrays, protein sequence alignment, substitution matrix loader, Smith-Waterman algorithm, Systolic Array.

Impact of Windows Height on Energy Efficiency in Air-conditioned Office Buildings

Najib Taher Al-Ashwal and Ahmad Sanusi Hassan

School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia

Abstract: In office buildings, working spaces are mainly illuminated by artificial lighting systems which considered being responsible for a major percentage of energy consumption. It is reported that energy consumed by electrical lighting systems can reach to about 20-30% of the total energy end-use in office buildings. The efficient integration of daylighting with artificial lighting using proper lighting control system could result in a significant reduction in energy consumed. Integration of daylighting necessitates efficient window design as it provides most of the transmitted natural lighting. The height of a window has a major role in the determination of the natural light amount which is transmitted into space. Furthermore, the windows height influences the light penetration depth can be reached in the space. This paper aims to investigate the impact of windows height on the window design for energy efficiency in office buildings in a hot-humid climate. In this study, different heights of the window were analyzed with different window areas and glazing types using computer modeling and simulation. The results showed that larger windows height could result in more energy savings, due to the increase of daylight provided to the indoor space. However, the increase of the windows height to more than 1.6 m produced a slight increase in expected energy savings.

Effect of the Length on the Tensile Deformation of Nickel Nanowires Using Molecular Dynamics Simulations

A. G. N. Sofiah, M. Samykano, J. Rivas Murillo, N. A. C. Lah, D. Ramasamy, K. Kadirgama & M. M. Rahman

Faculty of Mechanical Engineering, Universiti Malaysia Pahang, Malaysia.

Abstract: In the recent years, with the fast advancement in the fields associated with nanoscience and nanotechnology, metal nanowires, in specific have received enormous attention among researchers due to their fascinating properties and applications. In this study, the Young Modulus and failure behavior of Nickel (Ni) nanowires 7.04 nm in diameter with eight (8) different lengths (17.60, 21.12, 24.64, 28.16, 31.68, 35.20, 52.80 and 70.40 nm) were successfully modeled for uniaxial tensile tests using Molecular Dynamic (MD) simulations. MD simulations were performed at a fixed point of the temperature of 300 K and a constant strain rate of 0.0001 ps^{-1}. The finding showed that these Ni nanowires have a Young Modulus between 140.02 to 142.5 GPa. We strongly believe that the variation of the length model has no significant influence on neither the Young Modulus nor the failure behavior. All the investigated nanowires demonstrated ductile failure behavior type, in which represents a typical behavior of Ni at bulk scales.

Keyword: Young Modulus, mechanical behavior, nickel nanowire, uniaxial testing, molecular dynamics.

Studies on corrosion inhibitor activity of Azoles for copper

L. Alamiparvin[1], E Gorbani Kalhor[1], S. R. Nabavi[2], Sh. Ebrahimi[3], A. Farzamnia[3]

[1]Department of Chemistry, Faculty of Science, Tabriz branch, Islamic Azad University, Tabriz, Iran

[2] Department of Applied Chemistry, University of Mazandaran, Babolsar, Iran

[3] Faculty of Engineering, Universiti Malaysia Sabah (UMS), Kota Kinabalu, Sabah, Malaysia

Abstract: In this research, quantitative structure activity relationship of Azoles as copper corrosion inhibitors was studied by artificial neural networks(ANN). For this purpose, corrosion inhibitor efficiency of Azole compounds was collected from different references. The Azoles structures were optimized by Hyperchem software. Molecular descriptors of Azoles were extracted by Dragon software and selected by principal component analysis (PCA) method. Theses structural descriptors along with environmental descriptors (pH, time of exposure, temperature and concentration of inhibitor) were used as input variables. corrosion inhibitor efficiency of Azoles was used as output variable. Experimental data were divided randomly into two sets: training set for model building and simulation set for model validation. Linear models were investigated by multiple linear regressions (MLR). Results showed poor correlation between experimental data and model data in linear models. Hence nonlinear method such as artificial neural networks was used for studying nonlinearity of data. After optimization of network by training and validation data, built model was investigated with simulation data. The results showed good agreement between experimental and theoretical data .Therefor ANN can be used as a good tool for predicting Azole's corrosion inhibitor efficiency for copper in the presence of environmental conditions.

