

ISMS2016

Seventh International Conference

On

Intelligent Systems, Modelling and Simulation 2016

25 – 27 January 2016, Bangkok, Thailand

Conference Program

And Abstracts of Presented Papers

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On

Intelligent Systems, Modelling and Simulation 2016

25 – 27 January 2016, Bangkok, Thailand

Conference Chair	Assoc. Prof. Dr Tiranee Achalakul, King Mongkut's University of Technology Thonburi, Thailand.
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Local Arrangements Chair and Session Coordinators	Assist. Prof. Dr Santitham Prom-On Mr Patrawut Ruangkanokmas Mr Krittaphat Pugdeethosapol Secretariat: Ms Apinya Khamya, King Mongkut's University of Technology Thonburi, Thailand.
Registration Desk	Ms Ruedeemart Jessadapatharakul Mr Gantaphon Chalumporn King Mongkut's University of Technology Thonburi, Thailand.
General Chairs	Professor Dr David Al-Dabass, Nottingham Trent University, UK Professor Dr Ajith Abraham, Machine Intelligence Research labs (MIR)

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ISMS2016, Program at a Glance

ISMS2016 Conference Program at a Glance Conditions for Submission to IEEE-Xplore

1. Presenter must demonstrate deep and detailed knowledge of the paper content by utilizing the full 20 minutes presentation time.
2. The session chair must be satisfied the presenter has answered at least one question in full to the approval of both the session chair and the participants.
3. The value of conference attendance is to get maximum feedback from participants on the significance of the research being presented.
4. Speak clearly and slowly, do not 'mumble' or race through the sentences, moderate your voice to make sure attendees hear every word you say without shouting.

Session Code: **Mon.pm1.A** means Monday afternoon before tea break in room A. Other Time periods: am1, am2, pm1, pm2

Paper Code (PC): e.g. **K1** see following pages for a full list: Track letter: A, B, C . and paper number within track e.g. K1

Day-0: Sunday 24 January 2016: 5 to 6pm, Early registration desk opens for one hour, Century Park Hotel.

Time	Day-1: Monday 25 January 2016 (Keynote Speaker-1 & 2 + 36 papers)	
8.15 - 10.30	Mon.am1.A: (Chair: David Al-Dabass/Tiranee): Opening session and keynote Speaker-1 & 2: Prof Yong Men Teo and Prof Saman Halgamuge	
10.30 - 10.45	Refreshments	
	Room A	Room B
10.45 - 12.25, 5	Mon.am2.A (Chair: Rahul Gore-S4/Guo-F8): A1, A2, A3, A4, A5	Mon.am2.B (Chair: Tuba-A15/ Ilya-J3): B1, B2, C4, G1, N2
12.25 - 1.25	Lunch	
1.25 - 3.45, 7	Mon.pm1.A (Chair: Rommel-A2+K1+T3/Nelson-T2): A6, A7, A8, A9, A11, A13, A14	Mon.pm1.B (Chair: Tuba-A15/Dahlan-N2): F1, F3, F4, F5, F6, F7, F8
3.45 - 4	Refreshments	
4 - 6, 6	Mon.pm2.A (Chair: Dahlan-N2/ Oswin-A14): A15, A16, D1, D2, D3, I	Mon.pm2.B (Chair: Hiro-G1/Dewan-G1): J1, J2, J3, L1, L3, L4
6 - 6.15	Close of day-1 and photo opportunity	
7 - 8.30	Conference Dinner	
	Day-2: Tuesday 26 January 2016 (26 papers)	
8.15	Tue.am1.A: (Chair: David Al-Dabass/?): day-2 opening session	
8.15 - 10.15, 6	Tue.am1.A (Chair: Tuba-A15/Ilya-J3): K1, K3, K4, K5, K6, T1	Tue.am1.B (Chair: Chair: Guo-F8/Kaur-A9): M1, M2, S2, S3, S4, S6
10.15- 10.30	Refreshments	
10.30 - 12.50, 7	Tue.am2.A (Chair: Rahul Gore-S4/Rahim-K4): T2, T3, T4, T5, T6, T7, T8	Tue.am2.B (Chair: Ilya-J3/Oswin-A14): R1, R2, R4, R6, R7, N1, C1
12.50	Close of Conference, photo opportunity and Lunch	
2pm	Afternoon to explore culture of Bangkok and dinner (own expense)	
	Day-3 Wednesday 27 January 2016: Free Time/Social Program to explore the heritage, culture and history of Bangkok and Thailand	
S6: Late registration, not in printed program		

ISMS2016, Papers by Track

Seq	#	Track: 01-A Intelligent Systems	First author	Presenters names
A1	1570234989	<i>Deep Belief Networks with Feature Selection for Sentiment Classification</i>	Patrawut Ruangkanokmas	Ruangkanokmas
A2	1570236798	<i>Design of Alcohol Detection System for Car Users Thru Iris Recognition Pattern Using Wavelet Transform</i>	Rommel Anacan	Anacan
A3	1570238723	<i>Cloud Computing and Robotics for Disaster Management</i>	Nitesh Jangid	Sharma
A4	1570239324	<i>Intelligent Power Management System of Bangladesh Using Artificial Neural Network</i>	Md. Mahfuzur Rahman	Rahman
A5	1570241161	<i>Determining the Pressure Distribution on Water Pipeline Networks Using the Firefly Algorithm</i>	Lala Riza	Riza
A6	1570241168	<i>Modelling of Output Power Response for Switched Damping Electromagnetic Energy Harvester</i>	Beng Lee Ooi	Ooi
A7	1570241279	<i>An Algorithmic Method of Calculating Neighborhood Radius for Clustering In-Home Activities Within Smart Home Environment</i>	Duy Nguyen	Nguyen
A8	1570241446	<i>Mobile Users' Context Awareness Model Based on a Novelty Contextual-Soundscape Information</i>	Ho Sung Lim	Lim
A9	1570241882	<i>A Novel Technique for Reduction of Harmonics in Multilevel Inverters: A Survey</i>	Gagandeep Cheema	Kaur
A10	1570241914	<i>Recommending Learning Peers for Collaborative Learning Through Social Network Sites</i>	Mohammed Hassan	
A11	1570242034	<i>Human Activities Recognition in Android Smartphone Using Support Vector Machine</i>	Duc Tran	Tran
A12	1570242104	<i>Design of an Intelligent Home Assistant</i>	Md. Al-Amin	
A13	1570242150	<i>Chatbot Using A Knowledge in Database</i>	Bayu Setiaji	Setiaji
A14	1570242154	<i>Sentiment Classification of Film Reviews Using IB1</i>	Oswin Hartono	Hartono
A15	1570242182	<i>Constrained Portfolio Optimization by Hybridized Bat Algorithm</i>	Ivana Strumberger	Tuba
A16	1570244039	<i>Novel Contact Sensor Concept and Prototype Based on 2-DOF Vibration Absorber System</i>	Hussein Ali	Ali
		Track: 02-B Hybrid Intelligent Systems & Hybrid Soft Computing		
B1	1570234951	<i>Data Analysis to Generate Models Based on Neural Network and Regression for Solar Power Generation Forecasting</i>	Tushar Verma	Verma
B2	1570242099	<i>Improving Soft Computing Performance with Ant Colony Optimization for Multiclass Classification: The Application for Learning Style Classification</i>	Worapat Paireekreng	Sukpongthai
		Track: 03-C Methodologies, Tools and Operations Research		
C1	1570237384	<i>Revenue Efficiency Measurement with Undesirable Data in Fuzzy DEA</i>	Nazila Aghayi	Aghayi
C2	1570238545	<i>Simulators as Drivers of Cutting Edge Research</i>	Muhammad Raja	
C3	1570241497	<i>Comparison of Sensitivity for Consumer Loan Data Using Gaussian Naive Bayes (GNB) and Logistic Regression (LR)</i>	Rahul Pundlik	
C4	1570242192	<i>A Simulation-Based Reliability Analysis Approach of the Fault-Tolerant Web Services</i>	Yanjun Shu	Shu
		Track: 04-D Bio-informatics and Bio-Medical Simulation		
D1	1570241295	<i>Enhanced Viral Precursor MicroRNA Identification with Structural Robustness Features in Back-propagation Neural Network</i>	Songtham Anuntakarun	Anuntakarun
D2	1570242147	<i>Designing Machine-to-Machine (M2M) Prototype System for Weight Loss Program for Obesity and Overweight Patients</i>	Gunawan Wibisono	Astawa
D3	1570242487	<i>A Position Aware Mobile Application for E-Health Services</i>	I Hababeh	Alouneh

ISMS2016, Papers by Track

Track: 06-F Image, Speech and Signal Processing				
F1	1570234908	<i>A Comparative Study of Object Recognition Techniques</i>	Amit Singh	Singh
F2	1570236592	<i>Automatic Segmentation of Fuzzy Laser Lines with Sub-Pixel Accuracy From the Uneven Background During Robotic Arc Welding</i>	ZhenZhou Wang	
F3	1570240475	<i>Rotation, Translation, and Scale Invariant Bag of Feature Based on Feature Density</i>	Shih-Min Chen	Chiang
F4	1570240588	<i>Analysis and Dissection of Sanskrit Divine Sound "OM" Using Digital Signal Processing to Study the Science Behind "OM" Chanting</i>	Ajay Gurjar	Gurjar; Ladhake
F5	1570240608	<i>An Analysis of the Regularization Between L2 and Dropout in Single Hidden Layer Neural Network</i>	Ekachai Phaisangittisagul	Phaisangittisagul
F6	1570241022	<i>A Symbol Based Audio Watermarking Scheme Using Log Coordinate Mapping</i>	Bala Mallikarjunarao Garlapati	Garlapati
F7	1570241361	<i>A Probabilistic Approach for Human Action Recognition Using Motion Trajectories</i>	Srinivasa Rao Chalamala	Chalamala
F8	1570241381	<i>Radar Signal Classification Based on Cascade of STFT, PCA and Naive Bayes</i>	Yuanyuan Guo	Guo
F9	1570242250	<i>Online Blind Complex Source Separation Algorithm with In-phase and Quadrature Component Joint Processing</i>	Hua Yang	
Track: 07-G Industry, Business and Management				
G1	1570241978	<i>Innovative High Quality Aircraft Maintenance by Wisdom of Semantic Database Using Historical Data of Operation Staffs</i>	Dewan Abdullah	Abdullah; Takahashi
Track: 09-J Engineering: Civil, Mechanical, Chemical, Industrial, Manufacturing and Control				
J1	1570241563	<i>State Estimation of Thermal Systems with Multiple Operation Modes</i>	Shota Sasaki	Sasaki
J2	1570241866	<i>Modified Model - Following Sliding Mode Control Based on the Active Disturbance Rejection Control</i>	Hiroki Shibasaki	Shibasaki
J3	1570241926	<i>Methodology of Intelligent Energy Management System Simulation for Electric Vehicle Applications with Asynchronous Logic Controller</i>	Ilya Kavalchuk	Kavalchuk
Track: 10-K Energy, Power Generation and Distribution				
K1	1570236654	<i>Development and Design of PIC Controlled Float Buoy Wave Energy Converter System</i>	Rommel Anacan	Anacan
K2	1570237288	<i>A Nonlinear Adaptive State-Observer for Pressurized Water Reactors</i>	Zhe Dong	
K3	1570237744	<i>Average Current Feed-Forward Control for Multi-Modular Single-Phase UPS Inverters System</i>	Santosh Singh	Ghatak Choudhuri
K4	1570238562	<i>Modeling in Energy Sector: A Comparison Between Developing and Developed Countries</i>	Abdul Rahim Ahmad	Ahmad
K5	1570240615	<i>Steady-state Analysis of Three-Phase AC to DC Converter Using Current Injection Hybrid Resonant Converter for Power Factor Correction</i>	Rahimi Baharom	Baharom
K6	1570241600	<i>Trip Coil Signature Measurement and Analysis Techniques for Circuit Breaker</i>	Harriezan Ahmad	Ahmad
K7	1570241801	<i>Energy Harvesting From Vortex Induced Vibrations Using Vented Cylinders Mounted on Light Rail Locomotive</i>	Kishan Ramesh kumar	

