

# **EMS2015**

## **European Modelling Symposium 2015**

**6 – 8 October 2015, Madrid, Spain**

# **Conference Program**

**And Abstracts of Presented Papers**

**Conference Program at a Glance Pages 3 - 11**

**Conference Program in Full Pages 12 – 33**

# EMS2015

## European Modelling Symposium 2015

6 – 8 October 2015, Madrid, Spain

<b>Conference Chair</b>	<b>Gregorio Romero</b> , <i>University Polytechnic of Madrid, Spain</i>
<b>Honorary Conference Co-Chairs</b>	<b>Emilio Corchado</b> , <i>University of Burgos, Spain</i> <b>Valentina Colla</b> , <i>Scuola Superiore Sant'Anna, Pisa</i> <b>Zheng Xie</b> , <i>Manchester Metropolitan University, UK</i> <b>Ismail Saad</b> , <i>University of Malaysia in Sabah, Malaysia</i> <b>Alessandra Orsoni</b> , <i>University of Kingston, UK</i>
<b>Program Chairs and Honorary Program Co-Chairs</b>	<b>Marco Vannuci</b> , <i>Scuola Superiore Sant'Anna, Pisa</i> <b>Athanasios Pantelous</b> , <i>University of Liverpool</i> <b>Zuwairie Ibrahim</b> , <i>University of Malaysia in Pahang (UMP)</i> <b>Adam Brentnall</b> , <i>Queen Mary, London University, UK</i>
<b>Local Arrangements Chair</b>	<b>Gregorio Romero</b> , <i>University Polytechnic of Madrid, Spain</i>
<b>General Chairs</b>	<b>David Al-Dabass</b> , <i>Nottingham Trent University, UK</i> <b>Ajith Abraham</b> , <i>Norwegian University of Science and Technology, Norway</i>

Proceedings published by IEEE-Conference Publication Services  
ISBN 978-1-5090-0206-1

# EMS2015 Conference Program at a Glance

EMS2015 Conference Program at a Glance:					
<b>Session Code:</b> <b>Tue.pm1</b> means Tuesday afternoon before tea break. Other Time periods: am1, am2, pm1, pm2	<b>Paper Code:</b> e.g. <b>K1</b> see following pages for a full list: Track letter: A, B, C . and paper number within track e.g. K1				
<b>Day-0: Monday 5 October 2015 : 5 to 6pm, Early registration desk opens for one hour, RH Zurbano Hotel.</b>					
<b>Time</b>	<b>Day-1: Tuesday 6 October 2015 (Keynote Speaker + 37 papers)</b>				
8.45 - 10	Tue.am1.A: (Chair: David Al-Dabass/Gregorio Romero): Opening session and keynote Speaker: Prof Qiang Shen				
10 - 10.15	Refreshments				
	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">Room A</td> <td style="width: 50%; text-align: center;">Room B</td> </tr> <tr> <td style="text-align: center;">Tue.am2.A (Chair: Dominik Łuczak-J1/ Dmitry Korzun-S1): A1, A2, A3, D1, D4, D6</td> <td style="text-align: center;">Tue.am2.B (Chair: Edgardo Roldan-Villasana-G1/ Olawale Popoola-K5) F4, F5, F6, F7, F8, []</td> </tr> </table>	Room A	Room B	Tue.am2.A (Chair: Dominik Łuczak-J1/ Dmitry Korzun-S1): A1, A2, A3, D1, D4, D6	Tue.am2.B (Chair: Edgardo Roldan-Villasana-G1/ Olawale Popoola-K5) F4, F5, F6, F7, F8, []
Room A	Room B				
Tue.am2.A (Chair: Dominik Łuczak-J1/ Dmitry Korzun-S1): A1, A2, A3, D1, D4, D6	Tue.am2.B (Chair: Edgardo Roldan-Villasana-G1/ Olawale Popoola-K5) F4, F5, F6, F7, F8, []				
10.15 - 12.15, 6					
12.15 - 1.15	Lunch				
1.15 - 3.35, 7	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Tue.pm1.A (Chair: Abdullah Ibrahim Tashtoush-D1/ Amogh Adishesha-F8/ Bhagyashree Desai-F8): C1, E2, E3, G1, G3, G4, G5</td> <td style="width: 50%;">Tue.pm1.B (Chair: Selim Solmaz-J5/ Işıl Yagurcu-J4) K1, K2, K3, K4, K5, K6, []</td> </tr> </table>	Tue.pm1.A (Chair: Abdullah Ibrahim Tashtoush-D1/ Amogh Adishesha-F8/ Bhagyashree Desai-F8): C1, E2, E3, G1, G3, G4, G5	Tue.pm1.B (Chair: Selim Solmaz-J5/ Işıl Yagurcu-J4) K1, K2, K3, K4, K5, K6, []		
Tue.pm1.A (Chair: Abdullah Ibrahim Tashtoush-D1/ Amogh Adishesha-F8/ Bhagyashree Desai-F8): C1, E2, E3, G1, G3, G4, G5	Tue.pm1.B (Chair: Selim Solmaz-J5/ Işıl Yagurcu-J4) K1, K2, K3, K4, K5, K6, []				
3.35 - 3.50	Refreshments				
3.50 - 6.10, 7	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Tue.pm2.A (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): C2, J1, J2, J3, <b>J4, J5</b>, J6</td> <td style="width: 50%;">Tue.pm2.B (Chair: Amogh Adishesha-F8/ Bhagyashree Desai-F8) J7, J8, L1, L2, L3, M1, []</td> </tr> </table>	Tue.pm2.A (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): C2, J1, J2, J3, <b>J4, J5</b> , J6	Tue.pm2.B (Chair: Amogh Adishesha-F8/ Bhagyashree Desai-F8) J7, J8, L1, L2, L3, M1, []		
Tue.pm2.A (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): C2, J1, J2, J3, <b>J4, J5</b> , J6	Tue.pm2.B (Chair: Amogh Adishesha-F8/ Bhagyashree Desai-F8) J7, J8, L1, L2, L3, M1, []				
7 - 9	Conference Dinner				
<b>Day-2: Wednesday 7 October 2015 (20 papers)</b>					
8.30 - 8.40	Wed.am0.A: (Chair: David Al-Dabass/Gregorio Romero): day-2 opening session				
8.40 - 10.20, 5	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Wed.am1.A (Chair: Nima TaheriNejad-T6/Dominik Łuczak-J1) N3, P1, P2, P3, []</td> <td style="width: 50%;">Wed.am1.B (Chair: Alberto Leggieri-T9/Mahdiyar Sarayloo-T7): E1, R1, R3, S1, S2</td> </tr> </table>	Wed.am1.A (Chair: Nima TaheriNejad-T6/Dominik Łuczak-J1) N3, P1, P2, P3, []	Wed.am1.B (Chair: Alberto Leggieri-T9/Mahdiyar Sarayloo-T7): E1, R1, R3, S1, S2		
Wed.am1.A (Chair: Nima TaheriNejad-T6/Dominik Łuczak-J1) N3, P1, P2, P3, []	Wed.am1.B (Chair: Alberto Leggieri-T9/Mahdiyar Sarayloo-T7): E1, R1, R3, S1, S2				
10.20 - 10.35	Refreshments				
10.35 - 12.35, 6	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Wed.am2.A (Chair: Evgeni Krustev-G5/ Edgardo Roldan-Villasana-G1) <b>T1, T2, T3, T4, T5, T6</b></td> <td style="width: 50%;">Wed.am2.B (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): P4, T7, T8, T9, T10, []</td> </tr> </table>	Wed.am2.A (Chair: Evgeni Krustev-G5/ Edgardo Roldan-Villasana-G1) <b>T1, T2, T3, T4, T5, T6</b>	Wed.am2.B (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): P4, T7, T8, T9, T10, []		
Wed.am2.A (Chair: Evgeni Krustev-G5/ Edgardo Roldan-Villasana-G1) <b>T1, T2, T3, T4, T5, T6</b>	Wed.am2.B (Chair: Elizaveta Motovilova-D4/Abdullah Ibrahim Tashtoush-D1): P4, T7, T8, T9, T10, []				
12.35 - 12.45	Close of Conference and photo opportunity				
12.45pm -	Lunch				
Social Program and Free Time to explore the heritage, culture and history of Madrid and Spain					
<b>Day-3 Thursday 8 October 2015: Social Program and Free Time to explore the heritage, culture and history of</b>					
<b>Same day: J4, J5. Day-2: T1</b>					

