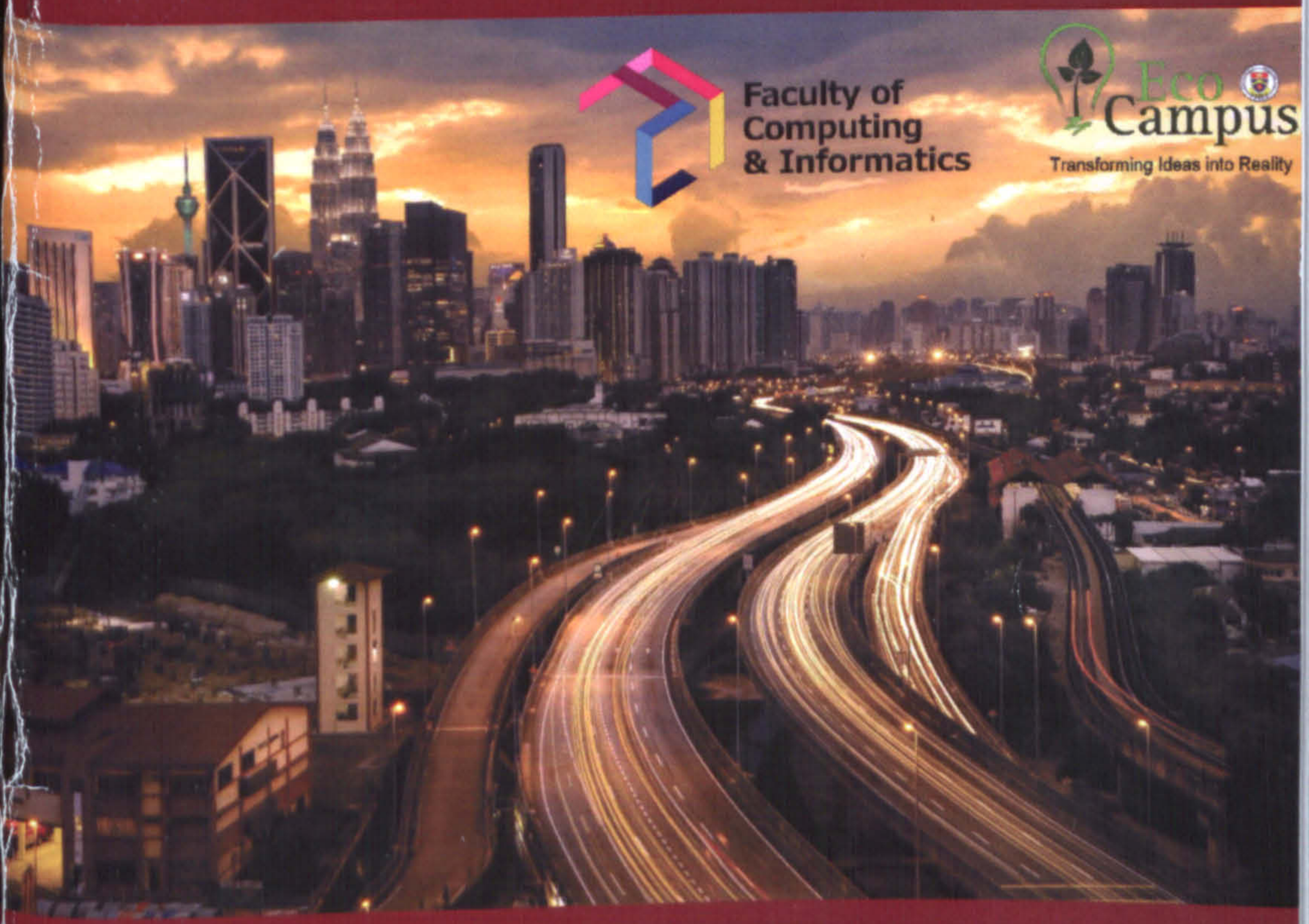
ICCSE2017

The Second International Conference on Computational Science and Engineering 2017

29 – 30 November 2017
Kuala Lumpur, Malaysia
www.iccsengr.org

BOOK OF ABSTRACTS



Rayner Alfred
Raymond Alfred
Chin Kim On (Eds.)

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KNOWLEDGE TECHNOLOGY RESEARCH UNIT

Advanced SCIENCE LETTERS

BORNEO WILDLIFE ALLIANCE

Trends in Computational Science and Engineering Research

ICCSE 2017

THE SECOND INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE AND ENGINEERING 2017

BOOK OF ABSTRACTS

Organized By

KNOWLEDGE TECHNOLOGY RESEARCH UNIT

UMS UNIVERSITI MALAYSIA SABAH

Knowledge Technology Research Unit
Faculty of Computing and Informatics,
Universiti Malaysia Sabah, Malaysia
and
Borneo Wildlife Alliance, Kota Kinabalu, Sabah, Malaysia

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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.

The Second International Conference on Computational Science and Engineering 2017 will provide a unique forum to exchange innovative research ideas, recent results, and share experiences among researchers and practitioners in 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.

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 compounds/molecules and solids, computational chemistry/cheminformatics, 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 and/or 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

Assoc. Prof. Dr. Rayner Alfred
(Universiti Malaysia Sabah, Malaysia)
Conference Chair

On behalf of the program board I would like to welcome you to the ICCSE2017 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.

For ICCSE2017, we have received more than 70 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, 40 papers were selected for oral presentation.

In this conference, we have four distinguished keynote speakers, Emeritus Professor Ian Witten from the University of Waikato, Professor Limsoon Wong from the School of Computing, National University of Singapore, Professor Wai Kiang (Albert) Yeap from the Auckland University of Technology, Auckland, New Zealand and finally Dr Mohammad Reza Beik Zadeh, who will share their knowledge in computational science and engineering. We hope that the keynote sessions and the parallel sessions add value to your knowledge and research career.

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 ICCSE2017 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 Kuala Lumpur for the ICCSE2017 Conference. Thank you

KEYNOTE SPEAKER 1

Keynote Speaker : Emeritus Professor Ian Witten

Affiliation : Emeritus Professor (Computer Science), The University of Waikato

Specialization : Programming by example, text compression, machine learning, data mining, digital libraries, interactive systems.

Title : Big data, deep learning, and Weka

Abstract : When is data "big"? We examine this question with reference to the popular Weka interactive data mining system. The widely used Explorer interface is limited by the fact that datasets must fit into main memory. However, Weka also has facilities that transcend this limitation and can learn from effectively unlimited datasets – which requires machine learning methods that operate incrementally, in one pass through the data. Weka includes incremental implementations of standard classifiers. Its Knowledge Flow and command line interfaces can be used on datasets of any size. Moa, Weka's big sister, is expressly designed to work on unlimited data streams, and includes suitable data generators and evaluation methods. Distributed Weka allows Weka to operate on multiprocessor clusters based on either the Hadoop or Spark architectures. We also survey what has been called the "deep learning renaissance": the application of high capacity networks to overwhelmingly large quantities of data, particularly in areas of image recognition, face recognition, and language processing. High-speed GPU implementations are critical to the success of these techniques. Weka supports deep learning with a classifier that applies Deeplearning4j, an open source program library that includes distributed parallel versions – and the ability to operate on a GPU. This Weka facility is unique in that you can train a deep learning network without writing code. The aim is to defy the Oxford English Dictionary's definition of big data as "data of a very large size, typically to the extent that its manipulation and management present significant logistical challenges."

KEYNOTE SPEAKER 2

Keynote Speaker : Professor Limsoon wong

Affiliation :

- KITHCT Professor of Computer Science, School of Computing, National University of Singapore,
- Professor of Pathology, School of Medicine, National University of Singapore,
- Leader, Bioinformatics Programme, NUS Office of Life Sciences,
- Coordinator, Computational Biology Lab, NUS School of Computing,
- Faculty Member, Graduate School for Integrative Sciences and Engineering, National University of Singapore.

Bibliography : Limsoon Wong is a KITHCT chair professor in the School of Computing and a professor in the Yong Loo Lin School of Medicine at the National University of Singapore. Before that, he was the Deputy Executive Director for Research at A*STARś Institute for Infocomm Research. He currently works mostly on knowledge discovery technologies and their application to biomedicine. He has also done, especially in the earlier part of his career, significant research in database query language theory and finite model theory, as well as significant development work in broad-scale data integration systems. Limsoon has written about 250 research papers, some of which are among the best cited of their respective fields. He is a Fellow of the ACM, named in 2013 for his contributions to database theory and computational biology. Some of his other recent awards include the 2003 FEER Asian Innovation Gold Award for his work on treatment optimization of childhood leukemias, the 2006 Singapore Youth Award Medal of Commendation for his sustained contributions to science and technology, and the ICDT 2014 Test of Time Award for his work on naturally embedded query languages. Limsoon was also conferred, in 2014, a Public Administration Medal (Bronze) by the Singapore Government for outstanding efficiency, competence, and industry. He serves/served on the editorial boards of Journal of Bioinformatics and Computational Biology, Bioinformatics, Biology Direct, Drug

Discovery Today, IEEE/ACM Transactions on Computational Biology and Bioinformatics, Genomics Proteomics and Bioinformatics, Journal of Biomedical Semantics, Methods, Scientific Reports, Information Systems, and IEEE Transactions on Big Data. He is also an ACM Books Area Editor. He received his BSc(Eng) in 1988 from Imperial College London and his PhD in 1994 from University of Pennsylvania.