ISMS2016, Papers by Track

		Track: 11-L Transport, Logistics, Harbour, Shipping and Marine Simulation		
L1	1570236352	<i>Simulated Civil Airplane Visual Conspicuity Experiments During Approaching and Departure in the Airport Vicinity</i>	Zhen Xie	Xie
L2	1570241042	<i>A Novel Travel Adviser Based on Improved Back-propagation Neural Network</i>	Min Yang	
L3	1570241452	<i>Prediction of Driver's Brake Pedal Operation in Vehicle Platoon System</i>	Hironori Suzuki	Suzuki
L4	1570242044	<i>Development of a Personal Mobility Vehicle for Short-range Transportation Support</i>	Yoshiyuki Takahashi	Takahashi
		Track: 12-M Virtual Reality, Visualization and Computer Games		
M1	1570241720	<i>Design of Eyegaze-sensitive Virtual Reality Based Social Communication Platform for Individuals with Autism</i>	Pradeep Raj Krishnappa Babu	Krishnappa Babu
M2	1570242184	<i>Parametric 3D Hand Model</i>	Maria Isabel Saldares	Saldares
		13-N Parallel and Distributed Architectures and Systems		
N1	1570237380	<i>Swarm Intelligence Algorithm for Job Scheduling in Computational Grid</i>	Mehdi EffatParvar	EffatParvar
N2	1570242201	<i>Design of Library Data Warehouse Using Snowflake Scheme Method</i>	Akhmad Dahlan	Dahlan
		Track: 15-R Mobile/Ad hoc wireless networks, mobicast, sensor placement, target tracking		
R1	1570238625	<i>Energy Consumption and Performance of Delay Tolerant Network Routing Protocols Under Different Mobility Models</i>	Bhed Bista	Bista
R2	1570240559	<i>A Model Based Connectivity and Localization Strategy for Vehicular Ad Hoc Networks</i>	Saurabh Jha	Jha
R3	1570240990	<i>A Dynamic Load Balancing Algorithm in Heterogenous Network</i>	Zhixiong Ding	
R4	1570241663	<i>Control Channel Load Balancing in Narrow Band Cellular IoT Systems Supporting Coverage Class</i>	Jung Wan Shin	Shin
R5	1570241816	<i>From AIMS2015. ReduxGO: Context-aware Mobile Recommender Application for Reducing Stop-and-Go Scenario</i>	Nazleeni Haron	Resented at AIMS2015
R6	1570242004	<i>A Study on Road Surface Condition Monitoring System Using Bicycle-Mounted Grid Laser Light</i>	Yoshiaki Taniguchi	Taniguchi
R7	1570242181	<i>Average Counting Via Approximate Histograms - Preliminary Report</i>	Jacek Cichoń	Gotfryd
R8	1570243093	<i>Fault Detection Prediction Analysis of Multi-Sensor Data Fusion Architecture</i>	Yasser Madany	
		Track: 16-S Performance Engineering of Computer & Communication Systems		
S1	1570241817	<i>From AIMS2015. Performance Analysis of Half-Sweep Successive Over-Relaxation Iterative Method for Solving Four-Point Composite Closed Newton-Cotes System</i>	Mohana Muthuvalu	Resented at AIMS2015
S2	1570241829	<i>Performance Analysis of Subcarrier Index Modulation-OFDM in Doppler Spread Environments</i>	Sung Yub Yu	Yu
S3	1570242185	<i>Noise Cancellation Using LMS Algorithm: An Interval Arithmetic Approach with Intlab</i>	Vidya Chidanand Mansur	Mansur
S4	1570242710	<i>Analysis of an IEC 61850 Based Electric Substation Communication Architecture</i>	Rahul Gore	Gore
S5	1570242914	<i>Simulation and Performance Evaluation of Vehicle-to-Vehicle (V2V) Propagation Model in Urban Environment</i>	Zeeshan Hameed Mir	

ISMS2016, Papers by Track

		Track: 17-T Circuits, Sensors and Devices		
T1	<u>1570234557</u>	<i>Quadrature Oscillator Using Operational Transresistance Amplifiers</i>	<u>Montree Kumngern</u>	Kumngern
T2	<u>1570236655</u>	<i>Design and Development of an Oil Spill Detection and Transmission System Using Artificial Illumination Using LEDs</i>	<u>Mark Nelson Pangilinan</u>	Pangilinan
T3	<u>1570237182</u>	<i>Design of a New External Signal Controlled Polymorphic Gates</i>	<u>Rommel Anacan</u>	Anacan
T4	<u>1570238651</u>	<i>Design and Implementation of PIC16F877A Microcontroller Based Data Acquisition System with Visual Basic Based GUI</i>	<u>Mousam Ghosh</u>	Ghosh
T5	<u>1570238880</u>	<i>4:2 and 5:2 Decimal Compressors</i>	<u>Prabir Saha</u>	Saha
T6	<u>1570242177</u>	<i>A Study on Thermal and Electrical Characteristics of Thermoelectric Cooler TEC1-127 Series</i>	<u>Najath Akram</u>	Akram
T7	<u>1570242490</u>	<i>Efficiency Improvement of Differential Drive Rectifier for Wireless Power Transfer Applications</i>	<u>Manal Mohamed</u>	<u>Mohamed</u>
T8	<u>1570244036</u>	<i>From AIMS2015. Error Source Identification in Measuring Soft Tissue Stiffness and Self Compensating This Error Using Three Probes Configuration</i>	<u>Ahmed Fouly</u>	Ali

ISMS2016, 25 – 27 January, 2016, Bangkok, Thailand

Time	A	B
	Monday, January 25	
08:15 am- 10:30 am	Mon.am1.A: <i>Keynote Speakers 1 and 2</i>	
10:45 am- 12:25 pm	Mon.am2.A: <i>Intelligent Systems</i>	Mon.am2.B: <i>Hybrid Intelligent Systems, Methodologies, Industry and Parallel/Distributed Systems</i>
01:25 pm- 03:45 pm	Mon.pm1.A: <i>Intelligent Systems</i>	Mon.pm1.B: <i>Image, Speech and Signal Processing</i>
04:00 pm- 06:00 pm	Mon.pm2.A: <i>Intelligent System and Bio- Informatics/ Medical Simulation</i>	Mon.pm2.B: <i>Engineering: Civil, Mechanical, Chemical, etc and Transport, Logistics, Harbour, Shipping etc</i>
	Tuesday, January 26	
08:15 am- 10:15 am	Tue.am1.A: <i>Energy, Power Generation & Distribution and Circuits, Sensors & Devices</i>	Tue.am1.B: <i>Virtual Reality, Visualization & Computer Games and Performance Engineering of Computer & Communication Systems</i>
10:30 am- 12:50 pm	Tue.am2.A: <i>Circuits, Sensors and Devices</i>	Tue.am2.B: <i>Mobile/Ad hoc wireless networks, etc, Parallel/Distributed Architectures/Systems and Methodologies</i>

Monday, January 25, 08:15 - 9:30, Room A

Mon.am1.A: Opening Words and Keynote Speakers 1

Chairs: David Al-Dabass (Nottingham Trent University, United Kingdom), Tiranee Achalakul (King Mongkut's University of Technology Thonburi, Thailand),

Keynote Speaker-1

Modelling and Formalizing Emergence

Yong Meng TEO

Department of Computer Science, National University of Singapore

Email: teoym@comp.nus.edu.sg

url: www.comp.nus.edu.sg/~teoym

The saying **The whole is greater than the sum of its parts** is often attributed to the Greek philosopher **Aristotle**. In a system, entity interactions give rise to new behavior of the whole or emergent behavior that cannot be reducible to the behavior of the individual entities. As systems grow in size and scale, advancing our understanding of emergent properties is both important and challenging. This keynote presents our work in addressing some of these challenges including formalizing weak emergence, quantifying the strength of emergence and modeling known emergence. Firstly, we present a computer science perspective in formalizing weak emergence [3]. This approach using cooperative-array grammar can be applied without prior knowledge of emergence but suffers from state-space explosion. Secondly, we propose methods for quantifying the strength of emergent properties with the aim of reducing the state-space and for classifying emergent property states in emergent discovery [2]. Lastly, we show that with prior knowledge of emergence, state-space is significantly reduced. Using Twitter social network as an example, we present two models: posting behavior model of Twitter users and a model for characterizing Twitter topic emergence and its intensity [1].

References

- [1] L. Birdsey, C. Szabo and Y.M. Teo, Twitter Knows: Understanding the Emergence of Topics in Social Networks, Proceedings of the Winter Simulation Conference, IEEE Computer Society Press, Huntington Beach, California, US, Dec 6-9, 2015. (**WSC 2015 Best Paper Award**)
- [2] C. Szabo, Y.M. Teo and G.K. Ghengleput, Understanding Complex Systems: Using Interaction as a Measure of Emergence, Proceedings of the Winter Simulation Conference, pp 207-218, IEEE Computer Society Press, Savannah, US, Dec 7-10, 2014.
- [3] Y.M. Teo, B.L. Luong and C. Szabo, Formalization of Emergence in Multi-agent Systems, Proceedings of ACM SIGSIM Conference on Principles of Advanced Discrete Simulation, pp 231-240, Montreal, Canada, May 19-22, 2013. [extended version in ACM Transactions on Modeling and Computer Simulation, Vol 26, No 1, Sep 2015].