## Papers by Track

Seq	#	TRACK: 01-A Intelligent Systems	First author	Presenter
A1	<a href="#">1570210191</a>	<i>Sentiment Analysis on Big Data using Machine Learning for Holiday Destinations 2015</i>	<a href="#">Divya Rajput</a>	<a href="#">Divya Rajput</a>
A2	<a href="#">1570212580</a>	<i>Dynamic Component Reconfiguration System using Case-based Reasoning for Weapons System in DM&amp;S: Guided Weapon Case</i>	<a href="#">Dohyun Kim</a>	<a href="#">Dohyun Kim</a>
A3	<a href="#">1570216409</a>	<i>On the usability of clustering for topic-oriented multi-level security models</i>	<a href="#">Paal Engelstad</a>	<a href="#">Paal Engelstad</a>
A4	<a href="#">1570216582</a>	<i>Adaptive Crop/Plant Growth Assistance Learning Algorithm</i>	<a href="#">Shrevaan Kaushal</a>	
A5	<a href="#">1570216799</a>	<i>Implementation of dynamic traffic light controllers using artificial neural networks to diminish traffic ordeals</i>	<a href="#">Md Tahmid Rashid</a>	
		<b>TRACK: 03-C Methodologies, Tools and Operations Research</b>		
C1	<a href="#">1570215629</a>	<i>Embedding sectorial models in an integrated platform for assessing climate change impacts</i>	<a href="#">Cristina Savin</a>	<a href="#">Cristina Savin</a>
C2	<a href="#">1570216682</a>	<i>Design of Spectrum Estimation Model for Mobile Broadband in Indonesia in 2015 2025</i>	<a href="#">Gunawan Wibisono</a>	<a href="#">Gunawan Wibisono</a>
		<b>TRACK: 04-D Bio-informatics and Bio-Medical Simulation</b>		
D1	<a href="#">1570200621</a>	<i>Therapeutic Degenerative Disc Disease (DDD) Using Disc Rehabilitation Table (DRT)</i>	<a href="#">Abdullah Tashtoush</a>	<a href="#">Abdullah Tashtoush</a>
D2	<a href="#">1570209483</a>	<i>The Effect of Aerobic Exercise on Growth Hormone, Insulin and Blood Glucose Levels in Non-Athletes Middle Aged Women With High Fat Profile</i>	<a href="#">Leila Momeni</a>	
D3	<a href="#">1570210295</a>	<i>ICA, LGE and FMI as DR Techniques followed by GMM as Post Classifier for the Classification of Epilepsy Risk Levels from EEG Signals</i>	<a href="#">Sunil Kumar Prabhakar</a>	
D4	<a href="#">1570212546</a>	<i>Head Coil for 10.5 Tesla Magnetic Resonance Imaging Human Body Scanner</i>	<a href="#">Elizaveta Motovilova</a>	<a href="#">Elizaveta Motovilova</a>
D5	<a href="#">1570216631</a>	<i>Classification of Epilepsy Risk Levels using Variable Thresholding Based Feature Extraction Technique and suitable Post Classifiers</i>	<a href="#">Sunil Kumar Prabhakar</a>	
D6	<a href="#">1570217062</a>	<i>Mechanical Interaction between Overlapping Stents and Peripheral Arteries - Numerical Model</i>	<a href="#">Moshe Brand</a>	<a href="#">Moshe Brand</a>
D7	<a href="#">1570217237</a>	<i>Raw ECG Signal Processing and the Detection of QRS Complex</i>	<a href="#">Andrea Peterková</a>	
		<b>TRACK: 05-E Discrete Event and Real Time Systems</b>		
E1	<a href="#">1570215638</a>	<i>Modeling, Validation and Continuous Integration of Software Behaviors for Embedded Systems</i>	<a href="#">Vladimir Estivill-Castro</a>	<a href="#">Vladimir Estivill-Castro</a>

E2	<a href="#">1570215876</a>	<i>MATLAB Function Based Approach to FOC of PMSM Drive</i>	<a href="#">Omer Kivanc</a>	<a href="#">Salih B. Ozturk</a>
E3	<a href="#">1570216023</a>	<i>On-Ramp Traffic Merging Modeling Based on Cellular Automata</i>	<a href="#">Hector Guzman</a>	<a href="#">Hector Guzman</a>
		<b>TRACK: 06-F Image, Speech and Signal Processing</b>		
F1	<a href="#">1570208081</a>	<i>Integrated framework for Multimedia Transcoding and Implementation in Cellular networks</i>	<a href="#">Shakti Awaghad</a>	
F2	<a href="#">1570212313</a>	<i>Noise Reduction Using Frequency-Warped FIR Wiener Filter</i>	<a href="#">Aida Shamsa</a>	
F3	<a href="#">1570212941</a>	<i>Shape based object detection for partially occluded objects under front lighting techniques</i>	<a href="#">Priya Loganathan</a>	
F4	<a href="#">1570213164</a>	<i>Performance Comparison of Discrete Orthonormal S-transform for the Reconstruction of Medical Images</i>	<a href="#">Yuslinda Wati Mohamad Yusof</a>	<a href="#">Yuslinda Wati Mohamad Yusof</a>
F5	<a href="#">1570215902</a>	<i>Simulation Study of DITMC Technique for Enhancing Channel Utilization in Speech Communication of Mobile Network</i>	<a href="#">Hemant Purohit</a>	<a href="#">Hemant Purohit</a>
F6	<a href="#">1570216042</a>	<i>Statistical Gabor-Based Gait Recognition Using Region-Level Analysis</i>	<a href="#">Amer Binsaadoon</a>	<a href="#">Amer Binsaadoon</a>
F7	<a href="#">1570216508</a>	<i>Adaptive Filter Based Image Registration</i>	<a href="#">Benjamin Henson</a>	<a href="#">Benjamin Henson</a>
F8	<a href="#">1570216660</a>	<i>3 D Imprinting of Environment for visually impaired</i>	<a href="#">Amogh Adishesha</a>	<a href="#">Desai; Amogh Adishesha</a>
		<b>TRACK: 07-G Industry, Business and Management</b>		
G1	<a href="#">1570198007</a>	<i>Importance of Simulators, Systematic Approach to Training, and Integral Instruction Centres in the Process Industry</i>	<a href="#">Edgardo Roldan-Villasana</a>	<a href="#">Edgardo Roldan-Villasana</a>
G2	<a href="#">1570212583</a>	<i>Gaussian Process Modeling of Well Logs</i>	<a href="#">Andy Rawlinson</a>	
G3	<a href="#">1570212610</a>	<i>A probability model for the size of investment projects</i>	<a href="#">Maurizio Naldi</a>	<a href="#">Maurizio Naldi</a>
G4	<a href="#">1570213568</a>	<i>Understanding Churn in Human Capital Network: A Dynamic Model</i>	<a href="#">Guannan Liu</a>	Zhang
G5	<a href="#">1570216056</a>	<i>Computer Assisted Quality Assessment of a Set of Business Process Models</i>	<a href="#">Evgeniy Krastev</a>	<a href="#">Evgeniy Krastev</a>
G6	<a href="#">1570216281</a>	<i>Disaster Recovery Drills Considerations: From Planning to Automation</i>	<a href="#">Raed Al-Shaikh</a>	
		<b>TRACK: 09-J Engineering: Civil, Mechanical, Chemical, Industrial, Manufacturing and Control</b>		
J1	<a href="#">1570211643</a>	<i>Delay of digital filter tuned for mechanical resonant frequency reduction in multi-mass mechanical systems in electrical direct drive</i>	<a href="#">Dominik Luczak</a>	<a href="#">Dominik Luczak</a>
J2	<a href="#">1570211657</a>	<i>Modeling, Simulation and Control of Pedestrian Avoidance Maneuver for an Urban Electric Vehicle</i>	<a href="#">Luciano Alonso Rentería</a>	<a href="#">Juan Pérez-Oria</a>
J3	<a href="#">1570214599</a>	<i>A Simple Fuzzy Logic Based Power Control for a Series Hybrid Electric Vehicle</i>	<a href="#">Zsolt Johanyak</a>	<a href="#">Zsolt Johanyak</a>
J4	<a href="#">1570216021</a>	<i>Lateral Stability Control Based on Active Motor Torque Control for Electric and Hybrid Vehicles <b>SAME DAY AS J5</b></i>	<a href="#">İşilay Yogurtcu</a>	<a href="#">İşilay Yogurtcu</a>

J5	<a href="#">1570216031</a>	<i>Parametric analysis and compensation of ride comfort for electric drivetrains utilizing in-wheel electric motors</i> <b>SAME DAY AS J4</b>	<a href="#">Selim Solmaz</a>	<a href="#">Selim Solmaz</a>
J6	<a href="#">1570216243</a>	<i>Nonlinear phase shift compensator for pilot-induced oscillations prevention</i>	<a href="#">Boris Andrievsky</a>	<a href="#">Boris Andrievsky</a>
J7	<a href="#">1570216650</a>	<i>An Optimal Geometric Model for Clavels Delta Robot</i>	<a href="#">Carlo Avizzano</a>	<a href="#">Jacinto</a>
J8	<a href="#">1570217150</a>	<i>Two-Dimensional Water Environment Numerical Simulation Research Based on EFDC in Mudan River</i>	<a href="#">Gula Tang</a>	<a href="#">Gula Tang</a>
		<b>TRACK: 10-K Energy, Power Generation and Distribution</b>		
K1	<a href="#">1570210749</a>	<i>A New Control Approach for Shunt Hybrid Active Power Filter to Compensate Harmonics and Dynamic Reactive Power with Grid Interconnection</i>	<a href="#">Tuğçe Demirdelen</a>	<a href="#">Tuğçe Demirdelen</a>
K2	<a href="#">1570210769</a>	<i>The Analysis and Performance Results of Bidirectional DC-DC Converter Based Dynamic Voltage Restorer under Voltage Sag/Swell Conditions</i>	<a href="#">Mustafa İnci</a>	<a href="#">Mustafa İnci</a>
K3	<a href="#">1570211655</a>	<i>The impact of distributed generation in the distribution networks' voltage profile and energy losses</i>	<a href="#">Vasiliki Vita</a>	<a href="#">Vasiliki Vita</a>
K4	<a href="#">1570212877</a>	<i>Water-Energy-Land Nexus - Modelling long-term scenarios for Brazil</i>	<a href="#">Matthias Senger</a>	<a href="#">Matthias Senger</a>
K5	<a href="#">1570213075</a>	<i>Residential lighting load Profile: ANFIS and Neural Network-based models</i>	<a href="#">Olawale Popoola</a>	<a href="#">Olawale Popoola</a>
K6	<a href="#">1570215290</a>	<i>Secure Design Patterns for Security in Smart Metering Systems</i>	<a href="#">Obaid Ur-Rehman</a>	<a href="#">Obaid Ur-Rehman</a>
K7	<a href="#">1570217444</a>	<i>Publish in EMS2015, Design of 24 Hour Energy Generation From Renewable Energy</i>	<a href="#">Mohammad Reza Maghami</a>	<b>Presented in KL</b>
K8	<a href="#">1570217446</a>	<i>Publish in EMS2015, Mathematical Relationship Identification for Photovoltaic Systems</i>	<a href="#">Mohammad Reza Maghami</a>	<b>Presented in KL</b>
K9	<a href="#">1570217479</a>	<i>Mathematical Modelling for Optimal Electrical Energy Generation and Distribution in Remote Micro-Grids</i>	<a href="#">Pranav Deshpande</a>	
		<b>TRACK: 11-L Transport, Logistics, Harbour, Shipping and Marine Simulation</b>		
L1	<a href="#">1570208911</a>	<i>Permanent Magnet Synchronous Linear Motor for an Urban Transport Electric Vehicle</i>	<a href="#">Monica Chinchilla</a>	<a href="#">Monica Chinchilla</a>
L2	<a href="#">1570213635</a>	<i>A Simulation Study of the Electronic Waybill Service</i>	<a href="#">Shoaib Bakhtyar</a>	<a href="#">Lawrence Henesey</a>
L3	<a href="#">1570215598</a>	<i>Nonlinear Model Predictive Control for Tracking of Underactuated Vessels under Input Constraints</i>	<a href="#">Mohamed Abdelaal</a>	<a href="#">Mohamed Abdelaal</a>
		<b>TRACK: 12-M Virtual Reality, Visualization and Computer Games</b>		
M1	<a href="#">1570214887</a>	<i>Planning for Non-player Characters Using HTN and Visual Perception</i>	<a href="#">Ibrahim Mahmoud</a>	<a href="#">Ibrahim Mahmoud</a>
		<b>TRACK: 13-N Parallel and Distributed Architectures and Systems</b>		
N1	<a href="#">1570209449</a>	<i>Throughput Evaluation of Irregular Routing Algorithm for 2-Dimensional Mesh Network-on-Chip</i>	<a href="#">Ladan Momeni</a>	