Specialization : Knowledge discovery technologies and their application to biomedicine.

Title : Some simple tactics for deriving a deeper analysis of data

Abstract : Data analysis can be an error-prone process. Unfortunately, while powerful statistical and data mining software removes a lot of the difficulties in the mechanical part of process, they do not guide the analyst toward a deeper analysis. That is, these tools make an analyst a more efficient one, but they do not make him a more insightful one. In the main part of this talk, I will describe a few simple tactics for deriving a deeper analysis of data, given an initial hypothesis or question. Moreover, these tactics can be reduced in a simple manner to superset pattern search on the given datasets. In the remaining part of this talk, time permitting, I will describe some techniques for efficient superset pattern search on large datasets.

KEYNOTE SPEAKER 3

Keynote Speaker : Professor Wai Kiang (Albert) Yeap

Affiliation :

- Professor of Artificial Intelligence, Auckland University of Technology, Auckland, New Zealand
- Director of Centre for Artificial Intelligence Research Auckland University of Technology, Auckland, New Zealand

Bibliography : Professor Wai Kiang Yeap has strong interests in developing computational models of cognitive processes and in particular models for spatial cognition, language and infant learning. He did his PhD at the University of Essex in 1984. He joined the University of Otago in 1985 and moved to the Auckland University of Technology in 2000 where he is currently a Professor in AI and the Director for the Centre for AI Research. Recently, he has been a keynote speaker at the Pacific Rim International Conference on AI in 2014 and a HWK Fellow at the Institute for Advanced Study at Delmenhorst, Germany in 2012. He is also a member of the Editorial Board for Spatial Cognition and Computation Journal.

Specialization : Artificial Intelligence - Space and Language

Title : The Mind Modelling Conundrum (and a solution using robots)

Abstract : To understand how the mind works, we need to develop computational models of various mental processes. However, developing them, one faces a conundrum: how does one create models for these processes if one does not know what they compute? For example, in spatial cognition, it is argued that what is learned is a map of one's environment but the nature of such a map has remained elusive. In language, it is well known that we acquire the rules that govern its use but these rules appear unlearnable by infants. In this talk, I will discuss this conundrum in depth and, using my recently developed computational theory of spatial cognition as an example, I will outline a solution that involves empowering a robot with a "mental" process and studying its behaviour. Would such an approach pose an ethical dilemma?

KEYNOTE SPEAKER 4

Keynote Speaker : Dr Mohammad Reza Beik Zadeh

Affiliation : Big Data Analytic Consultant

Bibliography : An experienced researcher in the fields of artificial intelligence and computer science. An inspiring team leader in international R&D Organizations in the field of ICT. A dedicated lecturer and an innovative researcher in Artificial Intelligence, Semantic Technology, Big Data Analytics. A Data Scientist.

From 2012-2017, he has been involved in teaching, advanced research in the field of machine learning, genetic algorithm, and fuzzy logic as well as conducting workshops and proposing research centre of excellences in different universities in Kuala Lumpur. He, as a data scientist, has consulted several projects related to Big Data analytics projects and Big Data analytics applications for Malaysian government 4 Big Data projects under MAMPU (price watch, crime watch, HFMD prediction, Sentiment Analysis for patriotism). In these projects, he has been mostly involved in data analysis, data modelling, prediction modelling, visual analytics, etc. Recently, he has proposed Big Data CoEs to 4 universities (MMU,UM,UTM,UKM) in order to support bi data research and development as well as academic and technical training.

Title : Data Science and Big Data Analytics Impacts in Industry

CONFERENCE PROGRAM

29 November 2017

08:00 # Registration

08:30 # Opening Ceremony (Plaza 1)

Welcoming Remark: A/Prof. Dr. Rayner Alfred (On Behalf of the Conference Chairs)

Opening Remark: A/Prof. Ag. Asri Ag. Ibrahim (Dean, FKI, UMS)

09:00 # Keynote Speech 1

Emeritus Professor Ian Witten (The University of Waikato)

Title: *Big data, deep learning, and Weka*

09:40 # Keynote Speech 2

Professor Limsoon wong (National University of Singapore)

Title: *Knowledge Discovery Technologies and Their Application to Biomedicine*

10:20 # Coffee Break

10:40 # Session 1 (Plaza 1)

13:00 # Lunch

14:00 # Session 2 (Plaza 1)

15:20 # Coffee Break

15:40 # Parallel Sessions 3 (Plaza 2) and 4 (Plaza 3)

17:20 # Adjourn

19:00 # Conference Dinner

30 November 2017

08:00 # Registration

09:00 # Keynote Speech 3

Professor Wai Kiang Yeap (Auckland University of Technology)

Title: *The Mind Modelling Conundrum (and a solution using robots)*

09:40 # Keynote Speech 4

Dr Mohammad Reza Beik Zadeh

Title: *Data Science and Big Data Analytics Impacts in Industry*

10:20 # Coffee Break

10:40 # Parallel Sessions 5 (Plaza 2) and 6 (Plaza 3)

13:00 # Lunch

14:00 # Session 7 (Plaza 1)

15:20 # Coffee Break

15:40 # Session 8 (Plaza 1)

17:30 # Closing Ceremony

PARALLEL SESSIONS

ALL SESSIONS

SESSION (29/11)	CATEGORY	TIME	VENUE
1	COMPUTATIONAL ENGINEERING	[10:40 - 13:00]	Plaza 1
2	COMPUTATIONAL SCIENCE	[14:00 - 15:20]	Plaza 1
3	COMPUTATIONAL ENGINEERING	[15:40 - 17:20]	Plaza 2
4	COMPUTATIONAL SCIENCE	[15:40 - 17:20]	Plaza 3
SESSION (30/11)			
5	COMPUTATIONAL ENGINEERING	[10:40 - 13:00]	Plaza 2
6	COMPUTATIONAL SCIENCE	[14:00 - 15:20]	Plaza 3
7	COMPUTATIONAL SCIENCE	[14:00 - 15:20]	Plaza 1

VENUES FOR ALL SESSIONS

29th Nov 2017	PLAZA 1	PLAZA 2	PLAZA 3
10:40 - 13:00	ICCSE 1		
14:00 - 15:20	ICCSE 2		
15:40 - 17:20		ICCSE 3	ICCSE 4
30th Nov 2017			
10:40 - 13:00		ICCSE 5	ICCSE 6
14:00 - 15:20	ICCSE 7		

SESSION 1 : COMPUTATIONAL ENGINEERING (PLAZA 1)

(CHAIRPERSON: DR. FARANAK RABIEI)

Time	PID	Paper Title	Authors
10:40 - 11:00	1	MHD stagnation-point flow of a nanofluid past a stretching sheet with a convective boundary condition and radiation effects	**Nor Ain Azeany Mohd Nasir**, Anuar Ishak and Ioan Pop
11:00 - 11:20	2	Simulation and Fabrication of Micro Magnetometer Using Flip-Chip Bonding Technique	**Tengku Muhammad Afif Tengku Azmi** and Nadzril Sulaiman
11:20 - 11:40	6	ALM Based Services on HPM P2P Architecture	**Mourad Amad**, Abdelmalek Boudries and Lyes Badis
11:40 - 12:00	14	2-point Diagonal Block Method for Second Order Ordinary Differential Equations	**Nooraini Zainuddin** and Zarina Bibi Ibrahim
12:00 - 12:20	17	A Novel LABSWETSM Model for Sisko Fluid: A Flow Case Study of Newtonian and non-Newtonian Bores	**Siti Habibah Shafiai**, Aaron Keith Philip, Anis Afirah Mohamad Radhi, Nur Asreenawaty Mohd Asri, Azuraien Jaafar, Hee Min Teh and Ahmad Hadi M. Rasidi
12:20 - 12:40	20	Dual Quantum Channel Modelling of Quantum Key Distribution Protocol	**Kah Wing Hong**, Oi-Mean Foong and Tang Jung Low
12:40 - 13:00	22	Evaluating solar-driven ejector efficiency used in hybrid conventional air conditioning systems: a parametric study	**Bashir Elhub**, Sohif Mat, Kamaruzzaman Sopian, Abdenaser Elbreki and Ali Muftah

SESSION 2 : COMPUTATIONAL SCIENCE (PLAZA 1)

(CHAIRPERSON: DR. MOURAD AMAD)

Time	PID	Paper Title	Authors
14:00 - 14:20	3	Adaptive And Dynamic Hybrid Model For Software Project Management - A Review On Its Clarity And Usage To Improve Project Success	Marzanah A Jabar and **Mohanarajah Seenivasagam**
14:20 - 14:40	5	Routing approach in Wireless Sensor Network	**Abdelmalek Boudries**, Mourad Amad and Rabah Kassa
14:40 - 15:00	9	Development of Low Cost Laser Speckle Imaging System for Optical Assessment of Blood Flow	**Sheena Philimon**, Audrey K. C. Huong and Xavier T. I. Ngu
15:00 - 15:20	11	A Simulation Study of Modified Lambert Beer Model in the Prediction of Transcutaneous Bilirubin and Oxygen Saturation Level	**Pek Ek Ong**, Audrey K.C Huong and Farhanahani Mahmud