Biography



TEO Yong Meng is an Associate Professor of Computer Science at the National University of Singapore (NUS) and an Affiliate Professor at the NUS Business Analytics Centre. He was a Visiting Professor at various institutes in the Chinese Academy of Science, China from 2010-2014. He received his PhD in Computer Science from the University of Manchester. His research interest is on parallel and distributed systems and applications. In the last five years, he focused on the performance of parallel systems, cloud computing, and emergent properties in complex systems. The paper on strategy-proof dynamic pricing of cloud computing resources won the **Best Paper Award** at the 10th International Conference on Algorithms and Architectures for Parallel Processing in 2010. Another paper, co-authored with his PhD student, on time-based semantic validation won the **ACM SIGSIM Best PhD Student Paper Award** in 2009. He leads the Computer Systems Research Group. He also served as Advisor (Directors Office) on Large-Scale Computing Systems, Asia-Pacific Science and Technology Centre, Sun Microsystems Inc. from 2007-2008, and External Grant Evaluator, European Research Council (Ideas Specific Program) from 2008-2013. He has received numerous external research grants including European Commission, Fujitsu Computers (Singapore) Pte Ltd, Fujitsu Laboratories Ltd (Japan), Sun Microsystems/Oracle (USA), Nvidia, and PSA Corporation (Singapore) among other institutions.

Monday, January 25, 09:30 - 10:30, Room A

Mon.am1.A: Keynote Speakers 2

Chairs: David Al-Dabass (Nottingham Trent University, United Kingdom), Tiranee Achalakul (King Mongkut's University of Technology Thonburi, Thailand),

Deep Near Unsupervised Learning for data analysis in Metabolomics, Drug-Drug Interaction Discovery and Human Gait Recognition

Prof Saman K. Halgamuge and Dr Isaam Saeed

Department of Mechanical Engineering and Biomedical Engineering Program
Melbourne School of Engineering, University of Melbourne, Vic 3010, Australia
e-mail: saman@unimelb.edu.au

Keywords- Clustering, Self Organising Maps, Unsupervised \Deep Learning, Big Data Analytics, Metabolomics, Human Gait

We have been working on the application of Machine Learning in Metabolomics, Drug-Drug Interaction Discovery and Human Gait Recognition [1-5], profiling large data sets. Extraction of vital information about 1) plant metabolomics that can improve the environment and food quality, 2) in vitro neuronal network behavior patterns for various drugs that can be used to characterize drugs for brain diseases and 3) human gait patterns that can reveal various diseases were among these applications. We have demonstrated with considerable success in using unsupervised clustering techniques to analyze genetic and metabolomic data. This includes analysis of drought resistance in wheat [4] and microbial metagenomes [5].

We introduced two methods: Near Unsupervised Learning (NUL) and Sub-sample Error Graphs (SEGs) [5] to analyze large amount of data. Self Organizing Map (SOM), which is one of the widely used Unsupervised Neural Networks, has been used as a data-mining tool due to its ability to map high dimensional data into a two dimensional feature map, which is expected to be topology preserving allowing users to visually identify clusters by their topological relationships in terms of their proximity on the map. The Growing Self Organizing Maps (GSOM) further allows the map size to be determined by the algorithm, which relies upon a user set parameter called Spread Factor (SF) [6]. The wide availability of GPUs for affordable prices allows faster comparison of various SOMs with different maps sizes taking away some of the advantages GSOM claimed. Further development of GSOM into a Dynamic SOM Tree exploits the possibility of varying SF to obtain multiple GSOMs from a small number of compact clusters to a large number of sparse clusters [7]. NUL methods can be applied on GSOM using a small number of labels that should be available for every class. This is however not realistic in some applications where the number of classes cannot be explicitly known. We propose a new method call Deep Near Unsupervised Learning (D-NUL), where Dynamic SOM tree is used instead of GSOM and the number of classes are not assumed to be known. The implementation of Dynamic SOM tree methods with varying SF on GPUs will make the computation with D-NUL possible for many problems in big data analytics.

Acknowledgment: This work is funded by Australian Research Council Grants: DP150103512 and LP140100670 and YourGene Australia. The current students: D. Herath, W. Wei, C. Wijetunga, D. Mendis, previous students Z. Li, K. Chan and collaborators: D. Ackland, S. L. Tang, B. Chang, A. Hsu, I. Saeed, U. Roessner, J. Browne, J. Li, S. Petrou and A. Bacic are acknowledged.

Biography



Prof. Saman Halgamuge is a Professor of the Department of Mechanical Engineering and Biomedical Engineering Initiative of School of Engineering, University of Melbourne. He graduated with Dipl.-Ing and PhD degrees in Electrical Engineering from Technical University of Darmstadt, Germany. His research interests are in intelligent systems, Deep Learning, Big Data Analytics and Optimization focusing on applications in Mechatronics and Bioengineering. These applications vary from Swarm Intelligence, Robot-animal collaborative systems, and Sustainable Energy generation to Bioinformatics and Neuro-Mechatronic Engineering. He has completed supervision of 28 PhD students and currently supervises a group of 15 PhD students. He is an Associate Editor of BMC Bioinformatics and IEEE Transactions on Circuits and Systems II: Express Letters and founding co-editor of Frontiers journal on Mechanical Engineering- Mechatronics section. He published over 250 research papers including a research book, 6 edited books, 20 book chapters, 100 journal articles, and over 130 refereed conference papers attracting 5650 Google Scholar (h-factor: 31) and 2550 ISI citations. He is listed among the top 1% most cited researchers by ISI's ESI. He is a member of Australian Research Council (ARC) College of Experts panel for Engineering, Information and Computing Sciences. His full profile is at:

http://scholar.google.com.au/citations?sortby=pubdate&hl=en&user=9cafqywAAAAJ&view_op=list_works.

Monday, January 25, 10:45 - 12:25, Room A

Mon.am2.A: Intelligent Systems

Chairs: Rahul Gore (ABB Corporate Research Center, Bangalore, India), Yuanyuan Guo (Tsinghua University, P.R. China)

10:45 *Deep Belief Networks with Feature Selection for Sentiment Classification*

Patrawut Ruangkanokmas (King Mongkut's University of Technology Thonburi, Thailand); Tiranee Achalakul (King Mongkut's University of Technology Thonburi, Thailand); Khajonpong Akkarajitsakul (King Mongkut's University of Technology Thonburi, Thailand)

Due to the complexity of human languages, most of sentiment classification algorithms are suffered from a huge-scale dimension of vocabularies which are mostly noisy and redundant. Deep Belief Networks (DBN) tackle this problem by learning useful information in input corpus with their several hidden layers. Unfortunately, DBN is a time-consuming and computationally expensive process for large-scale applications. In this paper, a semi-supervised learning algorithm, called Deep Belief Networks with Feature Selection (DBNFS) is developed. Using our chi-squared based feature selection, the complexity of the vocabulary input is decreased since some irrelevant features are filtered which makes the learning phase of DBN more efficient. The experimental results of our proposed DBNFS shows that the proposed DBNFS can achieve higher classification accuracy and can speed up training time compared with others well-known semi-supervised learning algorithms.

11:05 *Design of Alcohol Detection System for Car Users Thru Iris Recognition Pattern Using Wavelet Transform*

Rommel Anacan (Technological Institute of the Philippines-Manila, Philippines); Roberto Dela Cruz (Technological Institute of the Philippines, Philippines)

The purpose of this paper is to develop a system that will capture the Iris image of the driver to detect if he/she is drunk or not and develop a reliable algorithm for Iris Recognition. This paper is composed of hardware and software system which will focus on the implementation of algorithm based on Gabor Filter. The system consist of CCD Camera and Analog-to-Digital Converter which is linked into a MATLAB program to simulate the captured image which will then provide a signal going to the microcontroller and a relay circuit to manipulate the car ignition. If the MATLAB program detects that the driver is in the influence of alcohol a bypass system will follow through a password which will be recognize by the MATLAB program then the car/vehicle will start.

11:25 *Cloud Computing and Robotics for Disaster Management*

Nitesh Janqid (Green Research IT Solutions Pvt. Ltd., India); Bindu Sharma (Amity University Jaipur, India)

The power of cloud computing may also be realized for mankind if some dedicated disaster management clouds will be developed at various countries cooperating each other on some common standards. It is possible to realize a real-time disaster management cloud where applications in cloud will respond within a specified time frame. If a Real-Time Cloud (RTC) is available then for intelligent machines like robots the complex processing may be done on RTC via request and response model. The complex processing is more desirable as level of intelligence increases in robots towards humans even more. Therefore, it may be possible to manage disaster sites more efficiently with more intelligent cloud robots without great lose of human lives waiting for various assistance at disaster site. Real-Time Garbage Collector and Real-Time Specification for Java(RTSJ) technologies can be used to develop real-time applications in cloud.

11:45 Intelligent Power Management System of Bangladesh Using Artificial Neural Network

Md. Mahfuzur Rahman (American International University-Bangladesh, Bangladesh); Arifur Rahman Sabuj, Navid Hossain, Joy Shaha and Shuvra Saha (American International University - Bangladesh, Bangladesh); A. S. M. Baki Billah (American International University-Bangladesh, Bangladesh)

In this research work, we have developed an intelligent power management system using Artificial Neural Network (ANN) which will control load shedding automatically in a local distribution area and utilize different types of power generation units like conventional and non-conventional energy sources. If generation is not sufficient to meet the load demand, then ANN network will anticipate and predict when the load demand is greater than generation and will suggest specifically the area where load shedding would be appropriate. Utilizing and manipulating different types of seasonal and occasional load data (which is actually divided into different areas such as residential-load, industrial-load, commercial-load and VIP-load), we have designed the artificial neural network so that it will automatically show us the area where load-shedding would be preferable on the basis of priority. Hence, the priority is given by the area where maximum load-shedding is desired.

12:05 Determining the Pressure Distribution on Water Pipeline Networks Using the Firefly Algorithm

Lala Septem Riza and Jajang Kusnendar (Universitas Pendidikan Indonesia, Indonesia); Riyan Hays (Universitas Serang Raya, Indonesia); Munir Munir (Universitas Pendidikan Indonesia, Indonesia); Kuntjoro Adji Sidarto (Institute of Technology Bandung, Indonesia)

Along with the increase of population, companies delivering clean water to customers are dealing with some problems on their networks, e.g., flow assurance. It is to guarantee the availability of water on customers or to provide sufficient pressure distribution at any points on the network. This study aims to model and calculate the pressure distribution on the water pipeline networks. Using the analogy of Kirchoff's Law for the electrical current to the flow of water in pipelines, we construct a non-linear equation system for representing the water distribution system. In this research, we consider the Hazen-Williams equation for modeling fluid dynamics. Then, it is solved by using a method of swarm intelligence, namely the firefly algorithm. To provide a better illustration, a case using the Hanoi network is presented. A model and computation determining pressure distribution/head at each point of the network are obtained, along with a comparison with EPANET.