N2	<a href="#">1570211653</a>	<i>High-Performance and Distributed Computing in a Probabilistic Finite Element Comparison Study of the Human Lower Leg Model</i>	<a href="#">Corneliu T Arsene</a>	
N3	<a href="#">1570214904</a>	<i>Gradual development of an IoT architecture for real-world things</i>	<a href="#">Nicoleta-Cristina Gaitan</a>	Ungurean
		<b>TRACK: 14-P Internet Modelling, Semantic Web and Ontologies</b>		
P1	<a href="#">1570212368</a>	<i>A PHP application library for web-based power systems analysis</i>	<a href="#">Simon Agamah</a>	Simon Agamah
P2	<a href="#">1570214877</a>	<i>Potentials of web standards for automation control in manufacturing systems</i>	<a href="#">Borja Ramis Ferrer</a>	Borja Ramis Ferrer
P3	<a href="#">1570216923</a>	<i>Usability Degree for Arabized Open Source Software: PhpMyBibli Integrated Library System as a Case Study</i>	<a href="#">Nawras Othman</a>	Al-Zaghoul
P4	<a href="#">1570218723</a>	<i>Query Reformulation Using Crop Characteristic in Specific Domain Search</i>	<a href="#">Azilawati Azizan</a>	Azilawati Azizan
		<b>TRACK: 15-R Mobile/Ad hoc wireless networks, mobicast, sensor placement, target tracking</b>		
R1	<a href="#">1570212145</a>	<i>A New Efficient and Secure Mutual Authentication Protocol For RFID Systems</i>	<a href="#">Samad Rostampour</a>	Samad Rostampour
R2	<a href="#">1570212498</a>	<i>Energy management of wireless sensor network based on modelling by game theory approaches</i>	<a href="#">Shahinaz Altabbakh</a>	
R3	<a href="#">1570212508</a>	<i>Security of an anonymous RFID authentication protocol and its improvement</i>	<a href="#">Mahsa Fathi</a>	Mahsa Fathi
R4	<a href="#">1570216577</a>	<i>A Novel Data Fusion Method in Wireless Multimedia Sensor Networks</i>	<a href="#">Rui Gao</a>	
		<b>TRACK: 16-S Performance Engineering of Computer &amp; Communication Systems</b>		
S1	<a href="#">1570211985</a>	<i>A Simulation Study of the Stochastic Compensation Effect for Packet Reordering in Multipath Data Streaming</i>	<a href="#">Dmitry Korzun</a>	Dmitry Korzun
S2	<a href="#">1570214114</a>	<i>Performance Comparisons of Wireless Mesh IP Video Surveillance Models</i>	<a href="#">Smart Lubobya</a>	Smart Lubobya
S3	<a href="#">1570216669</a>	<i>Design of an Efficient Correlation Delay Shift Keying Scheme for Chaos Based Communications</i>	<a href="#">Nizar Albassam</a>	
		<b>TRACK: 17-T Circuits, Sensors and Devices</b>		
T1	<a href="#">1570210707</a>	<i>Mobile Controlled Wheelchair DAY-2</i>	<a href="#">Roger Achkar</a>	Roger Achkar
T2	<a href="#">1570211381</a>	<i>SimSiVIDS: Modelling of an Inductive Sensor for Traffic Applications</i>	<a href="#">José Lamas-Seco</a>	Castro
T3	<a href="#">1570211495</a>	<i>Low Power CMOS 8:1 Injection-Locked Frequency Divider with LC Cross-Coupled Oscillator</i>	<a href="#">Junho Yu</a>	Junho Yu; Kim
T4	<a href="#">1570211587</a>	<i>Microwave-band Circuit-level Semiconductor Laser Modeling</i>	<a href="#">Mikhail Belkin</a>	Vladimir
T5	<a href="#">1570211711</a>	<i>Design of 0.35 <math>\mu</math>m CMOS Temperature Sensor for Automatic Refresh Cycle in DRAM Memory Cell</i>	<a href="#">Sehyuk An</a>	Sehyuk An

T6	<a href="#">1570212907</a>	<i>Memristors' Potential for Multi-bit Storage and Pattern Learning</i>	<a href="#">Nima TaheriNejad</a>	<a href="#">Nima TaheriNejad</a>
T7	<a href="#">1570216170</a>	<i>Efficient Design of a Coplanar Adder/Subtractor in Quantum-dot Cellular Automata</i>	<a href="#">Milad Sangsefidi</a>	<a href="#">Sarayloo</a>
T8	<a href="#">1570216563</a>	<i>A Low Cost Open-Controller for Interactive Robotic System</i>	<a href="#">Juan Jacinto</a>	<a href="#">Juan Jacinto</a>
T9	<a href="#">1570216584</a>	<i>Computational Model of a Buncher Cavity for Millimetric Klystron</i>	<a href="#">Alberto Leggieri</a>	<a href="#">Alberto Leggieri</a>
T10	<a href="#">1570216645</a>	<i>Theoretical Analysis and Sensitivity Modeling of an Energy Detector for IR-UWB Applications</i>	<a href="#">Oswaldo Ramos Sparrow</a>	<a href="#">Oswaldo Ramos Sparrow</a>

- - -

## List of Published Papers

Seq	#	Title	First author
1	<a href="#">1570198007</a>	<i>Importance of Simulators, Systematic Approach to Training, and Integral Instruction Centres in the Process Industry</i>	<a href="#">Edgardo Roldan-Villasana</a>
2	<a href="#">1570200621</a>	<i>Therapeutic Degenerative Disc Disease (DDD) Using Disc Rehabilitation Table (DRT)</i>	<a href="#">Abdullah Tashtoush</a>
3	<a href="#">1570208081</a>	<i>Integrated framework for Multimedia Transcoding and Implementation in Cellular networks</i>	<a href="#">Shakti Awaghad</a>
4	<a href="#">1570208911</a>	<i>Permanent Magnet Synchronous Linear Motor for an Urban Transport Electric Vehicle</i>	<a href="#">Monica Chinchilla</a>
5	<a href="#">1570209449</a>	<i>Throughput Evaluation of Irregular Routing Algorithm for 2-Dimensional Mesh Network-on-Chip</i>	<a href="#">Ladan Momeni</a>
6	<a href="#">1570209483</a>	<i>The Effect of Aerobic Exercise on Growth Hormone, Insulin and Blood Glucose Levels in Non-Athletes Middle Aged Women With High Fat Profile</i>	<a href="#">Leila Momeni</a>
7	<a href="#">1570210191</a>	<i>Sentiment Analysis on Big Data using Machine Learning for Holiday Destinations 2015</i>	<a href="#">Divya Rajput</a>
8	<a href="#">1570210295</a>	<i>ICA, LGE and FMI as DR Techniques followed by GMM as Post Classifier for the Classification of Epilepsy Risk Levels from EEG Signals</i>	<a href="#">Sunil Kumar Prabhakar</a>
9	<a href="#">1570210707</a>	<i>Mobile Controlled Wheelchair</i>	<a href="#">Roger Achkar</a>
10	<a href="#">1570210749</a>	<i>A New Control Approach for Shunt Hybrid Active Power Filter to Compensate Harmonics and Dynamic Reactive Power with Grid Interconnection</i>	<a href="#">Tuğçe Demirdelen</a>
11	<a href="#">1570210769</a>	<i>The Analysis and Performance Results of Bidirectional DC-DC Converter Based Dynamic Voltage Restorer under Voltage Sag/Swell Conditions</i>	<a href="#">Mustafa İnci</a>
12	<a href="#">1570211381</a>	<i>SimSiVIDS: Modelling of an Inductive Sensor for Traffic Applications</i>	<a href="#">José Lamas-Seco</a>
13	<a href="#">1570211495</a>	<i>Low Power CMOS 8:1 Injection-Locked Frequency Divider with LC Cross-Coupled Oscillator</i>	<a href="#">Junho Yu</a>
14	<a href="#">1570211587</a>	<i>Microwave-band Circuit-level Semiconductor Laser Modeling</i>	<a href="#">Mikhail Belkin</a>