SESSION 3 : COMPUTATIONAL ENGINEERING (PLAZA 2)

(CHAIRPERSON: DR. CHIN KIM ON)

Time	PID	Paper Title	Authors
15:40 - 16:00	23	Natural cooling of PV module using Novel fin design	Kamaruzzaman Sopian, Abdenaser Elbreki, **Bashir Elhub** and Mohamed Alghoul
16:00 - 16:20	24	Pertinent Parameters Respecting Performance of Flat Plate PV/T Collector: An Overview	Kamaruzzaman Sopian, Abdenaser Elbreki, **Bashir Elhub** and Mohammad Alghoul
16:20 - 16:40	28	'Folded-Line' Left Handed Metamaterial for Efficient Architecture Implementation	**Suhailah Saibu** and Razak Mohd Ali Lee
16:40 - 17:00	29	Numerical Solution of Volterra Integro-Differential Equations Using Improved Runge-Kutta Methods	Nafsiah Md Lazim, **Faranak Rabiei**, Fatin Abd Hamid, Fudziah Ismail, Zanariah Abdul Majid, and Mohammad M. Rashidi
17:00 - 17:20	31	Development of Kenaf Nonwovens as Automotive Noise Absorption	Siti Nor Hawanis Husain, Nur Aiman Abdul Razak, **Azrin Hani Abdul Rashid**, Musli Nizam Yahya, Nurul Zakiah Zamri Tan, Muhammad Farid Shaari, Salwa Mahmood, Noraini Marsi and Harris Mubashir Mohamad Isa
17:20 - 17:40	42	Extraction and Graph Representation of Disease-Disease Associations From Biomedical Journals Using Support Vector Machines	**Andrew Laron**, Daniel Stanley Tan, Alicia Cornista Alfon, Michael Baclig, Maria Luisa Daroy, Angelyn Lao, Nathalie Rose Lim-Cheng and Riza Batista-Navarro

SESSION 4 : COMPUTATIONAL SCIENCE (PLAZA 3)

(CHAIRPERSON: DR. DOREEN YING YING SIM)

Time	PID	Paper Title	Authors
15:40 - 16:00	13	Computational Economic Evaluation of Channel Dredging as a Flood Protection Measure	**Balqis Mohamed Rehan**
16:00 - 16:20	15	Comparing the Efficiency and Effectiveness of Two Software Requirements Prioritization Methods: An Experimental Study	**Balsam A.J. Mustafa** and Amirul Sukemi
16:20 - 16:40	16	Features Selection of Artificial Neural Network Model for Bivariate Patterns Recognition	**Mohamad Azrul Azhad Mohd Haizan**, Ibrahim Masood, Ong Pauline and Mohd Helmy Abd Wahab
16:40 - 17:00	18	Pushing Constraints by Rule-Driven Pruning Techniques in Non-Uniform Minimum Support for predicting Obstructive Sleep Apnea	**Doreen Ying Ying Sim**, Chee Siong Teh and Ahmad Izuanuddin Ismail
17:00 - 17:20	19	Artificial Neural Network Modelling of Meander Lines for Delay Based Applications	Kah Seng Sam, **Chan Hong Goay**, Nur Syazreen Ahmad and Patrick Goh
17:20 - 17:40	37	Spatial Signature Algorithm (SSA): A New Approach in Countermeasuring XML Signature Wrapping Attack	Khaled Juma Ahmed Swessi, **Madihah Mohd Saudi**, Nurzi Juana Mohd Zaizi and Azreena Abu Bakar
17:40 - 18:00	49	Structural Behavior of Non-Uniform Mat Foundation on Weak Sandy Soil	**Zubair Syed**, Nada Alkhatib and Esra'A Hejah

SESSION 5 : COMPUTATIONAL ENGINEERING (PLAZA 2)

(CHAIRPERSON: DR. JOE HENRY OBIT)

Time	PID	Paper Title	Authors
10:40 - 11:00	25	Performance Evaluation of a Modified Stepped Solar Still	**Kamaruzzaman Sopian**, Ali Muftah and Bashir Elhub
11:00 - 11:20	26	Performance Modelling of Daylighting through Box Window DSF Low Energy Office Building under Intermediate and Clear Sky Conditions	**Kamaruzzaman Sopian**, Omkalthum Elayeb, Bashir Elhub and Mohammad Alghoul
11:20 - 11:40	36	Adding a Constant on the NARMAX model for Modeling Dynamic Systems	**Zakwan Mansor**, Mohd Zakimi Zakaria, Azuwir Mohd Nor, Mohd Sazli Saad and Mohamad Ezral Baharudin
11:40 - 12:00	39	Field Programmable Gate Array (FPGA) Based Microwave Oven	**Bhuvaneswari Thangavel**, Nor Hidayati Abdul Aziz, Md.Jakir Hossen and Venkataseshiah Cinthalaku
12:00 - 12:20	40	As(V) Adsorption Kinetics of Humic Acid Coated Magnetite Particles	**Nisha Kumari Devaraj**, Samer Riyad Elghazali, Lokesh Srinath Ganapathe, Mukter-Uz-Zaman A.S.M. and Hin Yong Wong
12:20 - 12:40	47	Influence of Data Transformation in Supervised Learning Algorithm	**Ganabathi Nadarajoo**, Nur Fadilah Ab. Aziz, Nur Azzammudin Rahmat, Zuhaila Mat Yasin, Norfishah A. Wahab, Nur Ashida Salim
12:40 - 13:00	51	Performance Evaluation of AdaBoost on Face Recognition	**Rayner Pailus** and Rayner Alfred

SESSION 6 : COMPUTATIONAL SCIENCE (PLAZA 3)

(CHAIRPERSON: DR. TEH NORANIS MOHD ARIS)

Time	PID	Paper Title	Authors
10:40 - 11:00	30	A Survey on Annotation in Sentiment Analysis	**Fitrah Rumaisa**, Halizah Basiron and Zurina Sa'Aya
11:00 - 11:20	32	Big Data and The Adaptive Teaching Competencies	**Andino Maseleno** and Miftachul Huda
11:20 - 11:40	35	Sequential Integer programming for solving real-life university curriculum-based course timetabling	**Mansour Hassani Abdalla**, Joe Henry Obit and Rayner Alfred
11:40 - 12:00	38	3D Facial Action Units Recognition for Happy and Sad Expression	Norhaida Hussain, **Hamimah Ujir**, Irwandi Hipni Mohamad Hipiny and Jacey Lynn Minoi
12:00 - 12:20	52	Automated Test Input Generation for Detecting SQL injection Vulnerability using Set Theory Concept	**Nor Fatimah Awang**, Azizah Abd Manaf and Ahmad Dahari Jarno
12:20 - 12:40	55	Decision Support System Level Economic Classification Of Citizens Using Fuzzy Multiple Attribute Decision Making	Muhammad Muslihudin, Rita Irviani, Prayugo Khoir, **Andino Maseleno**

SESSION 7 : COMPUTATIONAL SCIENCE (PLAZA 1)

(CHAIRPERSON: DR. ANDINO MASELENO)

Time	PID	Paper Title	Authors
14:00 - 14:20	41	Fuzzy AHP in a Knowledge-Based Framework for Early Flood Warning	**Teh Noranis Mohd Aris**, Maslina Zolkepli and Noraini Che Pa
14:20 - 14:40	43	Dynamic Data Sampling Approach by Using Price Distribution of Crude Palm Oil to Forecast High Magnitude Price Movement	**Kwan Hua Sim**, Isaac Goh and Kwan Yong Sim
14:40 - 15:00	44	Comparative Study on Artificial Intelligence Techniques in Crime Forecasting	**Alif Ridzuan Khairuddin**, Razana Alwee and Habibollah Haron
15:00 - 15:20	45	A Management Framework for Developing a Malware Eradication and Remediation System to Mitigate Cyberattacks	**Nasim Aziz**, Zahri Yunos and Rabiah Ahmad
15:20 - 15:40	50	A Comparative Study of Optimal Energy Efficient Path Planning Algorithms for an Unmanned Air Vehicle	Sanjoy Kumar Debnath, Rosli Omar and **Nor Badariyah Abdul Latip**

Contents

(SESSION 1)
COMPUTATIONAL ENGINEERING

10:40 - 13:00
PLAZA 1

CHAIRPERSON:
DR. FARANAK RABIEI

MHD Stagnation-Point Flow of a Nanofluid Past a Stretching Sheet with a Convective Boundary Condition and Radiation Effects

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

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Abstract

In this paper, the investigation of MHD stagnation point flow of a nanofluid past a stretching sheet with a convective boundary condition and radiation effects is carried out numerically. Similarity transformation is used to reduce the governing partial differential equations into third and second order non-linear ordinary differential equations. These equations are then being solved numerically using a problem solver built in the MATLAB software. The numerical solutions for the skin friction coefficient, local Nusselt number, velocity and temperature profiles for different values of the physical parameters are presented graphically and discussed further. The results indicate that the velocity and the temperature are influenced by the magnetic parameter M, Brownian motion parameter *Nb* and radiation parameter *Nr*. The local Nusselt number and the skin friction coefficient are affected significantly in the presence of suction at the boundary.