Monday, January 25, 10:45 - 12:25, Room B

Mon.am2.B: Hybrid Intelligent Systems, Methodologies, Industry and Parallel/Distributed Systems

Chairs: Milan Tuba (John Naisbitt University, Faculty of Computer Science & University of Belgrade, Serbia), Ilya Kavalchuk (RMIT Vietnam & RMIT Vietnam, Vietnam)

10:45 Data Analysis to Generate Models Based on Neural Network and Regression for Solar Power Generation Forecasting

Tushar Verma (Indian Institute of Technology Ropar, India); Alampratap Tiwana (Indian Institute of Technology, Ropar, India); Chakradhar Reddy Chandupatla (IIT Ropar, India); Vikas Arora and Pallikuth Devanand (Tata Power Delhi Distribution Ltd., India)

This paper presents methods for forecasting solar power generation by a solar plant. Solar power generation depends primarily on relative position of sun and some extrinsic as well as intrinsic factors. Extrinsic factors such as cloud cover, temperature, wind speed, rainfall and humidity have been used with intrinsic ones such as degradation of solar panels as inputs for proposed techniques for generation forecasting. The authors have used multiple linear regression, logarithmic regression, polynomial regression and artificial neural network method on the data of past one year (January 2014-December 2014) for creation of forecasting models. These forecasting models are then compared on the basis of their accuracy to forecast the solar generation.

11:05 Improving Soft Computing Performance with Ant Colony Optimization for Multiclass Classification: The Application for Learning Style Classification

Worapat Paireekreng, Duangjai Jitkongchuen and Warattha Sukpongthai (Dhurakij Pundit University, Thailand); Rossukon Suwannakoot (Nakhon Phanom University, Thailand)

Several areas such as education implement data mining technique to solve the problem related to classification. The unseen data are classifier using the built model from data mining. However, the multiclass classification seems to be difficult to improve the performance of the built classification model. Therefore, there are many attempts to improve the performance. This research aims to improve the performance of multiclass classification using Ant Colony Optimization. The customized Ant Colony Optimization (c-ACO) is proposed. It can handle the continuous data type and perform better than the traditional algorithm. The c-ACO uses feature selection with rule based to reduce least influent attributes. This leads to enhance computational time. The proposed technique is based on learning style prediction which addresses multiclass classification problem. The results showed that the proposed technique obtained the higher accuracy rate than ensemble technique using vote algorithm. This was implemented to application of learning style prediction.

11:25 A Simulation-Based Reliability Analysis Approach of the Fault-Tolerant Web Services

Yanjun Shu, Zhibo Wu, Hongwei Liu and Yixiang Gao (Harbin Institute of Technology, P.R. China)

Service-oriented computing is emerging as a new way to developing extensible the computing system which evolves from the component-based software engineering. Reliability is an important factor for choosing, ranking and compositing web services. As there are many web services provide the same function on the internet, applying the fault-tolerant strategies is an effective way to improve the reliability. However, the existing reliability analysis approaches for web services are seldom considering the effect of different fault-tolerant strategies. Simulation-based approaches have been used to component-based software reliability analysis which can study the different architecture and the impact of various failure behaviors. In this paper, the algorithms of discrete-event simulation for common fault tolerant strategies of web services are proposed. Based on these algorithms, the simulation-based reliability analysis approach is implemented. The ability of the simulation approach in complex failure scenarios is exhibited by several experiments.

11:45 Innovative High Quality Aircraft Maintenance by Wisdom of Semantic Database Using Historical Data of Operation Staffs

Dewan Abdullah (Dewan Air Express, Pakistan); Hironao Takahashi (Greenwich University, Pakistan)

The fare cost has become the major selection factor for majority of the passengers in today's highly dynamic aviation business. LCCs offering high value propositions are being selected by majority of the passengers. Airlines with amicable aircraft safety and maintenance records employ appropriate maintenance policies and strive to retain veteran maintenance staff. But due to high growth in aviation industry, airlines are now facing shortage of experienced staff and as a result new and less experienced staff is assigned much crucial aircraft maintenance activities. Airline operators have realized that in order to ensure high safety record, they must have high quality maintenance system and documents with highly experienced maintenance staff. To achieve these goals, this paper proposes wisdom of semantic database using historical data from maintenance operation of staff. The wisdom not only enhances the quality of aircraft maintenance but also contributes in reducing the total cost of maintenance operations.

12:05 Design of Library Data Warehouse Using Snowflake Scheme Method

Akhmad Dahlan and Ferry Wahyu Wibowo (STMIK AMIKOM Yogyakarta, Indonesia)

The existence of the library as a technical service unit in a campus is very important to provide services to the academic community. With the increasing number of library collections, the database system that is built has to be able to improve the oriented services on providing data warehouse. Especially at managerial levels require complete information, quickly and accurately to support the process and planning, evaluation, and right decision-making. The design of the data warehouse is determined by the description of the need for proper information, the selection of valid data source, the design of data warehouse using snowflake scheme design and ETL processes to integrate, extract, cleanse, transform and populate into the data warehouse. The snowflake scheme design method has applied to accommodate more dimension tables, because it will have other dimension sub-table, so it can generate more information that will be used as material to make a decision.

Monday, January 25, 13:25 - 15:45, Room A

Mon.pm1.A: Intelligent Systems

Chairs: Rommel Anacan (Technological Institute of the Philippines-Manila, Philippines), Mark Nelson Pangilinan (Mapua Institute of Technology, Philippines)

1:25 *Modelling of Output Power Response for Switched Damping Electromagnetic Energy Harvester*

Beng Lee Ooi (Quest International University Perak, Malaysia); A. Rashid A. Aziz (Universiti Teknologi Petronas, Malaysia)

The scavenging of electrical energy from surrounding environment has a number of attractions, and vibration energy is seen as one of the most potential sources. Switched damping is a method to improve the operational bandwidth of an electromagnetic energy harvester by alternatively switches the values of electrical damping coefficients of the device at different quadrants during the oscillation. From the literature, reasonably large range of resonant frequency shift can be achieved by this method, yet none of the works has demonstrated the model of the output power response. This paper presents the numerical modeling of the output power response of a damping switching device. The predictive results indicate that for a largely deviated effective loads system, significant power loss will be incurred to the output, which reduces the effectiveness of the system. Hence, reducing the merit of the device even with a large achievable range of shifted resonant frequencies.

1:45 *An Algorithmic Method of Calculating Neighborhood Radius for Clustering In-Home Activities Within Smart Home Environment*

Duy Nguyen (The University of Information Technology (UIT), VNU-HCMC, Vietnam); Tien Le (School of Computer Science and Engineering, IU, VNU-HCMC, Ho Chi Minh City, Vietnam, Vietnam); Son Nguyen (University of Information Technology - VNUHCM & Faculty of Computer Engineering, Vietnam)

Activity clustering and recognition is one of the most important research trends about smart home. Taking place inside a sensor smart home, activities differ from each other at typical characteristics such as sensor sets triggered as well as temporal ones. In this work, we present a smart home infrastructure and propose a method of calculating neighborhood radius for clustering and recognizing in-home activities based on temporal characteristics. Experiment results show that the new method is proved to be easier and more flexible in finding neighborhood radius for clustering than the original DBSCAN algorithm and helps to generate several times as many smart contexts for activity recognition and next-activity forecast as the clustering results reported in Enamul Hoque et al 's research work

2:05 *Mobile Users' Context Awareness Model Based on a Novelty Contextual-Soundscape Information*

Ho Sung Lim, Jun Lee and Yong-Jin Kwon (Korea Aerospace University, Korea)

With the wide spread of smartphones, providing contextualized information for mobile environment has been in demand, and many researchers have explored the topic of context awareness based on sensors in smartphones. The state-of-the-art method in this field only uses for input simple data such as location, current time, user activity and provides simple output. Various events that could take place in a given place and time are not distinguished for user. Implementation of such a feature requires additional contextual data. In this paper, we define associations of user's contextual data with sound from smartphone microphone and propose a method that discerns user's contextual information through background sound. Using the Bayesian Network, we combine our defined associations with locational and temporal data used in existing methods to discern user's context. The proposed context-discerning model and existing model are compared for validation.

2:25 A Novel Technique for Reduction of Harmonics in Multilevel Inverters: A Survey

Gagandeep Kaur Cheema (Punjab Technical University, Jalandhar, India); Gagandeep Kaur (Punjab Technical University, India)

The widespread use of harmonics-sensitive digital gadget are developing a near-epidemic of "power high-quality" problems, which might be being addressed by means of both customers and providers of electric energy. Numerous types, styles, and abilities exist within the field of instrumentation and diagnostic system for the detection, recording, and analysis of the harmonics distorted waveform. The essential shortage is in experienced strength machine engineers who can interpret the facts, diagnose the problems, and propose practical answers. This review is one attempt to employ Artificial Intelligence (AI) or intelligent water drop algorithm inside the Harmonics analysis expert system (HAES). The aim is to perform the analysis on the manner of applying this AI method that includes: schooling the consumer, measurements (non-obligatory), prognosis, and to answer the strength of the system for harmonics disturbances to acceptable power.

2:45 Human Activities Recognition in Android Smartphone Using Support Vector Machine

Duc Ngoc Tran (University of Information Technology & UIT, Vietnam)

In this study, we designed and constructed a system to identify human actions using integrated sensors in smartphones. There are six actions that are selected for recognition include: walking, standing, sitting, lying down, up the stairs, down the stairs. In this system, Support Vector Machine (SVM) is used to classify and identify action. Collected data from sensors are analyzed for the classification model - the model file. The classification models are optimized to bring the best results for the identified human activity. After forming the classify model, the model will be integrated into the system to identify the human activities. Human activities recognition system is written on Windows and Android platforms and operate in real time. The accuracy of the system depends on selected features and the quality of the training model. On the Android system running on smartphone with 248 features achieve 89.59% accurate rate.

3:05 Chatbot Using Knowledge in a Database

Bayu Setiaji and Ferry Wahyu Wibowo (STMIK AMIKOM Yogyakarta, Indonesia)

The chatter-bot or chatbot aims to make conversation between human and machine. The machine has been embedded knowledge to identify the conversation and making a decision itself as response to answer the question. The response principle is matching the sentence input from the user. From the input it will be scored to get the similarity of the sentences, the higher the score the more similarity of the reference sentences. The sentence similarity calculation in this paper using bigram to divide input as list of the sentence. The knowledge of chatbot are stored in the database. The chatbot consists of core and interface accessing that core which is in relational database management systems (RDBMS). The database has been employed as knowledge storage and interpreter as stored programs of function and procedure sets for pattern-matching requirement. The interface is standalone which has been built using programing language of Pascal and Java.