15	<a href="#">1570211643</a>	<i>Delay of digital filter tuned for mechanical resonant frequency reduction in multi-mass mechanical systems in electrical direct drive</i>	<a href="#">Dominik Luczak</a>
16	<a href="#">1570211653</a>	<i>High-Performance and Distributed Computing in a Probabilistic Finite Element Comparison Study of the Human Lower Leg Model</i>	<a href="#">Corneliu T Arsene</a>
17	<a href="#">1570211655</a>	<i>The impact of distributed generation in the distribution networks' voltage profile and energy losses</i>	<a href="#">Vasiliki Vita</a>
18	<a href="#">1570211657</a>	<i>Modeling, Simulation and Control of Pedestrian Avoidance Maneuver for an Urban Electric Vehicle</i>	<a href="#">Luciano Alonso Renteria</a>
19	<a href="#">1570211711</a>	<i>Design of 0.35 <math>\mu\text{m}</math> CMOS Temperature Sensor for Automatic Refresh Cycle in DRAM Memory Cell</i>	<a href="#">Sehyuk An</a>
20	<a href="#">1570211985</a>	<i>A Simulation Study of the Stochastic Compensation Effect for Packet Reordering in Multipath Data Streaming</i>	<a href="#">Dmitry Korzun</a>
21	<a href="#">1570212145</a>	<i>A New Efficient and Secure Mutual Authentication Protocol For RFID Systems</i>	<a href="#">Samad Rostampour</a>
22	<a href="#">1570212313</a>	<i>Noise Reduction Using Frequency-Warped FIR Wiener Filter</i>	<a href="#">Aida Shamsa</a>
23	<a href="#">1570212368</a>	<i>A PHP application library for web-based power systems analysis</i>	<a href="#">Simon Agamah</a>
24	<a href="#">1570212498</a>	<i>Energy management of wireless sensor network based on modelling by game theory approaches</i>	<a href="#">Shahinaz Altabbakh</a>
25	<a href="#">1570212508</a>	<i>Security of an anonymous RFID authentication protocol and its improvement</i>	<a href="#">Mahsa Fathi</a>
26	<a href="#">1570212546</a>	<i>Head Coil for 10.5 Tesla Magnetic Resonance Imaging Human Body Scanner</i>	<a href="#">Elizaveta Motovilova</a>
27	<a href="#">1570212580</a>	<i>Dynamic Component Reconfiguration System using Case-based Reasoning for Weapons System in DM&amp;S: Guided Weapon Case</i>	<a href="#">Dohyun Kim</a>
28	<a href="#">1570212583</a>	<i>Gaussian Process Modeling of Well Logs</i>	<a href="#">Andy Rawlinson</a>
29	<a href="#">1570212610</a>	<i>A probability model for the size of investment projects</i>	<a href="#">Maurizio Naldi</a>
30	<a href="#">1570212877</a>	<i>Water-Energy-Land Nexus - Modelling long-term scenarios for Brazil</i>	<a href="#">Matthias Senger</a>
31	<a href="#">1570212907</a>	<i>Memristors' Potential for Multi-bit Storage and Pattern Learning</i>	<a href="#">Nima TaheriNejad</a>
32	<a href="#">1570212941</a>	<i>Shape based object detection for partially occluded objects under front lighting techniques</i>	<a href="#">Priya Loganathan</a>
33	<a href="#">1570213075</a>	<i>Residential lighting load Profile: ANFIS and Neural Network-based models</i>	<a href="#">Olawale Popoola</a>
34	<a href="#">1570213164</a>	<i>Performance Comparison of Discrete Orthonormal S-transform for the Reconstruction of Medical Images</i>	<a href="#">Yuslinda Wati Mohamad Yusof</a>
35	<a href="#">1570213568</a>	<i>Understanding Churn in Human Capital Network: A Dynamic Model</i>	<a href="#">Guannan Liu</a>
36	<a href="#">1570213635</a>	<i>A Simulation Study of the Electronic Waybill Service</i>	<a href="#">Shoaib Bakhtyar</a>
37	<a href="#">1570214114</a>	<i>Performance Comparisons of Wireless Mesh IP Video Surveillance Models</i>	<a href="#">Smart Lubobya</a>
38	<a href="#">1570214599</a>	<i>A Simple Fuzzy Logic Based Power Control for a Series Hybrid Electric Vehicle</i>	<a href="#">Zsolt Johanyak</a>
39	<a href="#">1570214877</a>	<i>Potentials of web standards for automation control in manufacturing systems</i>	<a href="#">Borja Ramis Ferrer</a>
40	<a href="#">1570214887</a>	<i>Planning for Non-player Characters Using HTN and Visual Perception</i>	<a href="#">Ibrahim Mahmoud</a>
41	<a href="#">1570214904</a>	<i>Gradual development of an IoT architecture for real-world things</i>	<a href="#">Nicoleta-Cristina Gaitan</a>

42	<a href="#">1570215290</a>	<i>Secure Design Patterns for Security in Smart Metering Systems</i>	<a href="#">Obaid Ur-Rehman</a>
43	<a href="#">1570215598</a>	<i>Nonlinear Model Predictive Control for Tracking of Underactuated Vessels under Input Constraints</i>	<a href="#">Mohamed Abdelaal</a>
44	<a href="#">1570215629</a>	<i>Embedding sectorial models in an integrated platform for assessing climate change impacts</i>	<a href="#">Cristina Savin</a>
45	<a href="#">1570215638</a>	<i>Modeling, Validation and Continuous Integration of Software Behaviors for Embedded Systems</i>	<a href="#">Vladimir Estivill-Castro</a>
46	<a href="#">1570215876</a>	<i>MATLAB Function Based Approach to FOC of PMSM Drive</i>	<a href="#">Omer Kivanc</a>
47	<a href="#">1570215902</a>	<i>Simulation Study of DITMC Technique for Enhancing Channel Utilization in Speech Communication of Mobile Network</i>	<a href="#">Hemant Purohit</a>
48	<a href="#">1570216021</a>	<i>Lateral Stability Control Based on Active Motor Torque Control for Electric and Hybrid Vehicles</i>	<a href="#">İsıl Yagurtcu</a>
49	<a href="#">1570216023</a>	<i>On-Ramp Traffic Merging Modeling Based on Cellular Automata</i>	<a href="#">Hector Guzman</a>
50	<a href="#">1570216031</a>	<i>Parametric analysis and compensation of ride comfort for electric drivetrains utilizing in-wheel electric motors</i>	<a href="#">Selim Solmaz</a>
51	<a href="#">1570216042</a>	<i>Statistical Gabor-Based Gait Recognition Using Region-Level Analysis</i>	<a href="#">Amer Binsaadoon</a>
52	<a href="#">1570216056</a>	<i>Computer Assisted Quality Assessment of a Set of Business Process Models</i>	<a href="#">Evgeniy Krastev</a>
53	<a href="#">1570216170</a>	<i>Efficient Design of a Coplanar Adder/Subtractor in Quantum-dot Cellular Automata</i>	<a href="#">Milad Sangsefidi</a>
54	<a href="#">1570216243</a>	<i>Nonlinear phase shift compensator for pilot-induced oscillations prevention</i>	<a href="#">Boris Andrievsky</a>
55	<a href="#">1570216281</a>	<i>Disaster Recovery Drills Considerations: From Planning to Automation</i>	<a href="#">Raed Al-Shaikh</a>
56	<a href="#">1570216409</a>	<i>On the usability of clustering for topic-oriented multi-level security models</i>	<a href="#">Paal Engelstad</a>
57	<a href="#">1570216508</a>	<i>Adaptive Filter Based Image Registration</i>	<a href="#">Benjamin Henson</a>
58	<a href="#">1570216563</a>	<i>A Low Cost Open-Controller for Interactive Robotic System</i>	<a href="#">Juan Jacinto</a>
59	<a href="#">1570216577</a>	<i>A Novel Data Fusion Method in Wireless Multimedia Sensor Networks</i>	<a href="#">Rui Gao</a>
60	<a href="#">1570216582</a>	<i>Adaptive Crop/Plant Growth Assistance Learning Algorithm</i>	<a href="#">Shreyaan Kaushal</a>
61	<a href="#">1570216584</a>	<i>Computational Model of a Buncher Cavity for Millimetric Klystron</i>	<a href="#">Alberto Leggieri</a>
62	<a href="#">1570216631</a>	<i>Classification of Epilepsy Risk Levels using Variable Thresholding Based Feature Extraction Technique and suitable Post Classifiers</i>	<a href="#">Sunil Kumar Prabhakar</a>
63	<a href="#">1570216645</a>	<i>Theoretical Analysis and Sensitivity Modeling of an Energy Detector for IR-UWB Applications</i>	<a href="#">Oswaldo Ramos Sparrow</a>
64	<a href="#">1570216650</a>	<i>An Optimal Geometric Model for Clavels Delta Robot</i>	<a href="#">Carlo Avizzano</a>
65	<a href="#">1570216660</a>	<i>3 D Imprinting of Environment for visually impaired</i>	<a href="#">Amogh Adishesha</a>
66	<a href="#">1570216669</a>	<i>Design of an Efficient Correlation Delay Shift Keying Scheme for Chaos Based Communications</i>	<a href="#">Nizar Albassam</a>
67	<a href="#">1570216682</a>	<i>Design of Spectrum Estimation Model for Mobile Broadband in Indonesia in 2015 2025</i>	<a href="#">Gunawan Wibisono</a>
68	<a href="#">1570216799</a>	<i>Implementation of dynamic traffic light controllers using artificial neural networks to diminish traffic ordeals</i>	<a href="#">Md Tahmid Rashid</a>
69	<a href="#">1570216923</a>	<i>Usability Degree for Arabized Open Source Software: PhpMyBibli Integrated Library System as a Case Study</i>	<a href="#">Nawras Othman</a>

70	<a href="#">1570217062</a>	<i>Mechanical Interaction between Overlapping Stents and Peripheral Arteries - Numerical Model</i>	<a href="#">Elyasaf Leybovitch</a>
71	<a href="#">1570217150</a>	<i>Two-Dimensional Water Environment Numerical Simulation Research Based on EFDC in Mudan River</i>	<a href="#">Gula Tang</a>
72	<a href="#">1570217237</a>	<i>Raw ECG Signal Processing and the Detection of QRS Complex</i>	<a href="#">Andrea Peterková</a>
73	<a href="#">1570217444</a>	<i>Publish in EMS2015, Design of 24 Hour Energy Generation From Renewable Energy</i>	<a href="#">Mohammad Reza Maghami</a>
74	<a href="#">1570217446</a>	<i>Publish in EMS2015, Mathematical Relationship Identification for Photovoltaic Systems</i>	<a href="#">Mohammad Reza Maghami</a>
75	<a href="#">1570217479</a>	<i>Mathematical Modelling for Optimal Electrical Energy Generation and Distribution in Remote Micro-Grids</i>	<a href="#">Pranav Deshpande</a>
76	<a href="#">1570218723</a>	<i>Query Reformulation Using Crop Characteristic in Specific Domain Search</i>	<a href="#">Azilawati Azizan</a>

# EMS2015

Madrid, Spain, 6 – 8 October 2015

Time	Room A	Room B
<b>Tuesday, October 6</b>		
08:45 AM-10:00 AM	Tue.am1.A: <i>Opening Session and Keynote Speaker-1</i>	
10:15 AM-12:15 PM	Tue.am2.A: <i>Intelligent Systems and Bio Informatics/Medical simulation</i>	Tue.am2.B: <i>Image, Speech and Signal Processing</i>
01:15 PM-03:35 PM	Tue.pm1.A: <i>Methodologies, Discrete Events and Industry, Business &amp; Management</i>	Tue.pm1.B: <i>IEnergy, Power Generation and Distribution</i>
03:50 PM-06:10 PM	Tue.pm2.A: <i>Methodologies and Engineering</i>	Tue.pm2.B: <i>Engineering, Transport and Virtual Reality/Visualization/Computer Games</i>
<b>Wednesday, October 7</b>		
08:40 AM-10:20 AM	Wed.am1.A: <i>Parallel/Distributed and Internet Modelling, Semantic-Web/Ontologies</i>	Wed.am1.B: <i>Discrete Events, Mobile/Ad hoc Networks and Performance Engineering</i>
10:35 AM-12:35 PM	Wed.am2.A: <i>Circuits, Sensors and Devices</i>	Wed.am2.B: <i>Internet Modelling and Circuits, Sensors &amp; Devices</i>