Keyword: Azoles, Inhibitor, Copper, ANN, PCA.

Study of Airflow Quality in the Intake Passage to Improve the Combustion Efficiency

Shahriman A.B[1,2], Mohamad Syafiq A.[2], M.S.M. Hashim[1,2]

[1]Unit Penyelidikan Teknologi Sukan Permotoran, MOTECH (Motorsport Technology Research Unit), Universiti Malaysia Perlis (UniMAP), Pauh Putra Campus, 02600 Arau, Perlis
[2]School of Mechatronic Engineering, Universiti Malaysia Perlis (UniMAP), Pauh Putra Campus, 02600 Arau, Perlis, Malaysia

Abstract: Increasing the engine performances is a prime objective in order to meet regulatory and customers demand. One of the methods to increase the engine performances is by improving the airflow quality in the engine cylinder. The air flow quality through the intake is a critical factor in obtaining good performance on an engine. Given in this context, the airflow efficiency of an original intake passage design was initially investigate and has been studied when operating at discrete valve lift. Then, an improvement design was proposed in order to improve the airflow efficiency that is produced by the actual design. Design evaluation of engine intake port using virtual flow bench "CFD" is significantly improved by identifying best practices which reduce turnaround time for product realization. CFD results of actual and improvement design were compared for its efficiency and to develop a standard methodology for future iterations. Mass flow rate, turbulent intensity and swirl number calculated through CFD for both designs explained the behavior of air in the combustion chamber that affects the combustion efficiency.

Keyword: CFD, Swirl Number, Turbulent Intensity, Mass Flow rate.

SESSION 14A
Modelling and Simulations III

Overview of Replication Techniques on Distributed Database in Cloud Environment

Sharifah Hafizah Sy Ahmad Ubaidillah[1], A. Noraziah[1,2]

[1]Faculty of Computer Systems & Software Engineering, University Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[2]IBM Centre of Excellence, University Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

Abstract: Replication is a topic of interest in the cloud computing, distributed systems, and database communities. It is also one of the practical methods in distributed systems for developing better reliability and availability. Replication is employed to reduce user waiting time, increasing data availability and decreasing cloud system bandwidth used by offering the user numerous replicas of a detailed service on multiple nodes in cloud computing. This paper presents an overview of replication techniques on distributed database in the cloud environment.

Keyword: Replication, Cloud Computing, Distributed System, Database, Availability.

Overview Between Clustering and Load Balancing

A.Fairuzullah[1,2], A. Noraziah[1,3], Ahmed N.Abdalla[4]

[1]Faculty of Computer System and Software Engineering, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[2]ICT Center, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[3]IBM Center of Excellence, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia
[4]Faculty of Technology Management, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

Abstract: This paper show the strength of cluster and load balancing. It is important to technical people to choose between cluster and load balancing. The cluster computing is becoming more and more popular. The state-of-the-art technological developments and research innovations are pushing clusters into mainstream computing. The high performance cluster provides an approach to parallel processing that yields super computer level performance. This trend makes it very promising to build high performance computing environments by clusters, with various performance measures from which high availability need to be address. However Network Load Balancing provides improved performance, the ability to add additional servers as necessary, and the ability to perform maintenance on any of the servers without any user impact or hardware configuration changes. By using the combination of Load Balancing and multiple, redundant clusters can add and remove clusters with minimal user impact. It is usually involves dedicated software or hardware, such as a multilayer switch or a Domain Name System server to mitigate some added layer for clustering weakness. The focus of this paper to get High availability 24 x 7 which is a characteristic of a system, which aims to ensure an agreed level of operational performance for a higher than normal period.

Keyword: Cluster; Load Balancing; Parallel Processing.