Keywords: Magnetohydrodynamic, stagnation-point flow, Heat transfer, Nanofluid.

Simulation and Fabrication of Micro Magnetometer Using Flip-Chip Bonding Technique

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Abstract

Magnetic field detection has been widely accepted in many applications such as military systems, outer space exploration and even in medical diagnosis and treatment. Low magnetic field detection is particularly important in tracking of magnetic markers in digestive tracks or blood vessels. The presence of magnetic fields' strength and direction can be detected by a device known as magnetometer. A magnetometer that is durable, room temperature operation and having non-movable components is chooses for this project. Traditional magnetometer tends to be bulky that hinders its inclusion into micro-scaled environment. This concern has brought the magnetometer into the trend of device miniaturization. Miniaturized magnetometer is usually fabricated using conventional microfabrication method particularly surface micromachining in which micro structures are built level by level starting from the surface of substrates upwards until completion of final structure. Although the miniaturization of magnetometer has been widely researched and studied, the process however is not. Thus, the process governing the fabrication technique is studied in this paper. Conventional method of fabrication is known as surface micromachining. Besides time consuming, this method requires many consecutive steps in fabrication process and careful alignment of patterns on every layer which increase the complexity. Hence, studies are done to improve time consuming and reliability of the microfabrication process. The objective of this research includes designing micro scale magnetometer and complete device fabrication processes. A micro-scale search coil magnetometer of 15 windings with 600μm thickness of wire and 300μm distance between each wire has been designed.

Keywords: Magnetometer, microfabrication, miniaturization, micro-scale.

ALM Based Services on HPM P2P Architecture

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Abstract

Application Layer Multicast (ALM) is considered as an attractive and promoting approach for implementing large scale multicast services. In ALM, multicast functionalities are implemented at the edge instead of the core network. As opposed to IP multicast, ALM requires no infrastructure support and can be easily deployed in the Internet. In this paper, we propose a new efficient and scalable model for optimizing application layer multicast using HPM as underlying architecture. This solution benefits from P2P properties and characteristics. In this contribution, we consider a new optimized algorithm for tree construction simultaneously for each ring of HPM. The global tree construction algorithm is composed of two steps. In the first step, we construct a sub-tree for each ring; the second step is to build a global tree using sub sets of adjacent rings in HPM architecture. The proposed solution inherits from main P2P attributes such as: scalability and fault tolerance that characterize HPM. Preliminarily performance evaluations show that results are globally satisfactory, the depth of the resulting multicast tree is controlled and optimized.

Keywords: P2P, Group Communication, Media Streaming, ALM.

2-point Diagonal Block Method for Second Order Ordinary Differential Equations

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Abstract

In this paper, a 2-point diagonal block method is proposed to solve stiff second order initial value problem of ordinary differential equations (ODEs) directly without reducing it to an equivalent first order system. This block method gives the solutions at the points of t_{n+1} and t_{n+2}. The derivation is based on the backward differentiation formula (BDF) and by utilizing up to four back values. Four resulting formulas are implemented simultaneously and hence four solutions are produced for each successful integration step. Numerical performance comparison is made with the existing methods to demonstrate the efficiency of the proposed method. It is shown that the proposed method is efficient on solving stiff ODEs with less computational time and converged faster.

Keywords: Block Method, Ordinary Differential Equations, Second Order.

A Novel LABSWE^{TSM} Model for Sisko Fluid: A Flow Case Study of Newtonian and non-Newtonian Bores

Siti Habibah Shafiai[1], *Aaron Keith Philip*[1], *Anis Afirah Mohamad Radhi*[1], *Nur Asreenawaty Mohd Asri*[1], *Azuraien Jaafar*[1], *Teh Hee Min*[1] *and Ahmad Hadi M. Rasidi2*[2]

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Abstract

A new LABSWE^{TSM} (Turbulent-Sisko Modelling) model was developed to solve non-Newtonian (Sisko) fluid flow by extending the current Newtonian-based LABSWE^{TM} model. A novel Bhatnagar-Gross-Krook single relaxation time which considers the eddy viscosity of a non-Newtonian Sisko fluid during turbulent flow was introduced in the model. The performance of the model was gauged based on the case studies of bore waves propagating over a dry, frictionless, horizontal plane subjected to Newtonian and non-Newtonian (Sisko) fluid. Analytical comparison for the surface profiles generated using the novel numerical model, for both Newtonian and Sisko flow cases, showed excellent regression fit correspond to the ideal bore flow theory ($r^2 > 0.9$). Contrary, satisfactory results was achieved when compared with the theoretical model of real bore flow with achieved r^2 of 0.5027 for the Sisko fluid. Alternatively, comparison of the surface flux with the experimental results also showed satisfactory fit for both test cases. Overall, this highlight the applicability of the novel LABSWE^{TSM} to simulate non-Newtonian flow problems.

Keywords: Dam-break bore wave, Lattice Boltzmann Method, Sisko fluid, Thin film scheme, Turbulence Modelling.

Dual-Quantum Channel Model Quantum Key Distribution Protocol

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Abstract

With the increasing information being shared online, the vast potential for cyber-crime is a serious issue for individuals and businesses. Quantum key distribution (QKD) provides a way for distribution of secure key between two communicating parties. However, the current Quantum Key Distribution method, BB84 protocol, is prone to several weaknesses. These are Photon-Number-Splitting (PNS) attack, high Quantum Bit Error Rate (QBER), and low raw key efficiency. Therefore, this paper aims to improve Quantum Bit Error Rate and raw key efficiency by employing a dual-quantum channel for information transmission. Simulated data and results on QBER and raw key efficiency based on single quantum channel and dual quantum channel are presented which shows an improvement in both the QBER and raw key efficiencies in the presence of an eavesdropper.

Keywords: Quantum Key Distribution, BB84, cryptosystem, QBER, raw key efficiencies.

Evaluating Solar-Driven Ejector Efficiency Used in Hybrid Conventional Air Conditioning Systems: A Parametric Study

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Abstract

In this paper, we investigated the performance of a hybrid ejector cooling system combined with a vapor system. The ejector system was operated at 70% and 80% of the compression cycle in the simulation. The hybrid ejector air conditioning system was modeled with EES software, and the refrigerant used was R134a. For maximum ejector performance, superheated conditions were assumed for the primary flow stream. The solar generator temperature ranged from 80 °C to 100 °C. The condenser temperature was from 30 °C to 40 °C, and the operating temperature of the evaporator was 8 °C to 12 °C. The obtained results indicated that under any operating condition, the optimum values of pressure drop in the suction chamber, ejector area ratio, ejector outlet pressure, and cooling coefficient of performance (COP) differed. The COP of the basic ejector cycle reached 0.616, given that the ejector cooling cycle worked in different conditions. By comparison, the value for the hybrid combined with the compression cycle system reached 0.91, which increased from 25% to 29% compared with the basic ejector cycle. The performance of the system with the ejector was better than that of the basic system even in the case of off design operation.

Keywords: ejector efficiency, hybrid cooling, EES, air conditioning.

(SESSION 2)
COMPUTATIONAL SCIENCE
14:00 - 15:20
PLAZA 2

CHAIRPERSON:
DR. MOURAD AMAD

Adaptive And Dynamic Hybrid Model For Software Project Management: A Review On Its Clarity And Usage To Improve Project Success

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Abstract

Software developers have shown a lot of interest in using agile approaches and methods to manage projects. The Agile Manifesto in 2001 provided a good basis to use this as it formulated its 4 values and 12 principles. Adaptability was a common feature in the Agile Manifesto to make agility happen and there appears a need to combine dynamism to ensure agility takes a more concrete and effective role. Whilst the term adaptability is discussed more often than dynamism by most researchers, the clarity in its meaning needs improvement as the terms are used interchangeably. This paper proposes a useful clarity on its differences and how it should be used. In addition, this approach would also facilitate the current research interest in mixing and combining software development methodologies to create hybrid versions as pure methods (traditional and agile) have not worked well in most software projects.

Keywords: Project Success, Software Development, Agile, Methodologies, Adaptive, Dynamic, Hybrid.

Routing approach in Wireless Sensor Network

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Abstract

In this paper, we propose a routing approach in wireless sensor network by taking into account the connectivity maintenance between sensor nodes. Each node contains a weight calculated according to its remaining energy rate. During the routing process, if the transmitting node receives an update package of a node participated in the routing, then it re-examines its routing way choice, by comparing the weight of the updated routing way with the weight of the routing ways received at the time of its search of a way for the routing in its routing table. An example analysis and simulation show that the proposed approach is effective.

Keywords: Connectivity, Sensors networks, Routing protocols, Failure node, Energy constraint.