## **Tuesday, October 6, 8:45 AM - 10:00 AM, Tue.am1.A: Opening Session and Keynote Speaker**

Chairs: David Al-Dabass (Nottingham Trent University, United Kingdom), Gregorio Romero (Universidad Politecnica de Madrid, Spain)

### **Approximate Feature Selection in Data-Driven Systems Modelling**

**Prof Qiang Shen**

**Director, Institute of Mathematics, Physics and Computer Science  
Aberystwyth University, Wales, UK.  
Email: [qqs@aber.ac.uk](mailto:qqs@aber.ac.uk)**

#### **Summary**

Feature selection (FS) addresses the problem of selecting those system descriptors that are most predictive of a given outcome. Unlike other dimensionality reduction methods, with FS the original meaning of the features is preserved. This has found application in tasks that involve datasets containing very large numbers of features that might otherwise be impractical to model and process (e.g., large-scale image analysis, text processing and Web content classification).

This talk will focus on the development and application of FS mechanisms based on rough and fuzzy-rough theories. Such techniques provide a means by which data can be effectively reduced without the need for user-supplied information. In particular, fuzzy-rough feature selection (FRFS) works with discrete and real-valued noisy data (or a mixture of both). As such, it is suitable for regression as well as for classification. The only additional information required is the fuzzy partition for each feature, which can be automatically derived from the data. FRFS has been shown to be a powerful technique for data dimensionality reduction. In introducing the general background of FS, this talk will first cover the rough-set-based approach, before focusing on FRFS and its application to real-world problems. The talk will conclude with an outline of opportunities for further development.

#### **Speaker's Biography**

Professor Qiang Shen received a PhD in Knowledge-Based Systems and a DSc in Computational Intelligence. He holds the Established Chair of Computer Science and is Director of the Institute of Mathematics, Physics and Computer Science at Aberystwyth University. He is a Fellow of the Royal Society of Wales and a UK REF 2014 panel member for Computer Science and Informatics. He has been a long-serving Associate Editor of two IEEE flagship Journals (IEEE Transactions on Cybernetics and on Fuzzy Systems), and has chaired and given keynotes at numerous international conferences.

Professor Shen's current research interests include: computational intelligence, reasoning under uncertainty, pattern recognition, qualitative modelling and simulation, and their applications for intelligent decision support (e.g., crime detection, consumer profiling, systems monitoring, and medical diagnosis). He has authored 2 research monographs and over 350 peer-reviewed papers, including an award-winning IEEE Outstanding Transactions paper. Qiang has served as the first supervisor of 50 PDRAs/PhDs, including one UK Distinguished Dissertation Award winner.

**Tuesday, October 6, 10:15 AM - 12:15 PM**

**Tue.am2.A: Intelligent Systems and Bio Informatics/Medical simulation**

Chairs: Dmitry G. Korzun (Petrozavodsk State University, Russia), Dominik Luczak (Poznan University of Technology, Poland)

**10:15 *Sentiment Analysis on Big Data using Machine Learning for Holiday Destinations 2015***

Divya Rajput (Indian Institute of Corporate Affairs, India); Mani Madhukar (IBM, India); Seema Verma (University Banasthali Vidyapith, India); Manisha Sharma(University of Banasthali Vidyapith, Rajasthan, India)

Today, micro-blogging has become omnipresent. Because of its 'no cost' system of messages/posts/tweets, many end users discuss about products or services through the medium of post/tweet or express any kind of views, the companies can efficiently use such data for publicity, research, customer reviews etc. In this paper, we have performed sentiment analysis using R programming language by implementing its machine learning tools. This research classifies data into 3 categories: Positive, Negative and Neutral. The BTS model (Bag of Words for feature selection, TF-IDF for feature weighting and SVM for classification) and BTA model (BOW, TF-IDF and ANN for classification) are used to analyze big data and determine their accuracy levels and recall time. Post experimentation on twitter data, results are shown in a form of a table and hence, prediction will be made on the basis of comparison cloud which will be presented towards the end.

**10:35 *Dynamic Component Reconfiguration System using Case-based Reasoning for Weapons System in DM&S: Guided Weapon Case***

Dohyun Kim and Yoonho Seo (University of Korea, Korea); Dong-Mok Sheen (University of Ulsan, Korea)

This research focuses on the development of a system to support modeling required to simulate weapon system for acquisition purpose. We use a modeling method to reconfigure component assets in designing weapon systems. In reconfiguring component assets, we consider functional, behavioral, and physical aspects and adapt the FBS model by J.S. Gero to make connections between the components. Also, we use CBR (Case-based Reasoning) which is one of the paradigms of intelligent computer system to automate modeling for assembly. Our system provides a frame to generate easily a weapon system that meets the requirements of user. The significance of this research is to provide a way to configure weapon systems with reusable component models. Consequently, the proposed system shows the stable performance.

**10:55 *On the usability of clustering for topic-oriented multi-level security models***

Paal E. Engelstad (University of Oslo / Telenor GBD&R / Simula Research Laboratory, Norway)

Security levels used in organizations today are typically course-grained, while current research is advocating a move towards more fine-grained models for multi-level security. With a topic-oriented approach, information objects are characterized in terms of fine-grained descriptions of the topics of its content. It will lead to higher flexibility, but will also rely on a policy-database to assign a specific security policy to topics and subtopics. Due to increased complexity, it will also require automatic or semi-automatic tools for determining the topics and sub-topics of information objects, and the tools should extract topics that are easily understood by humans, since humans need to control the policy. This paper studies the feasibility of using clustering techniques to help humans in extracting the topics from information objects. A number of clustering methods are discussed, including k-means, Ward's hierarchical agglomerative clustering, Correlated Topic Models (CTM) and Latent Dirichlet Allocation (LDA). To the best of our knowledge, an in-depth analysis on the feasibility of using clustering for this problem has not been presented in previous work. Our analysis points out challenges with clustering in particular, which must be addressed before realizing the general vision of topic-oriented policy-driven security models.

### **11:15 *Therapeutic Degenerative Disc Disease (DDD) Using Disc Rehabilitation Table (DRT)***

Abdullah M Tashtoush (Yarmouk University, Jordan)

Since 1889, the mechanical traction technique had become popular in spinal disease treatment and other neurological diseases by using the pulley and weight approach. In these days and credit for high technology, many companies offered different types of expensive tables to serve patient in this domain away from the guidance of the National Institute for Health and Clinical Excellence (NICE), which is stressed on caring patient can be achieved by considering validity and cost-effectiveness as a types of treatments. As the number of cases of backache got increases, it has become so important to find a definitive treatment of this disease. This work will enhance nonsurgical treatments for various disc diseases by auto-traction device approach. Rest in bed will hurry the process of pain relief but it may take weeks. By means of mechanical auto-traction, one can achieve in minutes or hours what might take days or weeks in bed. Disc Rehabilitation Table (DRT) function is to space between vertebrae that can help strengthen the spinal column and the supporting muscles, ligaments, and tendons. It is very safe and very effective not only at early stages, but also for complicated disc problems.

### **11:35 *Head Coil for 10.5 Tesla Magnetic Resonance Imaging Human Body Scanner***

Elizaveta Motovilova and Shao Ying Huang (Singapore University of Technology and Design, Singapore)

The usage of ultra-high magnetic fields (more than 7 Tesla) in magnetic resonance imaging (MRI) can provide a much higher signal to noise ratio (SNR) in comparison with the commonly used 3T clinical MRI scanners. It will enable the in-vivo imaging of human anatomical details that had never been seen before with any other imaging techniques. However, conventional radiofrequency (RF) coils are no longer suitable for providing homogeneous magnetic field distributions. Homogeneity of the magnetic field distribution is an essential property of MRI coils which is important for accurate description of the interaction of the electromagnetic waves with the human body. Therefore, with the increase of the main magnetic field, novel RF technology and coil design are needed. In this paper, we present a new human head coil design for 10.5 Tesla MRI scanner. This novel design provides homogeneous coil sensitivities in the area of interest.

### **11:55 *Mechanical Interaction between Overlapping Stents and Peripheral Arteries - Numerical Model***

Elyasaf Leybovitch, Saar Golan and Moshe Brand (Ariel University, Israel)

The Superficial Femoral Artery (SFA) is the longest section of the femoropopliteal artery and can reach a length of 28-32 cm. Multiple stenoses can occur along its length. In such cases, two or three overlapping stents are inserted into the artery. Stent overlapping significantly increases the risk of stent fracture. Following restenosis, the procedure can lead to intermittent claudication, limb ischemia and in some cases eventually amputation. This study evaluates the stresses overlapping stents exert on the artery and on each other using a numerical (finite element) model. The model formulated comprises the stents and a two layers artery, each layer presenting hyper-elastic mechanical material properties. Results demonstrate significant differences in radial stresses exerted on the artery walls at regions of overlapping stents compared with regions of single stents (more than 150%). The study elucidates the outcome of deploying overlapping stents in terms of stresses exerted on the artery wall and on the implants and can contribute to the optimization of overlapping stents.

## Tuesday, October 6, Tue.am2.B: Image, Speech and Signal Processing

Chairs: Olawale Popoola (Tshwane University of Technology, South Africa), Edgardo J Roldan-Villasana (Instituto de Investigaciones Electricas & Simulation Department, Mexico)

### **10:15 *Performance Comparison of Discrete Orthonormal S-transform for the Reconstruction of Medical Images***

Yuslinda Wati Mohamad Yusof, [Azilah Saparon](#) and [Nor'aini Abdul Jalil](#) (Universiti Teknologi MARA, Malaysia)

This paper investigates the performance of the Discrete Orthonormal S-Transform (DOST) technique for the reconstruction of medical images. This technique is compared with the q-Recursive Zernike Moment (q-RZM) and Discrete Wavelet Transform (DWT) based on the performance measurement, namely Mean Square Error (MSE) and Peak Signal to Noise Ratio (PSNR) on medical images. The ultimate goal is to find the best technique that can extract the important feature of the medical image. Computer Tomography (CT) and Magnetic Resonance (MR) images are used to test the viability of the techniques to be used for image compression. The experiment is done using MATLAB tool. From the results, the DOST technique has high PSNR value and outperforms q-recursive Zernike Moments and Discrete Wavelet Transform Techniques.