Design Methodology of Preserving Piano Playing Techniques through Contactless Sensor System

Choo Chee Wee[1], Muralindran Mariappan[1], Razak Mohd Ali Lee[1], Resot Iggau[2], Jong Chia Sing[1], Wong Wei Kitt[1]

[1]Robotics & Intelligent Systems Research Group, Artificial Intelligent Research Unit (AiRU), Universiti Malaysia Sabah, Kota Kinabalu, Malaysia
[2]Musical Arts Program, Faculty of Humanities, Arts and Heritage, Universiti Malaysia Sabah, Kota Kinabalu, Malaysia

Abstract: The technique of fingers and arms movements in piano playing are equivalent to the body movements' technique of athletes. Extensive researches and studies had been employed to improve athletes' performance through technologies, however, researches on piano technique through scientific and technology means are lacking in comparison. One area in piano technique research is particularly important, which is finger position and pressure measurement applied by the musician while playing the musical instrument. One common problem that these researches faced is the sensors used are directly in contact with the pianist, which causes a change of piano playing experience. These sensors are considered to be intrusive to the piano playing experience. Concluding the challenges faced by current technologies, the proposed solution for this problems should meet few a criteria, where the proposed sensor system should be a non-intrusive sensor that remotely tracks the finger and arm position of a pianist.

Image Reconstruction Technique for the Ultrasonic Tomography System VIA Metal Pipe

Herlina Abdul Rahim, Javad Abbaszadeh Barghoshadi, Ruzairi Abdul Rahim

Faculty of Electrical Engineering, Universiti, Teknologi Malaysia, 81310, Skudai, Johor, Malaysia

Abstract: In this research, the non-invasive ultrasonic transmission tomography is investigated. In order to model the ultrasonic wave scattering for different thickness of metal pipes, two-dimensional (2D) finite element modeling (FEM) has been utilized. The wall thickness variation of the metal pipe and its influence on propagation of the ultrasonic pressure wave are explored in this paper include frequency analysing in order to find the maximum applicable frequency. The experimental results confirm the simulation results, in that for each wall thickness of the metal pipe, there is a separate maximum applicable ultrasonic frequency in UTT process. When the applied frequency is above the determined maximum applicable ultrasonic frequency, the Lamb wave disturb the straight-path signal and objects inside the metal pipe would not be detectable with UTT process.

Keyword: Ultrasonic transmission tomography, ultrasonic sensors, ultrasonic wave, non-invasive tomography, metal pipe.

Implementation of Energy Efficient Thermal Comfort Control for Cyber-Physical Home Systems

Lim Yuto[1], Ooi Sian En[2], Makino Yoshiki[1], Teo Tze Kin[2], Rayner Alfred[3], Tan Yasuo[1]

[1]School of Information Science, Japan Advanced Institute of Science and Technology (JAIST), Japan
[2]Faculty of Engineering, Universiti Malaysia Sabah (UMS), Malaysia
[3]Faculty of Computing and Informatics, Universiti Malaysia Sabah (UMS), Malaysia

Abstract: An energy efficient thermal comfort control (EETCC) system has been proposed to improve residents thermal comfort by optimizing the energy consumption. Today, most of the research works related to the thermal comfort control deals with the theoretical study of the proposed algorithm. Furthermore, none of these research works considers the implementation of real testbed of smart homes using the cyber-physical systems approach. Thus, the EETCC system is implemented in this paper. We conduct both experiment and computer simulation to evaluate and verify the feasibility of our proposed EETCC system in the cyber-physical smart home systems.

Keyword: Thermal Comfort, Energy Efficient, Temperature, Smart Homes, Cyber-Physical Systems.