Development of Low Cost Laser Speckle Imaging System for Optical Assessment of Blood Flow

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Abstract

This paper aims to demonstrate the feasibility of using a low cost laser speckle imaging built for the detection of changes of tissue blood flow with different experimental conditions. Images of anterior portion of the wrist of four healthy adult volunteers illuminated by a laser source of wavelength 650 nm were collected via a monochromatic charge-coupled device (CCD) imager. The mean blood flow perfusion was predicted as 3.92 ± 1.47 and 2.90 ± 1.39, respectively, for measurements at rest condition and during blood flow occlusion. This work showed the ability of the developed system to detect changes in blood flow perfusion with differences in the experimental conditions. However, further works are required to further confirm the suitability of the system before it is used for different clinical applications such as monitoring of blood flow during diabetic foot ulcers healing following standard medical treatment.

Keywords: Blood Flow Rate, Laser Speckle, Multispectral Imaging.

A Simulation Study of Modified Lambert Beer Model in the Prediction of Transcutaneous Bilirubin and Oxygen Saturation Level

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Abstract

This study aims to investigate the feasibility of using Modified Lambert Beer model (MLB) in the prediction of one's bilirubin concentration and blood oxygen saturation value, SO_2. This quantification technique is based on a priori knowledge of extinction coefficients of bilirubin and hemoglobin derivatives in the wavelength range of 442 – 500 nm. The validity of the predicted value was evaluated using attenuation data from TracePro for a single-layered skin model with varying bilirubin concentration. The results revealed some promising trends in the estimated bilirubin concentration and considerably good accuracy with mean absolute error of 9.11% in the predicted SO_2 value. The large mean relative error of 0.599 observed in the predicted bilirubin concentration value could be due to the insufficiency of the MLB at describing changes in the light attenuation with the underlying bilirubin absorption processes. This study concluded that the proposed analytic method can possibly be used for measurement of one's blood oxygen saturation level but further works need to be done in modifying the employed model to improve the accuracy of the predicted bilirubin concentration.

Keywords: Bilirubin Concentration, Blood Oxygen Saturation, Modified Lambert Beer Law.

(SESSION 3)
COMPUTATIONAL ENGINEERING

15:40 - 17:20
PLAZA 2

CHAIRPERSON:
DR. CHIN KIM ON

Optimizing PV Module Efficiency Using Planar Reflector and Fin Design

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Abstract

High temperature or low solar radiation level led to a significant PV module efficiency drop. Using planar reflector would increase solar radiation level but at the same time increases PV module temperature. Therefore, reducing PV module temperature is essential. Heat dissipation technique would be a reasonable option in terms of cost, maintenance and simplicity when compared with heat recovery option. In addition, at the same reference ambient temperature the expected temperature reduction of PV module with planar reflector and efficient heat dissipation approach is more than PV module cooled naturally. Therefore, the aim of this study is to combine planar reflector and back plate extended surface to the PV module to optimize its efficiency. The effect of longitude and interrupted fins on PV performance parameters are going to be investigated. 3-D, Navier–Stokes energy equations were solved using ANSYS, FLUENT, CFD software program to perform numerical computations. Response surface method (RSM)/Design of experiment (DOE) is carried out to come out with the superior design and optimum design parameters. The optimum design and optimum parameters are determined based on PV module temperature and efficiency. The results revealed that the longitude fins has a higher performance compare to interrupted fins in reduction the PV module temperature. Furthermore, it is found that thickness of longitude fin above 2 mm showed a negligible effect on the PV power and efficiency. In addition, the optimum number of fins (10-25) and the height of fins (100-300mm) are 15 and 200mm respectively. Finally, the temperature of PV module combined with planar reflector and longitude fins is reduced about 18.2^{o}C compared with reference PV module.

Keywords: Heat Dissipation Technique, Longitude and Interrupted Fins, Optimum Design for Thermal Regulation, CFD.

Pertinent Parameters Respecting Performance of Flat Plate PV/T Collector: An Overview

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Abstract

Over the past decades, PV/T technology has attracted many researchers because of their higher efficiency compared with the conventional PV system. The research and development aspects of PV/T collectors were addressed by many researchers. There are numerous studies in the literature discussing the climate, design and operational parameters affecting PV/T collector performance. However, the generalized compilation of these standards has not been addressed and reviewed in the literature. This article presents the most important parameters and their influence in determining the performance of the PV module power and efficiency. The aforementioned parameters that affect the thermal, electrical, and overall efficiency of PV/T systems are intensively reviewed. Overall, the most important finding gained from this literature review are highlighted in the lessons learned section.

Keywords: Photovoltaic Thermal (PV/T), Heat Transfer, Influence of Parameters Enhancement, Electrical Efficiency, Thermal Efficiency, Overall Efficiency.

'Folded-Line' Left Handed Metamaterial for Efficient Architecture Implementation

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Abstract

The design of artificial metamaterial (MTM) has been proposed as an effective medium with extracted scattering parameter by applying NWR equation to achieved negative permittivity and permeability. The architecture of 'Folded-Line' Left-handed metamaterial (FL-LHM) consists of split ring resonator, SRR is designed and modified using LC lump elements analysis to extend bandwidth and operational frequency at 6 GHz to 12 GHz. In this study, we purposed metamaterial unit cell design and then simulate the performance in terms of the distribution of electric and magnetic fields, absorption, transmittance and reflectance. The unit cell of FL-LHM as a medium to control electromagnetic waves that can cause backwave propagation is used to observed electromagnetic response of induced current in the unit cell. This design has its own advantages in term of FL-LHM parameter width, thickness, and absorption bandwidth and transmittance wavelength which might be severely important for particular purposes such as waveguiding or sensing application.

Keywords: Folded-Line Left Handed Metamaterial, LHM, Double Side Backward Wave, Permittivity, Permeability.

Numerical Solution of Volterra Integro-Differential Equations Using Improved Runge-Kutta Methods

Nafsiah Md Lazim[1], *Faranak Rabiei*[1,2], *Fatin Abd Hamid*[1], *Fudziah Ismail*[1,2], *Zanariah Abdul Majid*[1,2] *and Mohammad M. Rashidi*[3]

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Abstract

In this paper, we proposed the numerical solution of Volterra integro-differential equations of the second kind using Improved Runge-Kutta method of order three and four with 2 stages and 4 stages, respectively. The improved Runge-kutta method is considered as two-step numerical method for solving the ordinary differential equation part and the integral operator in Volterra integro-differential equation is approximated using quadrature rule and Lagrange interpolation polynomials. To illustrate the efficiency of proposed methods, the test problems are carried out and the numerical results are compared with existing third and fourth order classical Runge-Kutta method with 3 and 4 stages, respectively. The numerical results showed that the Improved Runge-Kutta method by achieving the higher accuracy performed better results than existing methods.

Keywords: Volterra Integro-Differential Equation; Improved Runge-Kutta Method; Quadrature Rule.

Development of Kenaf Nonwovens as Automotive Noise Absorption

Siti Nor Hawanis Husain[1], *Nur Aiman Abdul Razak*[1], *Azrin Hani Abdul Rashid*[1], *Musli Nizam Yahya*[2], *Nurul Zakiah Zamri Tan*[1], *Muhammad Farid Shaari*[1], *Salwa Mahmood*[1], *Noraini Marsi*[1], *Harris Mubashir Mohamad Isa*[1]

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Abstract

Getting rid of unwanted noise in car compartment is necessary and really significant measure for automotive makers. This research was directed to produce nonwoven material from Kenaf fiber using the needle-punching machine and the ability of the produced material to absorb sound will be tested. The performance in sound absorption of the sample was analyzed by the sound absorption coefficient (SAC) and noise reduction coefficient (NRC) using the impedance tube test referring to ASTM E1050-98. The sound absorption frequencies were evaluated utilizing the two-microphone transfer function technique in the impedance tube that has a 100 mm diameter for low frequency and 28 mm for high frequency, 0 Hz to 4000 Hz respectively. The physical examination also was executed according to ASTM D1772 to determine the density and the thickness of each sample. The parameter verified in this research is the number of layers to form the samples and it also were compared with the commercial products. As the outcome of this research, the sound absorption coefficient (SAC) showed that the sound reduction coefficient value was increased as the number of layers of the sample increase. In summation, the result also proved that the denser the samples, the higher the absorption coefficient value. On the other hand, for the noise reduction coefficient (NRC), overall result showed slight differences between each sample. The result is due to the rating is an average, two materials with the same rating might not perform the same. Referring to the previous research, the sample with higher areal density is dependable for higher sound reduction and there is a negative relationship between area density and bulk density of needle-punched nonwoven and sound reduction. With the rise in the number of density of nonwoven fabric, the sound reduction through the fabric increases at first but after the maximum it remains almost unaffected.

Keywords: Acoustic, Kenaf, Needle-punched Nonwoven, Noise, Sound absorption, Sound reduction coefficient.

Extraction and Graph Representation of Disease-Disease Associations From Biomedical Journals Using Support Vector Machines

Andrew Laron[1], *Nathalie Rose Lim-Cheng*[1], *Daniel Stanley Tan*[1,2], *Michael Baclig*[3,4], *Alicia Cornista Alfon*[3], *Maria Luisa G. Daroy*[3,4], *Angelyn R. Lao*[5,6], *Riza Batista-Navarro*[7]

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Abstract

A semantic analysis-based system for extracting biological events and relations between biochemical entities and diseases from journal texts and organizing these relations into a graph format is presented. The system is trained on manually annotated articles and identifies general associations between entities if instances of relations between them were extracted. The system had an overall accuracy of 84.35% when tested with five-fold cross-validation on 86 articles from PubMed Central OpenAccess, significantly outperforming a co-occurrence based approach.