### **10:35 *Simulation Study of DITMC Technique for Enhancing Channel Utilization in Speech Communication of Mobile Network***

Hemant Purohit (Rajasthan Technical University & JIET, India); [Kanika Joshi](#) (BITS Mesra, Jaipur, India)

The scope of multiple uses of various signals in digital form in channel utilization enhancement became possible as a result of inclusion of data communication with speech in the integrated communication networks. Almost unsatisfying demand of a large number of applications for using the internet through mobile at a considerable higher speed has catalyzed the research on optimizing the channel utilization in mobile communication. A variety of methods for enhancing channel utilization and thereby economizing the use of costly channel bandwidth have already been proposed and attempted during the last four decades. As none of these methods could attempt to improve channel utilization upto 100% more efforts were being to achieve a higher channel utilization. This research paper proposes a simulation study of efficient Data Interleaving Technique in Mobile Communication (DITMC) which is expected to enhance the channel utilization as well as the talk time of the mobile handset (both CDMA and GSM) by 47.32%.

### **10:55 *Statistical Gabor-Based Gait Recognition Using Region-Level Analysis***

Amer Binsaadon (King Fahd University of Petroleum and Minerals, Saudi Arabia); [El-Sayed M El-Alfy](#) (King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia)

Gait recognition has become a popular research problem gaining importance for human identification based on walking style. It has emerged as an attractive research problem due to possessing several desirable merits unlike other biometrics. However, most of the existing gait recognition methods that involve Gabor-based filters suffer from the curse of dimensionality even with the use of dimensionality reduction techniques. This adds more computational and storage burden and may cause difficulties to identify subjects with a high degree of confidence. To resolve this problem, this paper proposes a statistical gait recognition approach by analyzing overlapping Gabor-based regions. The Gait Energy Image (GEI) is first constructed from the gait sequence as a spatiotemporal summary. Then, the GEI image is convolved with a Gabor filter bank of 8 different orientations and 5 different scales. A statistical analysis is then applied to extract discriminative gait features from multi-overlapped Gabor-based regions. Consecutively, SVM classifier is applied to measure the gait similarity and identify the subject. Comprehensive experiments are carried out to evaluate the proposed approach and compare it to existing approaches. The results have shown that promising performance can be achieved with the proposed approach under a variety of scenarios.



### **11:15 Adaptive Filter Based Image Registration**

Benjamin Henson and Yuriy Zakharov (University of York, United Kingdom)

The work presented in this paper is the development of an image registration system based on adaptive filtering. The adaptive filter used has an additional penalty term to promote sparsity in the estimation of the convolution kernel. From the derived convolution kernel an estimate of the displacement field is made; from which an interpolated image is generated. This estimate can then be refined by iterating over the filtering process using the image generated as the new target image. Stability in the refining iterations is improved by using multiple space filling curves for the adaptive filter scan paths. This not only smoothes the changes in the displacement vectors but the multiple paths add diversity, which improves the evolution of the adaptive filter through more difficult portions of the image content. Due to this greater stability, the forgetting factor for the adaptive filter can be reduced allowing more detail in the displacement to be determined. The resultant system compares favourably with a standard intensity based image registration technique with the commercial Matlab implementation. A selected set of tests were also performed with the Middlebury dataset [1], which shows the comparative strength and weaknesses of the approach.

### **11:35 3 D Imprinting of Environment for visually impaired**

Amogh Adishesha (RNSIT & VTU, India); Bhagyashree Desai (RNSIT, India)

The aim of this article is focused on the design of an obstacle detection system for assisting visually impaired people. A simple Time of Flight camera captures real time images present in the environment of the subject. These images are analysed using OpenCV and MAT Lab for depth and position of objects. The disparity map created is segmented into depth categories. 3 categories, namely, near, medium and far will determine which obstacles are of importance. A matrix of this data corresponding to the environment is created. According to this matrix, a temporary Three-Dimensional model of the surrounding is generated using actuators and blocks. The subject can then feel this model on a raised surface in order to work the path around the obstacles

**Tuesday, October 6, 1:15 PM - 3:35 PM**

**Tue.pm1.A: Methodologies, Discrete Events and Industry, Business & Management**

Chairs: Abdullah M Tashtoush (Yarmouk University, Jordan), Bhagyashree Desai (RNSIT, India), Amogh Adishesha (RNSIT & VTU, India)

**1:15 *Embedding sectorial models in an integrated platform for assessing climate change impacts***

Cristina Savin (Faculty of Automatic Control and Computers, University Politehnica of Bucharest, Romania)

Climate change in the last decades has occurred not only as a result of extreme natural factors but as the effect of human interference in the environment well functioning. Having this aspect in mind, a prominent need for a software tool to quantify the bidirectional link between human influence and the balance of the natural system has emerged. This article presents such an on-line platform - CLIMSAVE Integrated Assessment Platform (IAP) - which aims to simulate and visualize a series of indicators covering a variety of key sectors such as: urban, forest, water in various states of aggregation, flood, agriculture, yield, and biodiversity. Each of these sectors has one or more corresponding simplified models that transpose the impact of climate change effects experienced by mankind into qualitative and quantitative data. The results presented at the end of this article confirm and validate the models integrated within the platform. The interactivity of the tool is enhanced by allowing the user to visualize output indicators with the help of GIS maps. The novelty introduced by CLIMSAVE IAP consists in offering a big picture that comprises the interactions between important sectors rather than a narrow and isolated image of each sector.

**1:35 *MATLAB Function Based Approach to FOC of PMSM Drive***

Omer C. Kivanc and Salih B. Ozturk (Okan University, Turkey)

In this study, modeling and simulation of a speed sensed field-oriented control (FOC) of a permanent magnet synchronous motor (PMSM) drive is developed by using MATLAB Function blocks in MATLAB/Simulink. This method allows easier algorithm and software development stages for experimental studies compared to the classical block diagram approach. The superiority of the method over commonly used "Code Generation" tools is also emphasized. First, a MATLAB/Simulink model of the FOC of PMSM drive is developed by using MATLAB programming in MATLAB Functions similar to C coding techniques. The results of the simulation are presented. Then, the MATLAB programming based codes developed in simulation are implemented in a TMS320F28335 floating-point MCU by using C programming language and the experimental results are obtained. Finally, the results of the simulation and experiments are compared.

**1:55 *On-Ramp Traffic Merging Modeling Based on Cellular Automata***

Hector Guzman (Universidad Nacional Autonoma de Mexico & Instituto de Ingenieria, Mexico); María Lárraga Ramírez (Universidad Nacional Autonoma de Mexico, Mexico); Luis Alvarez-Icaza (Instituto de Ingenieria UNAM, Mexico); Fernando Huerta Trejo (Universidad Nacional Autonoma de Mexico, Mexico)

Bottlenecks represent locations in a traffic network where capacity is greatly reduced. For that reason merging models are an important component of microscopic traffic simulation. In this paper an asymmetric two lanes cellular automata (CA) model with an on-ramp for traffic flow simulation is presented. The model takes into account mechanical restrictions of vehicles and drivers psychological behavior and preserves the computational simplicity of CA traffic models. The aim is to explore the usefulness of CA to model and simulate properly the access of vehicles from on-ramps to main lanes of a road. Extensive simulation results indicate that CA models can adequately capture the complexity, in terms of traffic phases, of on-ramp merging in real traffic and reproduce the bottlenecks induced by large volumes of traffic flow demanding access to the road.

### ***2:15 Importance of Simulators, Systematic Approach to Training, and Integral Instruction Centres in the Process Industry***

Edgardo J Roldan-Villasana (Instituto de Investigaciones Electricas & Simulation Department, Mexico)

Present challenges of process industries concern increase their competitiveness. One way to address these challenges is by investing in training of plant operators. Traditionally operator training was done informally through techniques on-the-job. Gradually these techniques have been used together with simulators whose good results in efficiency and effectiveness have been demonstrated. Besides, there has been found that its use results in savings for availability, thermal performance, plant life, and environmental compliance of the simulated processes. Despite its benefits, a simulator itself does not guarantee a successful training unless a program based on a systematic approach to training is used in order to maintain a continuous improvement in the stages here proposed (analysis, design, development and support, integration, implementation and evaluation). To have an integral instruction centre with the adequate personnel and materials infrastructure is the best way to exploit both, simulators and training system in the best way. These centres, among other things, must be designed in such a way that the simulator may: to exchange data with modern commercial external programs to support the training program; to consider the evolution of simulators (like immersive or not immersive virtual reality); and to expand the simulators considering analysis and optimisation capabilities.

### ***2:35 A probability model for the size of investment projects***

Maurizio Naldi (University of Rome "Tor Vergata", Italy)

Project size, as measured by the amount of investment required, is a relevant parameter to be used in project selection. The evaluation of a project portfolio must consider the variety of project sizes that may be met, so that a proper model should be adopted to describe that variety, especially for use in simulation. In this paper, a log-normal probability model is suggested to describe the dispersion of project sizes within a project portfolio. The model is obtained on the basis of two real datasets spanning over ten years of observations, and after comparison with competing Gamma and Pareto models. The parameters of the log-normal model are provided as resulting from the best-fit, and indications are also given for the values to use in a simulation study.

### ***2:55 Understanding Churn in Human Capital Network: A Dynamic Model***

Guannan Liu, Tianyang Han, Xiaocheng Yan and Junqiang Han (Northwestern Polytechnical University, P.R. China)

In this paper, a human capital network model is established based on an organization's actual situation with focus on its dynamic process, which can help people better understand churn and manage human resource in organizations. First, we give a definition to describe the importance of staff offices within the organization and then utilize their importance rank to categorize all the offices into four groups. Based upon the priority of these groups, all employees are distributed into their appropriate positions. After the personnel assignment, a human capital network is constructed for further analysis. In the second part, having taken employee turnover, recruitment and promotion into account, we build a dynamic model to explain these processes within the human capital network based on Markov Chain Theory. For employee turnover, we study the factors (intrinsic motivation and external influence) which decide an employee's churn probability and develop a method to predict this probability, inspired by the PageRank algorithm. We also simulate the dynamic process to calculate the number of recruitment according to the number of position vacancies. In addition, promotion probability is introduced to quantify the promotion process. Finally, we extend our model to multi-layered network.