3:25 Sentiment Classification of Film Reviews Using IB1

Oswin Hartono, Gloria Virginia and Antonius Rachmat (Duta Wacana Christian University, Indonesia)

Review of an object or product is important to public judgment of the product. Review can be used in film industry to consider a movie is worth to watch or not. Sentiment classification is used to detect the class of a commentary or review. The purpose of this research is to classify film reviews from Rotten Tomatoes using text mining methods. Classification methods are various like Naive Bayes, Instance Based Learning, Decision Tree, SVM. And IB1 (Instance Based Learning 1) is used on this research because of its simplicity and accuracy. WordNet component also used to expand the similar words on database. Performance of the algorithm is measured by evaluation methods such as accuracy, precision, recall and f-measure.

Monday, January 25, 13:25 - 15:45, Room B

Mon.pm1.B: Image, Speech and Signal Processing

Chairs: Milan Tuba (John Naisbitt University, Faculty of Computer Science & University of Belgrade, Serbia), Akhmad Dahlan (STMIK AMIKOM Yogyakarta, Indonesia)

1:25 A Comparative Study of Object Recognition Techniques

Amit Prakash Singh (Guru Gobind Singh Indraprastha University, India); Ritu Rani (Guru Gobind Singh Indraprastha University New Delhi, India); Ravinder Kumar (HMR ITM & HMR Institute of Technology & Management, India)

Object recognition is one of the research areas which has always attracted the attention of the researchers and research community because of its varied application in automation, biometrics, medical diagnosis, surveillance and security systems, defence, content-based image retrieval (CBIR), robotics and intelligent vehicle systems. Though a vigorous research is going on in this field but issues like scale, rotation, illumination invariance, and occlusion, pose and position estimation of objects are still drawing the attention of researchers. In this paper we tried to give an overview of the contemporary state of art techniques mainly Feature- based approaches along with the most recent and effective techniques been applied in this area. We have implemented SIFT on COIL dataset. A comparative analysis of these techniques have been reported in this paper.

1:45 Rotation, Translation, and Scale Invariant Bag of Feature Based on Feature Density

Shih-Min Chen and Chen-Kuo Chiang (National Chung Cheng University, Taiwan)

In this paper, we propose a feature representation that achieves translation, rotation, and scale invariant simultaneously. We first proposed a novel component, called Block Based Integral Image, to search the densest region of feature points. This aims to find the center of potential object in the image. Then, with the improved object center, we apply Spatial Pyramid Ring (SPR) by to handle translation and rotation invariant representation. After that, histogram equalization technique is utilized to adjust representation for scale invariant. The experimental results are demonstrated on different datasets by image classification task. Experimental results show that our translation, rotation, and scale invariant representation achieves higher accuracy than the previous methods.

2:05 Analysis and Dissection of Sanskrit Divine Sound "OM" Using Digital Signal Processing to Study the Science Behind "OM" Chanting

Ajay Anil Gurjar and Siddharth Ladhake (Sipna College of Engineering & Technology, India)

Sanskrit divine sound OM does not have a translation. Therefore, the Hindus consider it as the very name of the Absolute. In the scriptures of ancient India, the OM is considered as the most powerful of all the mantras. It has been recognized that the mantras have beneficial effects on human beings. The syllable OM is quite familiar to a Hindu. It occurs in every prayer. Invocation to most gods begins with this syllable. The syllable OM is not specific to Indian culture. It has religious significance in other religions also and is considered to be a cosmic sound, a primordial sound, the totality of all sounds etc. The entire psychological pressure and worldly thoughts are removed by chanting OM Mantra .To systematically analyze and dissect the traditional meditation chanting sound 'OM' using sophisticated mathematics is the endeavor of this research work which is presented in this paper.

2:25 An Analysis of the Regularization Between L2 and Dropout in Single Hidden Layer Neural Network
Ekachai Phaisangittisagul (Kasetsart University, Thailand)

In supervised learning, one of the motivations behind the design of the learning algorithm is to prevent an overfitting. Overfitting usually occurs when a learning model is excessively complex. A typical approach to alleviate this problem is to introduce a penalty term in the objective function, which is called regularization, for preventing the network parameters from growing too large. Another strategy known as dropout is introduced to prevent co-adaptation on each training data. In this paper, an analysis of different regularization techniques between L2- norm and dropout in a single hidden layer neural networks are investigated on the MNIST dataset. In our experiment, both regularization methods are applied to the single hidden layer neural network with various network complexity. The results show that dropout is more effective than L2-norm for complex networks. The results of this study are helpful to design the neural networks with suitable choice of regularization.

2:45 A Symbol Based Audio Watermarking Scheme Using Log Coordinate Mapping

Bala Mallikarjunarao Garlapati (TCS Innovation Labs, Hyderabad, India); Srinivasa Rao Chalamala (TCS Innovation Labs Hyderabad & IIT Hyderabad, India)

This paper proposes a high embedding capacity symbol based audio watermarking scheme. Audio watermarking has played an important role in multimedia security today. Watermark embedding based on single bit requires longer duration audio data in order to accommodate all the input watermark bits. The complete watermark should be available at least one time, for smaller duration audio sequences which are like advertisements in television, Radio. A robust multi-bit spread spectrum audio watermarking scheme based on LCM feature, is used to embedding and extraction of watermark. This method is very robust against audio geometric distortions and improving performance to DA/AD conversion attack[2]. A New embedded method is proposed in order to fit for small audio sequences. This can be achieved by symbol based embedding and achieves reducing the errors in longer duration audio due to repetitive adding of the symbols, which causes consideration of resultant symbols over all segments while extraction.

3:05 A Probabilistic Approach for Human Action Recognition Using Motion Trajectories

Srinivasa Rao Chalamala (TCS Innovation Labs Hyderabad & IIT Hyderabad, India); Prasanna kumar Akkupalli (TATA Consultancy Services, India)

Automatic recognition of human actions from the videos is of widespread interest for researchers as it has broad range of applications in areas such as video indexing, visual surveillance etc. This paper presents a simple and computationally efficient action recognition approach that extracts Harris corner points in difference of frames (DoF) and uses the magnitude of motion vectors extracted at corner points as weights to obtain center of mass (centroid) locations representing spatial distribution of corner points in each frame. The movement of centroid as action advances yields a motion trajectory. The sequence of quantized orientations of trajectory segments are used as temporal features for action classification that uses probabilistic state models and maximum likelihood decision making strategy. The benchmark action datasets such as KTH dataset, Weizmann dataset and UIUC complex activity dataset are used to train and test state models of each action class.

3:25 Radar Signal Classification Based on Cascade of STFT, PCA and Naïve Bayes

Yuanyuan Guo (Tsinghua University, P.R. China); Xudong Zhang (Tsinghua University, Algeria)

In this paper, for radar signals with different ways of frequency or phase modulation, Cascade of Short Time Fourier Transform (STFT) and Principal Component Analysis (PCA) is employed for effective Feature Extraction. Compressive ratios of dimensions are quite impressive. For the same features, applying Naïve Bayes on the whole set of radar signals, higher accuracy rate is got than the case where classifier is SVM. Besides, a Hierarchical Structure is designed for finer classifications of radar signals. Comparison shows that Hierarchical Structure contributes little to increase of accuracy rate of radar signal classification by cascade systems on the whole set. Models are trained on 10db and tested on different Signal Noise Ratios (SNR).

Monday, January 25, 16:00 - 18:00, Room A

Mon.pm2.A: Intelligent System and Bio- Informatics/ Medical Simulation

Chairs: Akhmad Dahlan (STMIK AMIKOM Yogyakarta, Indonesia), Oswin Hartono (Duta Wacana Christian University, Indonesia)

4:00 Constrained Portfolio Optimization by Hybridized Bat Algorithm

Ivana Strumberger and Nebojsa Bacanin (John Naisbitt University, Faculty of Computer Science, Serbia, Serbia); Milan Tuba (John Naisbitt University, Faculty of Computer Science & University of Belgrade, Serbia)

This paper presents the application of the hybridized bat algorithm to the constrained portfolio optimization problem which is a hard optimization problem suitable for stochastic optimization metaheuristics. Bat algorithm is a recent member of the group of nature-inspired algorithms. Hybridization between bat and artificial bee colony metaheuristics was adapted for solving portfolio problem with constraints that extend classical mean-variance portfolio selection formulation. To test the robustness of our hybridized approach, a comparative analysis with other swarm intelligence algorithms, as well as with three variants of genetic algorithm was performed. All algorithms included in comparative analysis were tested on the same portfolio model using the same data set. Results show that proposed hybridized bat algorithm has a great potential for tackling constrained portfolio problem.

4:20 Novel Contact Sensor Concept and Prototype Based on 2-DOF Vibration Absorber System

Hussein Ali (Egypt-Japan University for Science and Technology (E-JUST), Egypt); Ahmed Fath El-Bab (Egypt Japan University of Science and Technology E-JUST & Assiut University, Egypt); Zakarya Zyada (Universiti Teknologi Malaysia & Tanta University, Malaysia); Said Megahed (Mechanical Design and Production Engineering Dept., Cairo University, Egypt)

Landmines are major problems, waste life and money. Much recent research acknowledges that the contact sensors have promising potential. In this work, a new idea of contact sensor for landmine detection is introduced. The sensor main principle is based on the concept of 2-DOF vibration absorber system (two springs and two masses), to detect the existence of an object (ex: landmine) in sand which is modeled as a 3rd spring. The sand stiffness (the 3rd spring stiffness k_0) can be acquired as function of the frequency vibration absorber mode ω_{Abs} (the frequency at which the 2nd mass has the lowest amplitude (mathematically proven: zero)). When the sand stiffness changed due to the presence of the landmine, the vibration absorber frequency ω_{Abs} changes, and consequently the landmine can be detected. The mathematical derivation of the (ω_{Abs} - k_0) relation is verified by simulations with Matlab and with finite element COMSOL Multi-physics. The system is succeeded to measure the sand stiffness up to 100kN/m. A physical prototype for the sensor is developed with sensitivity 16.85 (N/m)/Hz. Finally, design procedure for the contact stiffness sensor for landmine detection is developed.