Keywords: Bioinformatics, Relation Extraction, Supervised Learning.

(SESSION 4)
COMPUTATIONAL SCIENCE
15:40 - 17:20
PLAZA 3

CHAIRPERSON:
DR. DOREEN YING YING SIM

Computational Economic Evaluation of Channel Dredging as a Flood Reduction Protection Measure

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Abstract

Channel dredging is one of the many engineering options that can reduce flood risk. It is known for its ability to reduce peak level when flood events occurring. Although dredging has been a popular choice for flood mitigation for local areas, there are lack of robust approaches available to evaluate the economic performance of such project in the planning stage. This has result in poor decision of fund allocation and also deficiency in prioritizing investment. This study offers an approach to evaluate the economic performance of channel dredging using a risk-based analysis within a cost-benefit analysis framework. The R programming language is used for the evaluation, which involves manipulation of algorithms and processing real world data. A case study to illustrate the methodology is performed for an appraisal period of 20 years. The final indicators for the economic performance show that the channel dredging has an estimated benefit-cost ratio of higher than 1 and an estimated positive net present value. This indicates that the investment put forward to increase the capacity of a channel is cost-effective. However, the benefit-cost-ratio that is slightly above 1 implies a weak indication for investment allocation. Overall, the study shows that the methodology has the capacity to serve as a decision support tool to provide explicit information of the economic performance of flood protection measures.

Keywords: Computational decision analysis, Channel dredging, flood risk, cost-benefit analysis.

Comparing the Efficiency and Effectiveness of Two Software Requirements Prioritization Methods: An Experimental Study

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Abstract

In software development, stakeholders requirements are crucial. If the candidate requirements for a single product release are wrongly identified, there is a high chance to design the incorrect software. Hence, requirement prioritization is an important task to develop the right product, particularly when the software project is subject to time, budget, and other resources constraints. The challenge becomes how to select important requirements to implement a system that meets user's demands. There are different views about the characteristics of prioritization methods and which method is more effective than others described in the literature. This study presents an empirical evaluation of two requirements prioritization methods to compare their efficiency and effectiveness in terms of time taken to conclude the priority of requirements, the method's ability to scale up to many more requirements, accuracy of results, ease of use, and finally how much the method is attractive for the one who uses it. A controlled experiment is designed to investigate two prioritization methods, the cumulative voting, and numerical assignment. The results of the experiment show that numerical assignment method is superior to cumulative voting in the above characteristics.

Keywords: Controlled Experiment, Method Efficiency, Effectiveness, Prioritization Methods, Requirements Engineering.

Features Selection of Artificial Neural Network Model for Bivariate Patterns Recognition

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Abstract

In quality control of in-progress manufactured parts such as precision components in machining process, an artificial neural network (ANN) model is known to be effective in recognizing the sources of unnatural variation based on specific bivariate control chart patterns (BCCP). Bivariate quality control example can be found in machining diameters at front end and rear end of a precision shaft. A proper design of neural network architecture and its input representation is important to achieve efficient recognition. The utilization of raw data input representation, however, gave limited recognition accuracy. In this paper, the features input representation was studied to improve the accuracy in classifying nine classes of BCCP. Based on values of summary statistical features, design of experiments analysis was applied in selecting the effective features, i.e., mean, multiplication of mean and standard deviation, maximum and minimum, and last value of exponentially weighted moving average. The selected features input representation produced an outstanding recognition accuracy (normal pattern = 97.85%, shifts patterns = 97.76%) compared to the raw data input representation (normal pattern = 74.65%, shifts patterns = 76.39%). This study gave a new perspective in designing a features-based ANN recognizer in bivariate quality control.

Keywords: Artificial Neural Network, Design of Experiments, Bivariate Control Chart Patterns, Quality Control.

Pushing Constraints by Rule-Driven Pruning Techniques in Non-Uniform Minimum Support for Predicting Obstructive Sleep Apnea

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Abstract

Boosted Association-Ruled Pruned Decision Tree (ARP-DT), the improved version of the Boosted Decision Tree algorithm, was developed by using association-ruled pre- and post-pruning techniques with referring to the pushed minimum support and minimum confidence constraints as well as the association rules applied. The novelty of the Association-Ruled pruning techniques applied mainly embark on the pre-pruning techniques through researching on the maximum number of decision tree splitting, as well as the post-pruning techniques involving subtree replacement and subtree raising. The applied association rules (ARs) augment the mining of frequent itemset(s) or interesting itemset(s) such that appropriate pre-pruning or subtree pruning techniques can be applied before AdaBoost ensemble is implemented. The ARs applied involve the Adaptive Apriori (AA) augmented rule definitions and theorem as stated in this research which focus on the characteristics of the datasets accessed so as to streamline the rule-driven pruning techniques on the Boosting algorithms developed for predicting Obstructive Sleep Apnea (OSA). There is a significant improvement in the prediction accuracies when comparing the classical boosting algorithms and Boosted ARP-DT being applied to the OSA datasets and those online databases from UCI data repositories.

Keywords: Boosted Association-Ruled Pruned Decision Tree; pushed minimum support; minimum confidence constraints; association rules (ARs); subtree replacement and subtree raising; frequent itemset(s); Adaptive Apriori.

Artificial Neural Network Modelling of Meander Lines for Delay Based Applications

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Abstract

This paper presents the application of artificial neural networks (ANNs) for meander line modeling. In this work, meander lines on microstrips will be investigated to determine a correlation between the physical parameters and the propagation delay of the lines. The simulation of the meander lines is done using the Momentum simulator in Keysight's Advanced Design System (ADS) to generate the S-parameters which will be used in a transient simulation to determine the propagation delay. Neural network models are then created for propagation delay prediction. Finally, both the ADS and ANN results for simulated delay times of meander lines are compared to validate the performance and to justify the proposed method. Results show that the ANN model is able to accurately predict the delay of the meander lines with an accuracy above 99.5% with a speed-up of over 2000x.

Keywords: Artificial Neural Network, Meander Lines, Propagation Delay.

Spatial Signature Algorithm (SSA): A New Approach in Countermeasuring XML Signature Wrapping Attack

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Abstract

This paper introduces a new approach in counter measuring XML signature wrapping attack called the Spatial Signature Algorithm (SSA). The motivation for proposing the SSA approach is due to the limitation of the SOAP (Simple Object Access Protocol) in handling the XML signature wrapping attack. A different strategy is to be planned in order to deter such attack without extensive computational expense. Spatial Signature Algorithm builds upon the notion of ratio signature that is recommended by a research in biotechnology. The research suggests the possibility of diagnosing a specific disease based on the idea of ratio, specifically on the comparative relationship between elements to detect the emergence of certain threats. Bridging this notion to security, the principle of using space and ratio to detect abnormality is extended to the application of spatial information and digital signature to detect and combat the XML wrapping signature attack.

Keywords: SOAP, SESOAP, Counter measuring XML Wrapping Signature Attack, Spatial Signature Algorithm.

Structural Behavior of Non-Uniform Mat Foundation on Weak Sandy Soil

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Abstract

Rapid urban growth due to increase in population and economic prosperity has witnessed large number of high-rise residential and commercial structures in cities like Abu Dhabi. The weak salty-sand that covers most of cities in UAE requires construction of costly deep foundation. As a solution to the requirement of large numbers of parking spaces for high-rise structures, especially in city areas, require basement-parking provision. To accommodate the high number of parking spaces needed for the building users, the underground floors on a mat foundation are considered as a solution for vertical expansion in a safe and an economic way. The mat foundations are often designed based on simplified design methods. Large number of piles which are associated with an over-designed uniform thickness mat foundation can significant increase the total cost of foundation for a high-rise building. Although, the application of non-uniform mat foundation can contribute in saving, the structural behavior of these non-uniform mat foundations on soil types similar to the soil of UAE is not well studied. To address this gap in knowledge on the behavior of both uniform and non-uniform mat foundations, a parametric study was conducted to explore the structural responses of different schemes of mat foundation on typical UAE soil conditions using finite element analysis. Results from this study provide a better understanding of the behavior of typical uniform and non-uniform mat foundation on a weak sandy soil. The findings of this study suggest some savings in material percentage by changing the mat scheme from uniform to non-uniform thickness subjected to UAE or similar soil conditions.

Keywords: Non-uniform mat foundation, Weak sandy soil, Structural behavior.