### ***3:15 Computer Assisted Quality Assessment of a Set of Business Process Models***

Evgeniy Krastev and Kristiyan Shahinyan (St. Kl. Ohridski University of Sofia, Bulgaria)

Business process modelling has become an indispensable tool for the documentation of business operations. In real-life, this approach requires the maintenance of a large set of business process models. The improvement of key performance indicators of the organization and the software implementation of the business process models depend of the quality of modelling. Existing research describes several approaches dealing with the challenges in model quality assurance. A set of structural metrics can serve as a predictor for EPC model quality. Process modelling guidelines (7PMG) address the issue of inadequate modelling competence typically observed in large-scale enterprise projects. In this paper, we present a computer-assisted approach to investigate the quality of a set of EPC business process models considered as a whole by means of several practicable criteria. It allows automating the process of identifying discrepancies between the domain knowledge and the meta-model represented by EPC diagrams. A realistic large-scale case study illustrates the implementation of this approach. It comprises a huge number of EPC process models originating from an academic institution. The proposed approach substantially reduces the human involvement in allocating inconsistent usage of documents, roles and information systems across the whole set of business processes

## Tuesday, October 6, Tue.pm1.B: IEnergy, Power Generation and Distribution

Chairs: Selim Solmaz (Gediz University & Elektromeka Corp., Turkey), Işıl Yagurtcu (Gediz University, Turkey)

### **1:15 *A New Control Approach for Shunt Hybrid Active Power Filter to Compensate Harmonics and Dynamic Reactive Power with Grid Interconnection***

Tuğçe Demirdelen, [Mustafa İnci](#) and [Mehmet Tumay](#) (Çukurova University, Turkey)

The grid interconnection of renewable energy source is the popular issue in the electric utilities. Different types of converter topology in grid interconnection have been improved by researchers to develop power quality and efficiency of the electrical system. The main contribution of this paper is that shunt hybrid active power filter (SHAPF) with a DC-DC converter at dc link is to provide interconnection between renewable source and grid with linear dynamic loads. The other contribution of this paper is to present a novel control strategy for reactive power compensation and harmonics elimination in industrial networks using a hybrid active power filter as a combination of a three phase, two level voltage source converter connected in parallel with single tuned LC passive filter. With this proposed control method, reactive power compensation is achieved successfully with perceptible amount. Besides, the harmonic compensation performance is satisfactory. Theoretical analyses and simulation results are obtained from an actual industrial network model in PSCAD. The simulation results are presented for proposed system in order to demonstrate that the harmonic compensation performance meets the IEEE-519 standard.

### **1:35 *The Analysis and Performance Results of Bidirectional DC-DC Converter Based Dynamic Voltage Restorer under Voltage Sag/Swell Conditions***

Mustafa İnci and [Tuğçe Demirdelen](#) (Çukurova University, Turkey); [Kamil Bayındır](#) (Yıldırım Beyazıt University, Turkey); [Mehmet Tumay](#) (Çukurova University, Turkey)

This paper presents Dynamic Voltage Restorer (DVR) based on bidirectional full-bridge dc-dc converter to compensate severe voltage sag/swell problems in medium voltage system. Voltage swell causes the continuous rise at dc-link voltage of DVR which may damage the dc-link capacitors and solid-state devices, and increase the power losses. Unidirectional dc-dc converters based DVRs do not allow power flow from dc link of inverter to battery. This condition may damage the dc-link capacitors and solid-state devices, and increase the power losses. The main contribution of this study is that bidirectional dc-dc converter permits the DVR to prevent voltage rise at DC link capacitor under severe voltage swell conditions. In this topology, power can flow both from battery to multilevel inverter and vice versa. For this propose, a control algorithm based on Proportional-Integrator (PI) control is developed for bidirectional dc-dc converter. This algorithm can keep the DC link voltage constant during voltage sag/swell. The performance results of proposed topology and control method is verified with PSCAD/EMDTC.

### **1:55 *The impact of distributed generation in the distribution networks' voltage profile and energy losses***

Vasiliki Vita and [Tareafa Alimardan](#) (City University London, United Kingdom); [Lambros Ekonomou](#) (School of Mathematics, Computer Science and Engineering, City University, United Kingdom)

The worldwide increasing demand for electricity, coupled with governmental policy changes for "green" energy has led to significant interest in distributed generation (DG). Integrating DG into an electricity network, especially close to load centres, has many significant benefits but also brings with it many drawbacks such as voltage drop, and power losses. In this paper the impact of three different types of distributed generation (diesel generator, wind turbine and photovoltaic (PV)) on distribution networks' voltage profile and power losses is studied. NEPLAN software and the extended Newton-Raphson method have been used in the analysis. The obtained results show that different types of DG influence differently the distribution network and that their precise location and size are vital in reducing power losses and improving the voltage stability.

### **2:15 Water-Energy-Land Nexus - Modelling long-term scenarios for Brazil**

Matthias Senger and [Catalina Spataru](#) (University College London, United Kingdom)

The interconnectedness of water, energy and land translates into the interdependence of water, energy and land use. This paper analyses the water-energy-land nexus with focus on Brazil. Recent drought shaved more than 1 % of the nation's economy and saw unprecedented widespread water scarcity. Four scenarios have been evaluated through 2050. This analysis reveals that the issues and challenges of water, energy and land are interwoven in many complex ways and cannot be managed effectively without cross-sectoral integration. The most distinctive feature of the nexus in Brazil is the high dependency on hydropower. The finding suggests that a diversification of electricity generation technologies with the expansion of photovoltaic, wind and nuclear capacity can help reducing additional land and water requirements for future power supply.

### **2:35 Residential lighting load Profile: ANFIS and Neural Network-based models**

Olawale Popoola (Tshwane University of Technology, South Africa)

This study presents methodologies (ANFIS and Neural Network-based models) based on characterization of variables that impact on lighting usage and has the platform of addressing and solving non-linear issues, ambiguity and randomness of data associated with lighting usage and models the lighting demand according to time of use (TOU) periods. Variables considered in the development of the models include natural lighting, occupancy (active) and income level. During the training process of the ANFIS-based and NN-based model trapezoidal membership and sigmoid transfer function were applied respectively. The ANFIS-based model interpreted the complexity associated with lighting usage, learned and adapted historical patterns and computed its output based on the associated characterizations than NN-based method. The ANFIS -based model showed good prediction accuracy in the time of use period (TOU) analysis especially standard and peak periods for lighting demand. This is very important for electricity distribution planners, energy conservation project evaluation and implementation etc.

### **2:55 Secure Design Patterns for Security in Smart Metering Systems**

Obaid Ur-Rehman and [Natasa Zivic](#) (University of Siegen, Germany)

A security by design approach for smart metering, using secure design patterns, is introduced in this paper. There are concerns that the security vulnerabilities in smart metering systems can be exploited on a large scale. On an individual level, smart meters can be made to provide false metering data to the service providers. On the collective level, the smart grids can be attacked to bring down the national grid or parts of it, which is a concern of national security. A list of possible security attacks on the smart metering systems is identified and summarized in this paper. It is well known that secure design patterns reduce the design flaws in a system. State of the art smart metering systems do not follow the standardized software development processes. A security pattern based engineering approach for developing secure software for smart metering systems is introduced in the paper. The secure design patterns are stored in a repository of patterns using pattern modeling tools. The engineering process and corresponding modeling tools were developed during the EU project, entitled "Trusted Computing Engineering for Resource Constraint Embedded Systems Applications".

**Tuesday, October 6, 3:50 PM - 6:10 PM**

## **Tue.pm2.A: Methodologies and Engineering**

Chairs: Elizaveta Motovilova (Singapore University of Technology and Design, Singapore), Abdullah M Tashtoush (Yarmouk University, Jordan)

### **3:50 *Design of Spectrum Estimation Model for Mobile Broadband in Indonesia in 2015 2025***

Gunawan Wibisono (University of Indonesia, Indonesia); Benny Eliau (Universitas Indonesia, Depok, Indonesia)

In accordance to the implementation of Indonesia broadband plan as well as to evaluate the spectrum used for mobile broadband, an assessment of spectrum requirement is needed to acquire the spectrum estimation. This paper presents Indonesia system (INS) model, an empirical model to estimate spectrum requirement for mobile broadband in Indonesia. This model is derived by elaborating a reference ITU model specified in ITU-R Recommendation M.1768-1 and an empirical Federal Communications Commission (FCC) model. This paper also presents the results of using the three models within a simplified ITU model scenario. The comparison of the results between the three models shows that the INS model deliver similar pattern of results with FCC model in dense urban and urban regions, while it shows similar pattern of results with ITU Model in suburban and rural region. It is found from the results that additional 840 MHz will be required in 2025 based on ITU model, while INS model indicates 295 MHz.

### **4:10 *Delay of digital filter tuned for mechanical resonant frequency reduction in multi-mass mechanical systems in electrical direct drive***

Dominik Luczak (Poznan University of Technology, Poland)

This paper presents a mathematical model of direct drive system. Includes a four-mass structure for the mechanical part. Discusses how to identify the mechanical resonance frequency using two signals: PRBS and chirp. The result is a nonparametric model from which is determined the resonant frequency. Knowledge of resonance frequencies allows to tune designated digital filter for resonance damping. The filter is inserted between the speed controller and current controller. The article discusses the method of determining the delay caused by the filter. Knowledge of total delay is used in the synthesis of the speed controller. In paper were analyzed following filters: notch, reversed resonance characteristics and low-pass. The exact formulas for the group delay was derived for the notch filter. In the last stage of research the control system was tested. Speed setpoint was less than 1 res/s.