4:40 Enhanced Viral Precursor MicroRNA Identification with Structural Robustness Features in Back-propagation Neural Network

Songtham Anuntakarun, Supawadee Ingriswang, Warin Wattanapornprom and Supatcha Lertampaiporn (BIOTEC, Thailand)

This article presents a new viral precursor miRNAs identification tool using back-propagation neural network. The tool discriminates the viral precursor miRNAs from coding sequences and other pseudo precursor miRNAs. It was trained with viral precursor miRNAs from miRBase, pseudo precursor miRNAs and coding sequences from ViralmiR and NCBI database respectively. Top 20 features out of totally 115 features including sequence-based features, secondary structure features, base-pair features triplet sequence-structure features and structural robustness features were selected using GainRatio. In particular, the six structural robustness features are found to be the most informative features among 20 selected features. Five-fold cross validation was applied to choose a classifier with the highest performance based on the receiver operating characteristics area and accuracy. The results demonstrated that back-propagation neural network has the best performance compared with other algorithms. It achieved up to 97% accuracy on the test set with only 1% false positive rate.

5:00 Designing Machine-to-Machine (M2M) Prototype System for Weight Loss Program for Obesity and Overweight Patients

Gunawan Wibisono (University of Indonesia, Indonesia); Bagus Astawa (Universitas Indonesia, Indonesia)

Obesity and overweight patient is a person who has excessive body weight which prone to have serious diseases like heart disease, stroke, diabetes, some types of cancer, and osteoarthritis. In general, obesity/overweight is caused by some factors: excessive food intake, lack of physical activities, and genetics. In 2013, more than 2 billion people suffer obesity/overweight including 40 million in Indonesia. To overcome obesity/overweight, patients should control their food intakes and do physical activities. In most cases, the problem is they don't know whether their foods are good or not for their weights, and in the end they fail to control their weights. This research helps weight loss program with machine-to-machine (M2M) technology with using special weight scale which can upload data to server. Website and mobile application are built to give recommendation what food to eat today based on calorie calculation, in order to loss their weight during the program.

5:20 A Position Aware Mobile Application for E-Health Services

I Hababeh (German Jordanian University, Jordan); Sahel Alouneh (German-Jordanian University, Jordan); Ala Khalifeh (German University of Jordan, Jordan)

The need of processing medical data services is growing rapidly and increasing exponentially. However, the current local data centers health systems have a shortage to manage this data proliferation and users' needs. Mobile applications can work in dynamic wireless network systems that cover wide geographical areas, thus it can enhance the medical data services. In this paper, we design a mobile application method that supports e-health data services, performs remote data transactions and determines patient's location and the nearby health centers. This approach is built on interface components, cloud virtual machines, and e-health databases. The main contribution of this research is building integrated e-health data services from independent mobile and wireless devices. This will allow developing large number of different mobile applications and facilitate the application's maintaining processes. The experimental results show the efficiency and the applicability of our method.

Monday, January 25, 16:00 - 18:00, Room B

Mon.pm2.B: Engineering: Civil, Mechanical, Chemical, etc and Transport, Logistics, Harbour, Shipping etc

Chairs: Hiro Takahashi (DTS, Japan), Dewan Abdullah (Dewan Air Express, Pakistan)

4:00 State Estimation of Thermal Systems with Multiple Operation Modes

Shota Sasaki, Kentaro Hirata and Yoichiro Masui (Okayama University, Japan); Masahiro Samej and Akihiro Kawasaki (RICOH Company, Ltd., Japan); Yasuharu Kawarasaki(LICOH Company, Ltd., Japan)

The state estimation of thermal systems with multiple operation modes is considered. Based on a description as hybrid dynamical systems, we reduce it into an observer design problem for switched linear systems. In this design, a tradeoff between fast response and robustness must be taken into account in addition to a guarantee of stability as a switched system. For this purpose, we introduce LMIs with common Lyapunov function to place the closed-loop poles of the observer for each subsystem in the prescribed region in the complex plane. The effectiveness of proposed method is verified through numerical simulations with experimental data set.

4:20 Modified Model - Following Sliding Mode Control Based on the Active Disturbance Rejection Control

Hiroki Shibasaki (Meiji University & Meiji University, Japan); Yoshihisa Ishida (Meiji University, Japan)

In this paper, modified model - following sliding mode control based on the active disturbance rejection control observer is proposed and demonstrated. We introduce the Active disturbance rejection control with disturbance observer. the Improved ADRC is normalizing the plant and the removal characteristics of the input-side disturbance. Therefore, the plant is changed to the characteristics not having the plant parameters. The controller is used the sliding mode control. In the sliding mode control, the reachability condition is improved the adaptive control by using the improved ADRC. The simulation studies are applied to a plant with stable, unstable terms, and a stable plant with an integrator. Simulation results show that this method can get the superior performance of positioning control.

4:40 Methodology of Intelligent Energy Management System Simulation for Electric Vehicle Applications with Asynchronous Logic Controller

Ilya Kavalchuk (RMIT University Vietnam, RMIT University, Vietnam); Huy L Nguyen (RMIT University Vietnam & School of Electrical and Computer Engineering, RMIT University, Melbourne, Vietnam); Thanh Pham (RMIT University, Vietnam)

Power management simulation of electrical vehicle systems has become more and more complicated due to high number of sub-systems, components and controlling methods. This paper describes a new methodology for the simulation of a smart energy management system for electric vehicles in MatLab Simulink environment. The main objective of the simulation is to improve the efficiency of the system through real-time power consumption optimization which bases on the load sharing algorithms with energy storage system management. Asynchronous logic was selected as a novel approach for the design and implementation of the energy management controller in order to optimize the computational time and energy consumption for the real time application with stochastic load requests.

5:00 Simulated Civil Airplane Visual Conspicuity Experiments During Approaching and Departure in the Airport Vicinity

Zhen Xie and Zhao Wei Zhong (Nanyang Technological University, Singapore)

The safety operation of the Airport Tower controllers require a clear vision of the airplane during departure and approaching process. It is costly and time consuming to conduct field visual conspicuity tests in the airport. And it may also interfere with the job of controllers and the schedules of the operation of the airport. Last but not least, in the field test, researchers can only measure the current situation based on the limitation of the airport. On the contrary, lab simulation can create as many scenarios as possible. So if the lab simulation produces a good fidelity and accuracy rate, it can make the visual conspicuity measurement flexible and convenient to a large extent. Based on our experiment, we measure the visual conspicuity with a good accuracy rate and detect the relationship between different parameters and the conspicuity.

5:20 Prediction of Driver's Brake Pedal Operation in Vehicle Platoon System

Hironori Suzuki (Nippon Institute of Technology, Japan)

This paper focused on the remaining time to brake pedal operation (TTBP) and proposed the unscented Kalman filter (UKF)- and particle filter (PF)-based models to estimate the TTBP prior to the actual brake pedal operation. The state and measurement equations were simply modeled by partially using an ANN model. Also, the three-vehicle convoy data collected through a driving simulator (DS) experiment showed that the first car started decelerating and shortened the headway at least two seconds before the brake pedal operation. This made sure that the proposed UKF and PF could be applied to the estimation of TTBP by simply measuring the velocity and headway of the preceding cars.

5:40 Development of a Personal Mobility Vehicle for Short-range Transportation Support

Yoshiyuki Takahashi (Toyo University, Japan)

Short-range transportation vehicle is paid attention today. It is to use for commuting, delivery and so on. We have developed a Personal Mobility Vehicle for short-range transportation. This three-wheeled vehicle (two in front and one in rear) is propelled by kicking off the ground. To evaluate the personal mobility motion, drivability and stability, 6 DOF simulation model is proposed. In this paper, mathematical model of our developed personal mobility vehicle is presented. The model includes wheel model, suspension model and dynamical equation of motion of the body. And also, simulation results were compared with experimental results. The validity of the results were evaluated and confirmed.

Room A

Day-1 Closing Remarks, photo opportunity and Dinner.

Tuesday, January 26, 08:15 - 10:15, Room A

Tue.am1.A: Energy, Power Generation & Distribution and Circuits, Sensors & Devices

Chairs: Milan Tuba (John Naisbitt University, Faculty of Computer Science & University of Belgrade, Serbia), Ilya Kavalchuk (RMIT Vietnam & RMIT Vietnam, Vietnam)

8:15 Development and Design of PIC Controlled Float Buoy Wave Energy Converter System

Rommel Anacan (Technological Institute of the Philippines-Manila, Philippines); Ramon Garcia (Mapua Institute of Technology, Philippines)

The paper is entitled Development and Design of PIC Controlled Float Buoy Wave Energy Converter System is conceptualized to generate electricity as an alternative due to increasing oil prices and as a possible solution to energy crisis in the incoming years. Electricity can be generated by the mechanical force collected from the movement of waves in the oceans. Electricity will be stored to a 12 Volts Lead Acid Battery and monitored using a microcontroller. The paper goal is to analyze the relationship of the wind speed and water depth to the power produced by the prototype. A regression equation was also develop for the prototype. It has proved that the water depth and wind speed has a direct relationship with the time of charging the batteries and the power produced.

8:35 Average Current Feed-Forward Control for Multi-Modular Single-Phase UPS Inverters System

Santosh Singh and Sumit Ghatak Choudhuri (Indian Institute of Technology Roorkee, India)

Parallel connected multi-modular (M-M) single-phase UPS inverter system is an attractive choice for a reliable and scalable power delivery for critical loads. However, a proper current sharing control technique is required to avoid the inter-modular circulating (IMC) currents without use of any extra power circuit components. The output current of an UPS module is used as load disturbance compensation feedback to reduce output voltage distortion in multi-loop (ML) control of single inverter module structure. This paper presents output Average Current Feed-Forward (ACFF) control scheme for both voltage regulation and equal current sharing in parallel inverter modules. This greatly simplifies the conventional current sharing control. The obtained results in MATLAB environment in Discrete Time Frame (DTF) using Simulink and Sim Power System (SPS) toolboxes for bi-modular and tri-modular UPS inverters system illustrate the effectiveness of the proposed control scheme.

8:55 Modeling in Energy Sector: A Comparison Between Developing and Developed Countries

Abdul Rahim Ahmad (Universiti Tenaga Nasional, Malaysia); Lucas Darras and Valentin Coyard (ESIGELEC, France); Wahidah Hashim (Universiti Tenaga Nasional, Malaysia); Ibrahim NurAmalia Irdina (UNITEN, Malaysia)

Energy models developed by international institutions specifically address national and international issues surrounding the current energy environment. Energy used in developing countries has risen rapidly in the past and it is expected to continue to increase rapidly in the future and it is distinct from those of developed countries in many ways. This paper provides an overview of the research work regarding the comparison of developing and developed countries in energy modeling sector. Modeling tools are required to explore and quantify these pathways. These models help to organize large amount of data, reflect complete system in understandable form and provide consistent framework for testing hypothesis. Overview of the energy modeling tools required to model the energy such as Long-range Energy Alternatives Planning Systems (LEAP) and comparison of LEAP with other energy modeling tools such as MARKET Allocation (MARKAL) also are provided.