ClassDiagramCritic: A Design Critic Tool for UML Class Diagram

Soran Mahmood Abdulkareem, Norhayati Mohd Ali, Novia Admodisastro and
Abu Bakar Md Sultan

Faculty of Computer Science and Information Technology, Universiti Putra Malaysia,
43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia

Abstract: Unified Modeling Language (UML) diagrams are widely used in Computer Science courses. The UML Class Diagram is part of the most important and widely used diagrams in teaching UML. The learning of UML Class Diagram demands a sufficient guidance from the lecturers. Thus, a critic-based and collaborative approach was proposed in the design of the ClassDiagramCritic (CDC) tool. The CDC is an educational tool that offers quick and meaningful feedback to students about UML class diagrams they design. Critics in CDC tool are mainly to critique errors in UML class diagrams, offer suggestions, and provide semi-automated design improvements to students. The CDC tool employed the collaborative approach as to support the collaborative learning between students and lecturers.

SESSION 14B
Modelling and Simulations IV

ClassDiagramCritic: A Design Critic Tool for UML Class Diagram

Soran Mahmood Abdulkareem, Norhayati Mohd Ali, Novia Admodisastro and
Abu Bakar Md Sultan

Faculty of Computer Science and Information Technology, Universiti Putra Malaysia,
43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia

Abstract: Unified Modeling Language (UML) diagrams are widely used in Computer Science courses. The UML Class Diagram is part of the most important and widely used diagrams in teaching UML. The learning of UML Class Diagram demands a sufficient guidance from the lecturers. Thus, a critic-based and collaborative approach was proposed in the design of the ClassDiagramCritic (CDC) tool. The CDC is an educational tool that offers quick and meaningful feedback to students about UML class diagrams they design. Critics in CDC tool are mainly to critique errors in UML class diagrams, offer suggestions, and provide semi-automated design improvements to students. The CDC tool employed the collaborative approach as to support the collaborative learning between students and lecturers.

Keyword: Class Diagram Critic, Critic-based Approach, Design Critic, UML Class Diagram.

Inconsistency Detection of Model and Code via Critic-Based Approach

Osman Mohammed, Norhayati Mohd Ali, Novia Admodisastro and Jamilah Din

Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia

Abstract: Model Driven Software Engineering (MDSE) has become the state of the art in software abstraction and increasingly popular in industry and academia. MDSE concerns the use of models as first-class artifacts of software development process. The MDSE has been seen as a way to manage the increasing of software complexity. However, one of the challenges in MDSE is to generate a consistent model-implementation mapping between design model and source code. Source code is also an important software development artifact as it represents the executable system. Detecting inconsistencies between design models and source code is hard because both artifacts normally will have some changes or modifications. Several researchers have introduced various methods in managing the inconsistency of model-code. In this paper, we propose a critic-based approach to detect the inconsistencies between design model and source code. The critic-based approach will provide instant feedback that point out the inconsistencies between model and code.

Keyword: Critic-based Approach, Model-Code Consistency, Inconsistency Detection.

Capacitated Maximal Covering Location Allocation Problem during Flood Disaster

Noridayu Mah Hashim, S.Sarifah Radiah Shariff, Sayang Mohd Deni

Center for Statistics and Decision Science Studies, Faculty of Computer and Mathematical Sciences, Universiti Teknologi Mara, 40450 Shah Alam

Abstract: Every year, Malaysia is hit by seasonal floods that forces thousands of evacuees to be transferred to relief centers. In this paper, we propose the use of an optimization model to find the appropriate number of temporary relief centers as well as the size of the facility. The objectives are to maximize the number of flood victims that can be relocated to a relief center within a fixed distance while ensuring that the relief center has enough capacity to cater for the victim. In this study, we used MCLP and capacitated MCLP (CMCLP) that are solved using Excel Solver. The MCLP involves locating a fixed number of relief centers to cover the maximum number of flood victims in demand zones. The results indicate that MCLP showed no significant problem in allocating the flood victims to the relief centers as the facilities are readily available. Meanwhile the capacitated MCLP (CMCLP) reveals how the limited capacity can affect the number of flood victims that can be relocated. An actual case study based on the scenario of flood victim evacuation from their homes during a severe flood in Kuantan 2013 was analysed.

Keyword: Capacitated maximal covering location problem, location allocation.