(SESSION 5)
COMPUTATIONAL ENGINEERING

10:40 - 13:00
PLAZA 2

CHAIRPERSON:
DR. JOE HENRY OBIT

Performance Evaluation of a Modified Stepped Solar Still

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Abstract

It is difficult maintaining minimum depth in conventional basin type solar still, as the area is large. However In an attempt to increase production per unit area by decreasing the thermal inertia of the water mass, this can be achieved in basin-type stepped solar still in which the area of the basin is minimized by having small trays. In this study a new type of stepped solar still was designed and fabricated. in addition theoretical analysis has been carried out to predict the distilled water output, mainly of the numerical models of basin-type solar still have the evaporative heat and mass transfer correlations using the temperature and vapor pressure on the water surface and the cover of still .The energy balance equations results are obtained by solving of the energy balance equations for various elements; absorber plate, saline water and glass cover of the solar still are solved. The results indicated that, the productivity of the modified stepped still is higher than that for stepped solar still without modification and conventional solar still approximately by 83% and 103%. Also, the daily efficiency for modified stepped still is higher than that for stepped solar still without modification and conventional solar still approximately by 23% and 57% respectively.

Keywords: Solar Still, Conventional Basin, Stepped Still.

Performance Modelling of Daylighting through Box Window DSF Low Energy Office Building under Intermediate and Clear Sky Conditions

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Abstract

The use of daylight in DSF buildings has become an important strategy to improve energy efficiency by minimizing artificial lighting requirements thus increasing daylight harvesting in the office buildings. The present paper assesses of daylighting performance in the box window DSF office building under intermediate and clear sky conditions. IES VE simulation tool is adopted to reveal the effect of different design parameters on daylighting performance inside DSF office. The implemented design parameters are window wall ratio of internal façade (10-100)%, cavity depth of DSF (0.5-3.0) m. Low-e clear single glazing for the exterior facade and low-e clear double glazing for the interior façade were selected from the list available in the (IES VE) simulation tool. The study shows that the increase of the WWR of the internal façade dramatically produces a decrease the average indoor illuminance from 10 to 40%. The average indoor illuminance in the cavity at a minimum of implemented outdoor illuminance is in the range of (2–6 klux), but, it is between (13-30 klux) at the maximum outdoor illuminance. The optimum design parameters of DSF office building obtained are CD of 2.5m and WWR range of 60-70% are appropriate as a maximum and minimum values respectively.

Keywords: Daylight, Commercial Office Building, Box window DSF, intermediate and clear sky conditions, Window-to-Wall Ratio (WWR).

Adding a Constant on the NARMAX model for Modeling Dynamic Systems

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Abstract

In this paper, a constant is included in the nonlinear auto-regressive moving average with exogeneous input (NARMAX) model structure called C-NARMAX model. The aim is to investigate the performance of the C-NARMAX model and compare to the conventional NARMAX model for modeling CE8 coupled electric drives system. Multi-objective optimization differential evolution (MOODE) algorithm is used as a model structure selection algorithm to obtain the final model from both conventional NARMAX and C-NARMAX models. Model predicted output (MPO) test is applied in order to reveal the performance of each model. Through the MPO test, it is concluded that C-NARMAX model offers a better predicted output than conventional NARMAX model.

Keywords: C-NARMAX, NARMAX, System identification, Multi-objective optimization differential evolution.

Field Programmable Date Array (FPGA) Based Microwave Oven

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Abstract

In this paper, an FPGA-based microwave oven controller design implemented using Altera DE1 development board is presented. The motivation of the work is to explore FPGA for real time applications. First, a microwave oven controller design architecture that could fit into Altera DE1 board, utilizing on-board peripherals, is developed. Then, using the proposed architecture, the design is implemented using Verilog HDL. The microwave oven functionalities are demonstrated using Altera DE1 development board by means of Quartus II 13.0 software. The testbenches are created and waveforms are generated using Modelsim 10.1d software. The simulation results for various cases have been presented and the results confirmed the basic functionalities of the practical microwave oven used in our daily life.

Keywords: FPGA, Microwave Oven, DE1, Quartus II.

As(V) Adsorption Kinetics of Humic Acid Coated Magnetite Particles

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Abstract

The discharge of arsenic (As) ions into water is a serious issue which needs to be curbed effectively due to the hazards of As exposure. Hence, a simple, cheap and effective removal procedure is required in order to meet water quality standards. In this research, magnetite (Fe3O4) particles coated with humic acid were investigated for its efficacy in adsorbing As. The particles were synthesised by varying the temperature (70, 80 and 90°C) and concentration of humic acid (1%, 2% and 3%) to study the corresponding changes in terms of size, structure and As adsorption performance. The phase and size were characterised with X-ray Diffraction and Dynamic Light Scattering technique, respectively. The performance of the synthesised particles in removing As(V) was quantitatively analysed using the colorimetric method with the assistance of a double-beam Ultraviolet-Visible Spectrophotometry. XRD analysis confirms the formation of magnetite while samples coated with 2% and 3% humic acid exhibited less crystallised structures. From the DLS analysis, Fe3O4 was found to have an average size of 2238nm while humic acid coated-Fe_3O_4 had increased particle sizes of between 2400nm to 3712nm. All the synthesised magnetite particles were able to remove certain percentages of As(V) from water. The highest adsorption capacity obtained was 1.984 mg/g and the lowest was 1.376 mg/g for a contact times of 40 minutes and 20 minutes, respectively.

Keywords: Magnetite, Humic Acid Coating, Arsenic Adsorption Kinetics.

Influence of Data Transformation and Preprocessing in Supervised Learning Algorithm

Ganabathi Nadarajoo[1], *Nur Fadilah Ab. Aziz*[1], *Nur Azzammudin Rahmat*[1], *Zuhaila Mat Yasin*[2], *Norfishah A. Wahab*[2], *Nur Ashida Salim*[2]

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Abstract

Nowadays, the ideas of integrating machine learning techniques in power system has become more popular due to their pattern recognition, learning capabilities and high speed of identifying and detecting things. A successful machine learning technique is the one with fast computation time as well as high accuracy. This paper investigates the importance of data transformation and preprocessing in machine learning algorithm. Three type of data transformation method which are rescale, normalize, and standardize are studied using electrical fault location data from OPENDSS simulation. The proposed algorithm used Python-based split train and k-fold model evaluation to evaluate the performance of the transformation methods in terms of accuracy and computation time. This paper shows that data transformation in machine learning can improve the performance of the developed algorithm in terms of accuracy as well as computation time.

Keywords: Machine learning, classification, data transformation, supervised learning.

Performance Evaluation of MADBoost on Face Recognition

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Abstract

This paper reviews the classification of various techniques, algorithms and classifiers used for face recognition that include various feature extraction algorithms, feature selection methods, classifiers based on similarity, probabilistic and decision boundaries. A methodology is proposed that starts with facial detection using a real-time face region detection method using Haar wavelet and AdaBoost Viola-Jones cascade techniques. After the normalization processes, several methods are combined that includes feature reduction algorithms such as PCA, converting the face image to eigenface and eliminating noise and proceed with Enhanced Chaos Genetic Algorithm (ECGA) genetic algorithm to optimize the combination of feature selection, that not only maintain the diversity of collection but also enhance the global searching capability whereby genetic algorithm improves on data dimensional reduction. The next essential process is the ensemble approach for data modeling using Multiple Adaptive Diversify Booster (MADBoost) that allows multiple combination of feature extractions to adapt or to be trained using diversified classifiers classes whereby the combination of each diversification are corrected by the weighted error where it aims to minimize the weighted error that helps us in getting the best structure ensemble model classifier for the purpose of data modeling processes. Final ensemble data modeling will be the complex classifiers model used against new images vectors for better and improved features. Then, a Multilevel Neural Network (MLNN) process under facial recognition detection and classification processes will be used in which incorrect matching or matching failure data are retained and be a feed back for the next recognition processes. Finally, there experiments are summarized based on three experimental setups. Based on the summary, the proposed algorithm have improved the overall process of Facial Recognition. The techniques are evaluated based on the percentage of matching success or recognition rate, incorrect matching rate and matching failures rate.

Keywords: Face recognition; Feature extraction, Feature Selection, Classifiers

(SESSION 6)
COMPUTATIONAL SCIENCE
10:40 - 13:00
PLAZA 3

CHAIRPERSON:
DR. TEH NORANIS MOHD ARIS

A Survey on Annotation in Sentiment Analysis

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Abstract

The research literature on sentiment analysis methodologies has exponentially grown in recent years. In any research area, where new concepts and techniques are constantly introduced, it is, therefore, of interest to analyze the latest trends in this literature. In particular, we have chosen to primarily focus on the literature of the last five years, on annotation methodologies, including frequently used datasets and from which they were obtained. Based on the survey, it appears that researchers do more manual annotation in the formation of sentiment corpus. As for the dataset, there are still many uses of English language taken from social media such as Twitter. In this area of research, there are still many that need to be explored, such as the use of semi-automatic annotation method that is still very rarely used by researchers. Also, less popular languages, such as Malay, Korean, Japanese, and so on, still require corpus for sentiment analysis research.

Keywords: Survey, Sentiment-Annotated, Methodology, Dataset.

Revolutionizing Education Through Technology: Big Data and Online Learning

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Abstract

The aim of this paper is to present revolutionazing education through online learning and big data. In the olden times, when technology has not progressed far enough, there is only one type of teaching and learning that was known: a chalk and blackboard, with the teacher and student being the main factor. Now, as in the 21st century, teaching can be taught without a teacher and learning can be done in various ways, either we are connected to the Internet or not, and also have the drive to strive for that certain knowledge. Online learning is referred to the delivery of learning, training or education via electronic means. It happened because of the revolutionising of technology and increased in standard of living. The technology includes many types of mass media, for example photos, voice, animation and many more. This application will react efficiently with the connection of the Internet. In addition, online learning can occur inside or outside the classroom. In fact, people nowadays use online learning as distance learning or blended learning, which blended learning means the use of technology during face-to-face interaction.