9:15 Steady-state Analysis of Three-Phase AC to DC Converter Using Current Injection Hybrid Resonant Converter for Power Factor Correction

Rahimi Baharom (Universiti Teknologi MARA, Malaysia); Mohd Khairul Mohd Salleh (Universiti Teknologi MARA & Microwave Technology Centre, Malaysia); Ihsan M. Yassin (Universiti Teknologi Mara, Malaysia); Mohammad Nawawi Seroji (Universiti Teknologi MARA, Malaysia)

This paper presents the simulation of the steady-state analysis and design equations of high power factor three-phase AC to DC current injection hybrid resonant converter. The series-parallel (hybrid) resonant converter using current injection technique is the key concept of this paper, which is realized by injecting the high-frequency resonant current to the diode-bridge rectifier. Featuring a high power factor operation, the circuit offer low total harmonics distortion (THD) level of the input current waveforms, hence increase the quality of the power supply system. Both simulation and steady-state analysis (prediction) are carried out using MATLAB to verify the feasibility and the effectiveness of the proposed control strategy and theoretical analysis for the high power factor three-phase AC to DC current injection hybrid resonant converter.

9:35 Trip Coil Signature Measurement and Analysis Techniques for Circuit Breaker

Harriezan Ahmad (TNB Research Sdn. Bhd., Malaysia); Sieh Kiong Tiong (UNITEN, Malaysia)

The Condition Based Maintenance (CBM) is a maintenance strategy that uses the actual condition of the asset to decide what maintenance needs to be done. The trip coil signature analysis for circuit breaker offers a cost-effective methodology in fulfilling the CBM requirement. In this paper, analysis of trip coil signature in circuit breakers is discussed together with different perspectives in implementing their methodologies. This analysis provides the essential insights from the perspective of mechanical degradation and control circuit reliability in assessing the performance of circuit breaker operation in switchgear. Finally, this paper disseminates the knowledge of the trip coil signature analysis methods, which leads to more effective switchgear maintenance practice in CBM.

9:55 Quadrature Oscillator Using Operational Transresistance Amplifiers

Montree Kumngern (King Mongkut's Institute of Technology Ladkrabang, Thailand)

In this paper, a new quadrature oscillator using operational transresistance amplifiers (OTRA) as active elements is proposed. The use of OTRA which offers low parasitic parameters, high slew rate and high bandwidth independent of the gain, the precision of frequency of oscillation can be achieved. The frequency of oscillation and the condition of oscillator can be independently controlled. Also output terminals are possessed low impedance which can be directly connected to the load without any buffer circuits. Simulation results verifying the theoretical analysis are also expressed to confirm proposed structure. From simulation results, it can be expressed that the simulation result is very agree well with theory.

Tuesday, January 26, 08:15 - 10:15, Room B

Tue.am1.B: Virtual Reality, Visualization & Computer Games and Performance Engineering of Computer & Communication Systems

Chairs: Yuanyuan Guo (Tsinghua University, P.R. China), Gagandeep Kaur (Punjab Technical University, India)

8:15 Design of Eyegaze-sensitive Virtual Reality Based Social Communication Platform for Individuals with Autism

Pradeep Raj Krishnappa Babu and Uttama Lahiri (Indian Institute of Technology Gandhinagar, India)

Deficits in adaptive social communication skills and poor dyadic eye contact are critical concerns among children with autism spectrum disorder (ASD). Also, they often exhibit high social anxiety which restricts them from socialization. Recent advancement in technologies, e.g., Virtual Reality (VR) have shown its promise in training and intervention tasks for individuals with ASD, carried out in a safe and controlled environment. In this paper, we describe the design of Eyegaze-sensitive Virtual reality based Social communication Platform (E-VISP) as a proof-of-concept application dealing with some of the aspects of social communication skills for children with autism. Preliminary results of a usability study with two pairs of individuals with ASD and Typically Developing (TD) participants indicate the feasibility of our E-VISP to cause variations in their task performance, behavioral viewing (e.g., fixation duration) and gaze-related biomarkers (e.g., pupil diameter and blink rate) that can be mapped to their individualized anxiety levels.

8:35 Parametric 3D Hand Model

Maria Isabel Saldares and Rowel O Atienza (University of the Philippines, Philippines)

In virtual reality, particularly in gaming applications, the hands usually used are generic representations which moves using a controller. An individualized hand representation can create a more immersive experience, since the hand being controlled by the user is similar with his which can create a more effective means of interaction with the virtual world. We present a parametric 3D human hand model from Leap Motion's hand geometry data. Piece-wise geometric 3D shapes, such as ellipsoid and truncated elliptic cone, were used to generate the 3D hand. The dimensions of the hand were obtained from the Leap Motion sensor. These dimensions were then used as parameters to make the 3D hand model.

8:55 Performance Analysis of Subcarrier Index Modulation-OFDM in Doppler Spread Environments

Sung Yub Yu, Yongpan Feng, Minki Kim and Suk Chan Kim (Pusan National University, Korea)

In this paper, the effect of Doppler spread in Subcarrier Index Modulation-OFDM (SIM-OFDM), one of the multicarrier transmission systems, is compared to OFDM system that the most widely used multi-carrier transmission method. For this purpose, average subcarriers interval was derived from SIM-OFDM. The results showed the performance improvement by calculating Signal-to-Interference Ratio (SIR) and by the simulation. Theoretical values and simulation results showed that the performance of SIR for both curves are nearly matched, and the performance of SIR for SIM-OFDM modulation is about 3dB better than that of OFDM modulation. However, if SIM-OFDM uses high order modulation such as M-QAM, there is disadvantage in terms of transmission speed because a lot of sub-carriers are wasted by OOK.

9:15 Noise Cancellation Using LMS Algorithm: An Interval Arithmetic Approach with Intrlab

Vidya Chidanand Mansur (Employed, India); Rajashekar Basavaraj Shettar (Vishweswaraya technological University, Belgaum.Karnataka State, India)

With the advancement in the field of design of adaptive filter it is expected that the convergence will improve correctness in the estimates of output. Adaptive filter system focus on integrity in the existing LMS algorithm including FIR filter , with the computation using different data formats. Adaptive filter system support various applications with the objective to provide stable system performance. Current adaptive filter system needs in depth investigation in the computing domain to enhance the quality of the estimates. Hence interval arithmetic domain is used to increase the precision of computation. Proposed solution to this research task in this aspect is examined for a sine signal.

9:35 Analysis of an IEC 61850 Based Electric Substation Communication Architecture

Rahul Gore (ABB Corporate Research Center, Bangalore, India); Hariram Satheesh (ABB, India); Mahesh Varier (Amrita School of Engineering, India); Simi P Valsan (ABB GISL, India)

The electric power grid with its network of trans-mission, distribution lines and substations are important part of present process and automation world. The ever-increasing demand for power and limitations on upgrade of existing in-frastructure have led to increased operating voltages and conse-quentially, larger and higher number of substations. Substation automation systems (SAS) are responsible for the protection, monitoring and control of all electric equipment and process within an electric substation. SAS evolved from electromechanical, static relays to numerical relays and also from copper cable wiring to digital communication at station level, although with proprietary communication protocols. The next big evolution for SAS came with introduction of IEC 61850 standard released by the International Electrotechnical Commission (IEC) for power utilities that provides integrated and interoperable data commu-nications within and around Substation. IEC 61850 standard offers interoperability, free configuration, overall cost saving, and simple architecture. In order to realize the benefits of the standard, the SAS design engineering needs to be thoughtful of practical challenges such as implementation of communication network. The success of SAS depends largely on efficient and reliable communication architecture design. In this paper, we present an analysis of the performance of communication infrastructure using the test bed or lab set up of typical power system substation architecture. This set up is then used to examine sample substation architectures to determine if they meet the communication performance requirements. The paper also brings out various advantages of substation test bed from utility point of view.

Tuesday, January 26, 10:30 - 12:50, Room A

Tue.am2.A: Circuits, Sensors and Devices

Chairs: Rahul Gore (ABB Corporate Research Center, Bangalore, India), Abdul Rahim Ahmad (Universiti Tenaga Nasional, Malaysia)

10:30 *Design and Development of an Oil Spill Detection and Transmission System Using Artificial Illumination Using LEDs*

Mark Nelson Pangilinan (Mapua Institute of Technology, Philippines); Rommel Anacan (Technological Institute of the Philippines-Manila, Philippines); Ramon Garcia (Mapua Institute of Technology, Philippines)

Oil spill pollution, a severe environmental problem has grown to an alarming magnitude with increased levels of oil production and transport. The effects of an oil spill directly hit the marine animals and plants, which live in the path of the oil spill. The main objective of this paper is to design and develop an oil spill detection and transmission system using artificial illumination with LEDs. Specifically, first, is to design a sensor that can detect an oil spill thru LEDs and Photo Transistor .Second, to design a buoy that will be used to carry the oil spill detector. Third, to have a renewable power supply ready battery (solar power) that will maintain the power of the detector and lastly, is to transmit the data via SMS and telemetry technology and lastly, to evaluate the results.

10:50 *Design of a New External Signal Controlled Polymorphic Gates*

Rommel Anacan (Technological Institute of the Philippines-Manila, Philippines); Mark Nelson Pangilinan (Mapua Institute of Technology, Philippines)

As normally encountered in electronics systems, a conventional circuit fails in extreme conditions due to changes in transistors characteristics. Engineers are trying to deal with this problem for years until they come up with the adaptive electronics circuit they called polymorphic circuits. Polymorphic circuits are multi-functional in many ways. It has an ability to modify its system and vary with different conditions of environment; this depends on its components response. This paper will design a building block polymorphic gates with the least transistors possible and applies it to a multi-functional two-bit Adder-Subtractor polymorphic circuit. After being applied to a polymorphic circuit, there will be comparisons of two technologies of IC design using Tanner EDA Tools and LT Spice IV.

11:10 *Design and Implementation of PIC16F877A Microcontroller Based Data Acquisition System with Visual Basic Based GUI*

Mousam Ghosh (National Institute of Technology Meghalaya, India); Suman Ghosh (Bengal Institute of Technology and Management, India); Pradip Saha and Goutam Panda(Jalpaiguri Government Engineering College, India)

Data acquisition (DAQ) is a process of bringing a real world signal in to the computer for processing, analysis, storage or other data manipulation. Here in this paper not only the process of data capture from real world in real time, also the process of data feed to real world in real time from computer in different format is also discussed with a developed user friendly Graphical User Interface (GUI) in Visual Basic platform. To control any parameter of a device it is necessary to have the real time data of that parameter in the controller. Also, to control the device it is required to feed some data back to the real world after some processing of the captured data. Here in this paper capturing and feeding of data with user friendly GUI is developed with the help of PIC16F877A microcontroller.