Response Surface Modeling of Electrospinning Parameters on Titanium Oxide Nanofibers Diameter: A Box-Behnken Design (BBD)

Zi Sheng Tang[1], Nurmin Bolong[1], Ismail Saad[1], Ahmad Fauzi Ismail[2], Franklin Tiam Yang Lim[1]

[1]Faculty of Engineering, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia
[2]AMTEC, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia

Abstract: Electrospinning has been employed to produce titanium oxide nanofibers from ethanolic solution containing precursor titanium tetraisopropoxide and polymer polyvinylpyrrolidone with acetic acid as stabilizer. Response surface methodology based on Box-Behnken Design was implemented to investigate the influence of applied voltage (10-25 kV), flow rate (1.0-3.0 ml/hr) and tip to collector distance (6-14 cm) on the electrospun nanofibers diameter. The diameter of the fibers was examined using scanning electron microscope. A second order polynomial was developed to predict the fibers diameter. The importance of each parameters was tested through analysis of variance with 95% of confidence level. From reduced response surface model, tip to collector distance was the most significance factor whereas applied voltage appeared to be the least significance factor in predicting fibers diameter. Decrement of 26.2% with an increase of tip to collector distance from 6 cm to 14 cm at constant flow rate and applied voltage. When the applied voltage increased from 10 kV to 25 kV, the fiber diameter decreased 10.96%.

Keyword: Electrospinning, Nanofibers, Titanium Oxide, Box-Behnken Design (BBD).

Investigation on Impact Hammer Testing with Different Types of Hammer Tip for Welded Thin Plate

S. N. Zahari[1], M. S. M. Sani[1,2]

[1]Advanced Structural Integrity and Vibration Research, Faculty of Mechanical Engineering, University Malaysia Pahang, Malaysia
[2]Automotive Engineering Centre, Faculty of Mechanical Engineering University Malaysia Pahang, Malaysia

Abstract: Modal testing using impact hammer had been used extensively in various industries to analyze the dynamic properties of the structure. Impact testing become famous due to their advantages for instances; fast, compatible for measurements in the field and relatively inexpensive. Even though these methods are fast and convenient, many important consideration should be take note during the measurement in order to get an accurate result. For this paper, hammer tip selection become the research issue. The thin sheet plate with different materials (Aluminum alloy; AA7075 & AA6061) joined by friction stir welding (FSW) will be used as a specimen. Four types of hammer tip used in this study; hard, medium, soft and super soft tip. The effect of hammer tip towards the shape of coherence and frequency response function for ranging between 0 to 1000 Hz will be discussed further. From this experiment, it was found that medium tip chosen as the most compatible tip for thin plate joined by FSW.

Keyword: Modal Analysis, Impact Hammer, Hammer Tip, FSW Flat Plate.

Estimation for Large-Scale Kinetic Parameters for Main Metabolism of *Escherichia coli*

Mohammed Adam Kunna[1], Tuty Asmawaty Abdul Kadir[1], Aqeel S. Jaber[2]

[1]Faculty of Computer System and Software Engineering, Universiti Malaysia Pahang, Kuantan, Malaysia

[2]Department of Electrical Power Techniques, Al-ma'mon University college, Baghdad Iraq

Abstract: The kinetic parameters estimation for the metabolic model of E. coli has become important and needed in order to fit the kinetic parameters closely to real experimental data. To this point, this study focusing to identify and estimate the kinetic parameters for 0.2 dilution rate using two distinct approach: firstly, one-at-a-time sensitivity, performed on 185 kinetic to identify the most affective kinetics, which represent glycolysis, pentose phosphate, TCA cycle, glyconeogensis, glycoxylate pathways in addition to acetate formation. Eight kinetic parameters where found to be highly affected in the model response; secondly, particle swarm optimization was applied for kinetic parameters of metabolic model of *E. coli*. The validation results proved the effectiveness of the proposed methods.

Keyword: Metabolic model, sensitivity analysis, estimation, algorithm.