Keywords: Education, Blended Learning, Student, Big Data, Online Learning.

Sequential Integer Programming for Solving University Curriculum-Based Course Timetabling

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Abstract

This research propose two stages sequential integer programming (IP) approach for solving real-life university curriculum-based course timetabling problems (CB-UTT) in universiti Malaysia Sabah, Labuan international campus (UMSLIC). Like other timetabling problems, CB-UTT in UMSLIC has its own rules and features. The problem involves several hard constraints which need to be fully satisfied and soft constraints which satisfaction is very much desirable. In this research mathematical formulation and two stages sequential IP search methodology based on UMSLIC is proposed. The IP search methodology is tested over two real-life datasets, semester 1, session 2016/2017 and semester 2, session 20162017. The objective of this research is to generate high quality feasible CB-UTT which satisfies all the parts involved. The results show that the IP formulation proposed in this research is able to produce feasible solution in the first stage, and further improve by 10.9986% and 8.9164% respectively by solving soft constraints in the second stage without violating any hard constraints solved in the first stage. This IP approach is applicable towards the CB-UTT in UMSLIC

Keywords: Integer Programming, Curriculum Course Timetabling, Mathematical Formulation

3D Facial Action Units Recognition for Emotional Expression

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Abstract

The muscular activities caused the activation of certain AUs for every facial expression at the certain duration of time throughout the facial expression. This paper presents the methods to recognise facial Action Unit (AU) using facial distance of the facial features which activates the muscles. The seven facial action units involved are AU1, AU4, AU6, AU12, AU15, AU17 and AU25 that characterises happy and sad expression. The recognition is performed on each AU according to rules defined based on the distance of each facial points. The facial distances chosen are extracted from twelve facial features. Then the facial distances are trained using Support Vector Machine (SVM) and Neural Network (NN). Classification result using SVM is presented with several different SVM kernels while result using NN is presented for each training, validation and testing phase.

Keywords: Facial action units recognition, 3D AU Recognition, Facial Expression.

Automated Test Input Generation for Detecting SQL Injection Vulnerability using Set Theory Concept

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Abstract

The use of web application has grown rapidly because of user has changed their lifestyle in doing business, daily activities and social life. E-commerce, E-banking, E-book, social applications and much more are among the examples of web applications. However, at the same time, the number of vulnerabilities exist in the web application is increased as well. SQL injection is among the most dangerous vulnerabilities in web applications that allow attackers to bypass the authentication and access the application database. Security testing is one of the technique is required to detect the existence of SQL injection vulnerability in a web application. However, inadequate test input during testing, can affect the effectiveness of security testing. Therefore, the generation of test input is formulated by applying Cartesian product in Set theory concept in order to detect SQL injection vulnerability. Finally, the ideas obtained from our method will generate a set of test inputs automatically and able to exploit SQL injection vulnerability.

Keywords: Test Input Generation, SQL Injection Vulnerability, Security Testing.

Classifying the Level of Economic of Citizens using Fuzzy Multiple Attribute Decision Making

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Abstract

Economics is the first supply for the survival of a country, especially in the development, development and progress. The more developed a country is the better economic growth. Indonesia including the user databases on the economy, especially in the banking sector and the government. Government as the manager of the country's economy in order to make extra efforts of the people and citizens can get considerable economic assistance through various operations conducted by the government such as the division of poor rice and BPJS card. BPJS stands for Badan Penyelenggara Jaminan Sosial (Social Insurance Administration Organization). By doing classifying economic levels using Fuzzy Multiple Attribute Decision Making (FMADM) methods (Simple Additive Weighting) meant that applications created can be used as a tool to suppress errors and improve accuracy by minimizing the possibility of such a wrong target or targets. The application uses the input in the form of data that has a high level of security to be forged such as: proof of payment of electricity bills, vehicle tax, and property tax. Data from the family card to input the number of people staying. the results are sorted according emerged from the lowest to the highest. The calculations were already system and by calculation that has been designed is expected to work as expected.

Keywords: Level of Economic, Fuzzy Multiple Attribute Decision Making, Simple Additive Weighting.

(SESSION 7)
COMPUTATIONAL ENGINEERING

14:40 - 15:20
PLAZA 1

CHAIRPERSON:
DR. ANDINO MASELENO

Fuzzy AHP in a Knowledge-Based Framework for Early Flood Warning

Teh Noranis Mohd Aris[1], *Maslina Zolkepli*[1], *Noraini Che Pa*[2]

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Abstract

Knowledge is essential for early flood warning as it can save life and property. This paper presents a novel knowledge-based framework based on rainfall, river water level, sediment, cloud distance and cloud strength that contributes to flood in Malaysia as the criteria in the AHP for Multiple Criteria Decision Analysis (MCDM). AHP caters complex decisions during flood events in uncertainty condition and provides fast decision making. The proposed framework is applied to the Bernam River Basin dataset located in Selangor, Malaysia. The framework is expected to produce early flood warning to the public.

Keywords: Framework, Fuzzy AHP, Flood.

Dynamic Data Sampling Approach by Using Price Distribution of Crude Palm Oil to Forecast High Magnitude Price Movement

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Abstract

High magnitude commodity time series volatility is a major challenge faced the commodity industry. Though many time series models have been developed, few have wide adoption in the industry, and one of the key issues is the sampling interval used in the models. To date, little effort has been spent on mining historical data to determine the representativeness of interval sampling. This paper presents a novel approach in identifying price equilibrium for crude palm oil by mining the sampling amount through historical price distribution. Evaluation is done on the outcomes of the experiment, and analysis is performed on the attributes of each different criteria of the price distribution. The performance of the proposed approach is also compared to the conventional Bollinger Band with static sampling size. Overall, the preliminary results show that price distribution with leptokurtic distribution outperforms other price distribution patterns, this will definitely assist further works to devise a novel financial time series analysis technique.

Keywords: Price Distribution, Statistical Data Analysis, Time Series Analysis.

Comparative Study on Artificial Intelligence Techniques in Crime Forecasting

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Abstract

An application of efficient crime analysis is beneficial and helpful to understand the behaviour of trend and pattern of crimes. Crime forecasting is an area of research that assists authorities in enforcing early crime prevention measures. Statistical technique has been widely applied in the past to develop crime forecasting models. However, it has been observed that researchers have begun to shift their research interests from statistical model to artificial intelligence model in crime forecasting. Thus, this study is conducted to observe the capabilities of artificial intelligence technique in improving crime forecasting. The main objective of this study is to conduct a comparative analysis on forecasting performance capabilities of four artificial intelligence techniques, namely, artificial neural network (ANN), support vector regression (SVR), random forest (RF), and gradient tree boosting (GTB) in forecasting crime rate. Forecasting capability of each technique was assessed in terms of measurement of errors. From the result obtained, GTB showed the highest performance capability where it scored the lowest measurement of errors compared to SVR, RF, and ANN.

Keywords: Crime Analysis, Forecasting, Prediction, Multivariate Time Series Analysis, Artificial Intelligence Technique.

A Management Framework for Developing a Malware Eradication and Remediation System to Mitigate Cyberattacks

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Abstract

Malware threats are a persistent problem that interrupts the regular utilization of IT devices. For effective prevention of malware infections in computer system, development of a malware mitigation system needs to be developed. Malware mitigation system should encompass a thorough technical and management outlook to achieve an effective result. A Management Framework should thus be put in place to facilitate better management and effective outcomes of such a system. This research presents the identification, formulation and proposal of a Management Framework for the development of a malware eradication and remediation system to mitigate cyberattacks. The aim of this research is to construct a Management Framework that allows for the effective development of a malware eradication and remediation system. The method used in this work is qualitative research (observation and interviews) at organizations that have implemented similar systems. The framework covers specific areas that refer to the management of people, process and technology in designing a malware eradication and remediation system.

Keywords: Advanced Persistent Threat (APT), Critical National Information Infrastructure (CNII), Information Technology (IT), Internet of Things (IoT), Malicious Software (Malware).

A Comparative Study of Energy Efficient Path Planning Algorithms for Unmanned Air Vehicles

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Abstract

Unmanned Aerial Vehicle (UAV) is a type of autonomous vehicle for which energy efficient path planning is a crucial issue. The use of UAV has been increased to replace humans in performing risky missions at adversarial environments and thus, the requirement of path planning with efficient energy consumption is necessary. This study analyses all the available path planning algorithms in terms of energy efficiency for a UAV. At the same time, the consideration is also given to the computation time, path length and completeness because UAV must compute a stealthy and minimal path length to save energy. Its range is limited and hence, time spent over a surveyed territory should be minimal, which in turn makes path length always a factor in any algorithm. Also the path must have a realistic trajectory and should be feasible for the UAV.

Keywords: Energy efficient, UAV, Path planning, Optimal Path