11:30 4:2 and 5:2 Decimal Compressors

Prabir Saha, Puja Samanta and Deepak Kumar (National Institute of Technology Meghalaya, India)

Decimal compressors are essential components for partial product addition facilitating decimal multipliers. In this paper improved design and architectures of 4:2 and 5:2 high speed compressors have been reported. Binary full adders, optimized unconventional (non binary coded decimal) recoding scheme, have been used to implement basic digit compressor. Cascaded operations of the basic digit compressors have been used to implement the higher order like 4:2 and 5:2 decimal compressors which ensures the high speed operations. Configurations of decimal compressors (4:2 and 5:2) have been prototyped and simulated to evaluate performance parameters like speed (propagation delay), power dissipation, power-delay product and energy delay product. The simulation have been carried out in Cadence Spectre using 90nm technology revealed the propagation delay of the resulted compressors were ~41ns and ~61ns respectively. Moreover reported architecture offered ~38% improvement in speed compared with the best reported architecture so far for 5:2 compressor.

11:50 A Study on Thermal and Electrical Characteristics of Thermoelectric Cooler TEC1-127 Series

Najath Mohomed Akram, Nirman Ranthagoda and Nisabha Jayasundare (University of Ruhuna, Sri Lanka)

Thermoelectric Coolers (TECs) are essential in realizing high performances in electronic and electrical devices by keeping them in an optimum temperature. TECs have become popular owing to compact, quiet design. But there are design limitations of TECs when they are used in practical applications. Among limitations, energy inefficiency is prominent. Although, ample researches have been done on TECs, only a few considered operational characteristics of TECs. Individual users find it difficult to select and gather required information on TECs due to lack of published resources about TECs. Manufacturers' specifications only provide basic details and sometimes those specifications are away from practical accuracy. This paper is based on samples of TEC1-127 series. This includes various tests done with samples to identify operational characteristics of TECs. Basically electrical and thermal characteristics of TECs were considered. Besides test results, the paper includes a discussion on limitations of mass scale manufactured TECs.

12:10 Efficiency Improvement of Differential Drive Rectifier for Wireless Power Transfer Applications

Manal Mohamed (Egypt-Japan University of Science and Technology ejust, Egypt); Adel Bedair, Mohamed Abbas and Ahmed Allam (Egypt-Japan University of Science and Technology, Egypt); Hongting Jia (E-JUST Center, Kyushu University, Japan); Ramesh K Pokharel (Kyushu University, Japan)

In this paper, optimization results are presented for a 0.18 μm CMOS differential drive (DDR) full-wave rectifier. The optimized rectifier achieves 83.3 % power conversion efficiency (PCE) at -16.3 dBm input power, with an input RF of 953 MHz and 0.6 V peak sinusoidal signal. The voltage conversion ratio becomes 72.3 % at -13 dBm input power. The output average voltage equals 0.4 V at peak input voltage 0.6 V, whereas the conventional DDR rectifier achieves PCE = 75.4 % at an RF input power $P_{in} = -12.5$ dBm and output average voltage of 0.15 V at the same peak input voltage. The optimized rectifier is suitable for such applications that require minimum RF input power as UHF RFID tag and implantable medical devices (IMDs).

12:30 From AIMS2015. Error Source Identification in Measuring Soft Tissue Stiffness and Self Compensating This Error Using Three Probes Configuration

Ahmed Fouly (Egypt Japan University of Science and Technology, Egypt); Ahmed Fath El-Bab (Egypt Japan University of Science and Technology E-JUST & Assiut University, Egypt); A. A. Abouelsoud (Cairo university, Egypt); Mohamed Nasr (Alexandria University, Egypt)

One of the most challenges for measuring soft tissue stiffness using tactile sensors is to have an output independent of the contact conditions. Although the approach of using two springs with different stiffness is used, the output of sensor is usually unstable because of the soft tissue surface irregularity. This irregularity creates an inclination angle between the sensor tips and the tissue. By scanning some real organs of a chicken using laser microscope, it is found that the angle value does not exceed 3 degrees. A modification on the original sensor is proposed to compensate that error. A finite element analysis for the two sensors is carried out to compare their behavior. The error of the original approach is about 55% and 103% with an inclination angle 3 degrees on the left and right direction, respectively. However, the modified sensor output is stable up to 8 degrees with an error not exceeding 4%. Furthermore, it could differentiate between different soft tissues stiffness within the specified range.

Tuesday, January 26, 10:30 - 12:50, Room B

Tue.am2.B: Mobile/Ad hoc wireless networks, etc,Parallel/Distributed Architectures/Systems and Methodologies

Chairs: Ilya Kavalchuk (RMIT Vietnam & RMIT Vietnam, Vietnam), Oswin Hartono (Duta Wacana Christian University, Indonesia)

10:30 Energy Consumption and Performance of Delay Tolerant Network Routing Protocols Under Different Mobility Models

Bhed Bahadur Bista (Iwate Prefectural University, Japan); Danda B. Rawat (Georgia Southern University, USA)

Delay Tolerant Network (DTN) is a mobile ad hoc network in which every node does not have wireless connection with other nodes all the time. Traditional ad hoc routing protocols cannot be used in DTN. Basically in DTN routing, a node stores the message and when it encounters another node it forwards a copy of the message to the node which repeats the same process until the destination node is encountered and the message is delivered or the message life is expired. Nodes in DTN are resource constrained. It is important to utilize the resources efficiently in DTN. There are various routing protocols designed to use resources efficiently. In this paper, we perform analysis of three important DTN routing protocols to see their resource utilization specially energy consumption under three different mobility models. Furthermore, we also compare their message delivery probability and message overhead ratio.

10:50 A Model Based Connectivity and Localization Strategy for Vehicular Ad Hoc Networks

Saurabh Jha and Deviyet Choudhary (NIIT University, India); Jetendra Joshi (NIIT University & NIIT University, India); Manash Jyoti Deka and Dushyant Yadav (NIIT University, India)

Nowadays Researchers have performed extensive experiments to study the feasibility and Connectivity of vehicle access. We investigate connectivity in the ad hoc network formed between vehicles that move on a typical highway. We use the common model in vehicular traffic theory. Since a vehicle spends a large portion of the connection time in this poor link quality area, No GPS Zone the data throughput can be significantly reduced. Relative location information is an important aspect in vehicular Ad hoc networks. It helps to build vehicle topology maps, also provides locationtracking of nearby vehicles. In this paper, we propose a protocol of localization in VANET when no GPS information is available, based on clustering and link Prediction and also has the advantage to use a single coordinates system. Using the network simulator NS-2 and also checked the mobility scenario in SUMO by implementing the above protocol

11:10 Control Channel Load Balancing in Narrow Band Cellular IoT Systems Supporting Coverage Class

Jung Wan Shin (Sungkyunkwan University(SKKU), Korea); Jun Suk Kim (Sungkyunkwan University, Korea); Sungjin Lee (Samsung Electronics, Korea); Min Young Chung(Sungkyunkwan University, Korea)

In order to support various Internet of Things (IoT) services, 3GPP is working to standardize cellular IoT (CIoT) systems based on the existing GSM & GPRS networks. CIoT systems are aiming to support the massive number of devices, extend the network coverage, and improve the battery life of IoT devices. Furthermore, in order to support more than 50,000 CIoT devices, CIoT systems categorize the devices with different coverage classes and manage control and data channels. However, as a massive number of devices will be deployed in system coverage, traffic loads for each coverage class might be unequal and difficult to release the traffic overload. To solve this problem, in this paper, we propose a novel load balancing scheme for control channel in the CIoT systems. Simulation results show that the proposed scheme can accommodate system loads quickly and effectively.

11:30 A Study on Road Surface Condition Monitoring System Using Bicycle-Mounted Grid Laser Light
Yoshiaki Taniguchi (Kindai University, Japan); Hiroyuki Hisamatsu (Osaka Electro-Communication University, Japan)

In the case of cycling at night, it is helpful for cyclist if information on bad road surface condition is obtained autonomously. In this paper, we propose a system for autonomously monitoring road surface condition by using laser light and camera modules. In our system, the laser light module emits grid laser light, and the camera module captures the image of front road area. When our system detects bad road surface condition by processing obtained images, it alerts to the cyclist. In this paper, we apply template matching for detecting obstacles in the front of bicycle. In addition, we implement the system using off-the-shelf node, Raspberry Pi, a laser module and a typical bicycle. Through experimental evaluations, we show that the monitoring system can detect obstacles in the front of bicycle.

11:50 Average Counting Via Approximate Histograms - Preliminary Report

Jacek Bronisław Cichoń (Wroclaw University of Technology & Faculty of Fundamental Problems of Technology, Poland); Karol Gotfryd (Wroclaw University of Technology, Poland)

In this paper we propose a novel method of solving the averaging problem for distributed Wireless Sensors Networks. Our method uses a set of probabilistic counters and allows to find the approximation of the average of a set of measures done by sensor network with arbitrary, controlled by two parameters, precision. The exchange of information is based on broadcasting method and use the extreme propagation technique. We use probabilistic counters for a construction of approximated histogram of observed data. Our method require $O(D)$ rounds, where D is the diameter of the network. The average message complexity for each node is also of order $O(D)$.

12:10 Swarm Intelligence Algorithm for Job Scheduling in Computational Grid

Mehdi EffatParvar (Ardabil Branch, Islamic Azad University, Ardabil, Iran); Somayeh Aghayi (Sama Technical and Vocational Training College, Iran); Vahid Asadzade and Yousef Dashti (Germi Branch, Islamic Azad University, Germi, Iran)

Grid computing is actually the next generation of distributed systems. Its objective is to create a powerful, large and autonomous virtual computer. This computer is created through assembling countless heterogeneous resources with the aim of sharing them. Scheduling is one of the most important and challenging issue of such systems. An accurate and efficient schedule is required to increase the grid efficiency. Grid resources belong to different management domains; each one applies different management policies. This paper proposed a new heuristic approach based on particle swarm optimization algorithm in order to scheduling the jobs in grid environment. The proposed algorithm would create an optimal scheduler to complete the jobs in the minimum flowtime and makespan.

12:30 Revenue Efficiency Measurement with Undesirable Data in Fuzzy DEA

Nazila Aghayi (Ardabil Branch, Islamic Azad University, Ardabil, Iran)

Since in the real world data have imprecise value; fuzzy concept is too important as imprecise data. Moreover, the decision making units may have been some inputs and outputs index such undesirable data. Therefore, in this study, we introduce a method to evaluate revenue efficiency of DMUs when the data are desirable and undesirable in fuzzy DEA. For this purpose, we apply method and extension principle and obtain lower and upper bounds per each provides for assessment of revenue efficiency; Thus, the amount of fuzzy revenue efficiency is greater than one. Finally, a numerical example is presented for application of proposed method.

Room A
Closing Remarks, photo
opportunity and lunch.