### **4:30 *Modeling, Simulation and Control of Pedestrian Avoidance Maneuver for an Urban Electric Vehicle***

Luciano Alonso Rentería (University of Cantabria, Spain); Juan Pérez-Oria (Universidad de Cantabria & E. T. S. I. Industriales y Telecomunicación, Spain); Victor Becerra (University of Reading, United Kingdom); Agustin Jimenez and Basil Alhadithi (University Polytechnic Madrid, Spain)

In this paper, the mathematical model of an electric vehicle, as well as the control system for avoiding pedestrians in urban traffic is described. The vehicle is modeled as a continuous system consisting of several subsystems. The discrete model of several sensors and actuators, a decision system, and low-level controllers for acceleration/braking and steering systems are added. Based on this model, a pedestrian avoidance maneuver for typical speeds in city traffic is simulated. When the sensory system detects a pedestrian in the vehicle's path, the decision system calculates its relative trajectory. Using this information, the speed and/or direction that the vehicle must take in order to avoid the accident are estimated. These values are sent to the low-level controllers of the accelerator/brake and steering, which generate the signals to be applied to such systems to achieve the desired trajectory and speed.

#### **4:50 A Simple Fuzzy Logic Based Power Control for a Series Hybrid Electric Vehicle**

Zsolt Csaba Johanyak (Kecskemet College, Hungary)

Hybrid electric vehicles became popular owing to their capability to combine the advantages of electric propulsion and legacy internal combustion engines. The main objective of the research work reported in this paper was to find a new fuzzy logic based control solution for the power management of a specific series hybrid electric vehicle. The developed controller was modelled in Simulink and it was evaluated through simulation runs for different initial battery energy levels and different usage profiles. Basically we tried two different approaches. In the first case the aim was to keep the state of charge (SOC) of the battery at a constant level, while in the second case the SOC had to follow a prescribed function of time. The developed fuzzy system ensured good results in both cases.

#### **5:10 Lateral Stability Control Based on Active Motor Torque Control for Electric and Hybrid Vehicles**

Işıl Yagurcu and Selim Solmaz (Gediz University, Turkey); Selahattin Başlamışlı (Hacettepe University, Turkey)

This paper describes a method for lateral stability control of electric and hybrid automotive vehicles utilizing motor torque control based on multiple electric motors connected to independent wheels of the vehicle. This approach is investigated particularly for vehicles configurations with multiple in-wheel electric motors. Independent motor torque control based on LQR and PID control techniques are used to generate positive drive and negative brake torques for imposing an aligning moment around the yaw axis resulting in the lateral stability control functionality. The alternative controllers are designed based on the simultaneous sideslip angle and yaw rate tracking objective. The developed algorithms were implemented and performance tested in Matlab-Simulink environment and the dynamic performance characteristics are reported with numerical simulation results.

#### **5:30 Parametric analysis and compensation of ride comfort for electric drivetrains utilizing in-wheel electric motors**

Selim Solmaz (Gediz University, Turkey); Selahattin Başlamışlı (Hacettepe University, Turkey); Ahmet Afatsun (Gediz University, Turkey)

In this paper we study the effects of increased unsprung mass that result from the use of in-wheel electric motors utilized in hybrid and electric vehicle drivetrains. For this purpose we reduce the problem to the analysis of the quarter car vehicle suspension model to assess how increasing unsprung mass affects the ride comfort. In order to see the change in the ride comfort level according to the international standard ISO 2631, the analysis was done in frequency domain using random road profile inputs generated according to ISO 8608 standard. Also the results were assessed using a commercial multi body vehicle simulation software. Finally we suggest empirical solutions regarding modified suspension and tire parameters to compensate the detrimental effects of increased unsprung mass.

#### **5:50 Nonlinear phase shift compensator for pilot-induced oscillations prevention**

Boris Andrievsky (IPME RAS & SPb State University, Russia); Nikolay Kuznetsov (University of Jyväskylä, Finland); Olga A. Kuznetsova (Saint-Petersburg State University, Russia); Gennady Leonov (Saint Petersburg State University, Russia); Svetlana Seledzhi (Saint Petersburg State University, Finland)

The pilot-induced oscillation (PIO) is denoted as unintended steady fluctuation of the piloted aircraft, generated due to the efforts of the pilot to control the aircraft. While PIOs can be easily determined from the analysis of the post-flight data, the pilots often can not recognize that PIO occurs. The main non-linear factor leading to the PIO is, generally, rate limitations of the aircraft control surfaces, resulting in a delay in the response of the aircraft to pilot commands. Due to the tight relationship between magnitude and phase frequency responses for linear systems, applicability of the linear compensator for mentioned aim is highly restricted. This leads to the idea of employing the nonlinear phase shift compensator. In the control theoretic literature, various nonlinear corrective devices (NCD) are elaborated, which make it possible to change the phase-frequency and amplitude-frequency responses independently on each other. In the paper, methods of nonlinear systems analysis are applied to the problem of PIO, caused by rate limiting of the actuators. A novel phase shift compensator based on nonlinear correction technique is presented and numerical comparative study for two models of a pilot for PIO prevention during the flight is given.

## Tuesday, October 6, Tue.pm2.B: Engineering, Transport and Virtual Reality/Visualization/Computer Games

Chairs: Amogh Adishesha (RNSIT & VTU, India), Bhagyashree Desai (RNSIT, India)

### **3:50 *An Optimal Geometric Model for Clavels Delta Robot***

Carlo Avizzano and Alessandro Filippeschi (Scuola Superiore Sant'Anna, Italy); Juan Jacinto, Villegas (Scuola Superiore Sant'Anna & International Doctoral Programme in Emerging Digital Technologies, Italy); Emanuele Ruffaldi (Scuola Superiore Sant'Anna, Italy)

This paper discusses the Clavel's Delta Robot and propose an alternative solution to its kinematics/dynamic model. We meant to integrate these models into on a small electrical driving circuit that integrates an onboard microcontroller. The solution has been designed in order to keep into account the reduced computing capability of small embedded systems. Direct kinematics (DK), differential kinematics, both direct (J) and inverse (invJ), and a simplified dynamic model will also be presented. The novelty of the approach relies into a series of geometric properties that allow to reduce the standard computational load and, when the three kinematics are computed together (DK, J, invJ), to pack all the computation into few lines of code. The accuracy of motion will be compared to classic algorithms as well as the reduced computing power. The algorithms have been implemented into a real mechanism used within a telemedicine project. Controller and device performance will be demonstrated through real case simulations.

### **4:10 *Two-Dimensional Water Environment Numerical Simulation Research Based on EFDC in Mudan River***

Gula Tang (University of Chinese Academy of Sciences, P.R. China); Jing Li (Institute of Environmental Sciences of Heilongjiang Province, P.R. China); Yunqiang Zhu (Institute of Geographical Sciences and Natural Resources Research, P.R. China); Zhaoliang Li and Françoise Nerry (University of Strasbourg, France)

This paper establishes a two-dimensional (2D) numerical simulation model for water environment of Mudan River using hydrodynamic and water quality model based on EFDC. It simulates the migration of CODCr and NH<sub>3</sub>-N in urban sections of the trunk stream in glacial and non-glacial periods. It also calibrates and verifies bed roughness and integrated attenuation coefficient of pollutants. As the findings reveal, bed roughness and integrated attenuation coefficient of pollutants vary significantly in icebound and non-icebound seasons: roughness coefficient in icebound season is higher than that in non-icebound season while attenuation rate in icebound season is lower than that in non-icebound season. In addition, main factors for attenuation rate drop in icebound season are, according to simulation results, temperature drop, upstream inflow decrease, and ice layer cover. Ice sheet is the major contributor of roughness increase. It is feasible to apply the 2D water environment numerical model established in this paper to urban sections of Mudan River trunk stream.

### **4:30 *Permanent Magnet Synchronous Linear Motor for an Urban Transport Electric Vehicle***

Monica Chinchilla (University Carlos III de Madrid, Spain); Jaime Montoya Larrahondo (Universidad Carlos III de Madrid, Spain)

This work proposes a new linear motor for an electric bus propulsion system. The vehicle is powered by a new topology of permanent magnet synchronous linear motor. The slider of the motor is integrally attached to the floor of the vehicle to propel. The motor is fed with an alternating voltage conveniently applied to a three-phased stator coils which are distributed in the rails that attach the vehicle travel. Therefore, the motor requires no energy storage system. A set of permanent magnets located on the slider and disposed in Halbach array, maximize thrust force. The new slider topology is able to reduce the thrust ripple, while maintaining its average value. At the same time it reduces the normal force, which in this type of motor with ferromagnetic slotted stator, is an attraction force. The study of the dynamic behavior of electromagnetic forces concerning the movement of the slider on the stator is shown as well as the motor structural design. A 3D Finite Element simulation tool is used.



#### **4:50 A Simulation Study of the Electronic Waybill Service**

Shoaib Bakhtyar (Blekinge Institute of Technology, Sweden); Gideon Mbiydzenyuy (Netport Science Park, Sweden); Lawrence Henesey (Blekinge Institute of Technology, Sweden)

We present a simulation study for investigating the potential positive impacts, i.e., the invoicing and processing time, and financial savings, when using electronic waybills instead of paper waybills for road-based freight transportation. The simulation model is implemented in an experiment for three different scenarios, where the processing time for waybills at nodes, i.e., the freight loading and unloading locations, is different for each of the scenario. The results indicate that a significant monetary and time savings in invoicing and processing waybills can be achieved when using electronic waybills instead of paper waybills. Additionally, we found that an increase in the processing time of waybills at the nodes, significantly increase the overall invoicing time and the number of waybills in the case of paper waybills. Our study can be helpful to decision makers, e.g., managers and staff dealing with paper waybills, to estimate the potential benefits when making decisions concerning the implementation of electronic waybills instead of paper waybills.

#### **5:10 Nonlinear Model Predictive Control for Tracking of Underactuated Vessels under Input Constraints**

Mohamed Abdelaal (University of Oldenburg, Germany); Martin Fränzle (OFFIS Institute for Computer Science and University of Oldenburg, Germany); Axel Hahn (OFFIS, Germany)

In this paper, a nonlinear model predictive control (NMPC) is presented for position and velocity tracking of underactuated surface vessel with input constraints. A three-degree-of-freedom (3-DOF) dynamic model is used with only two control variables: namely, surge force and yaw moment. Without frame transformation, a nonlinear, but convex, optimization problem is formulated to minimize the deviation of the vessel states from a time varying reference generated over a finite horizon by a virtual vessel with the same dynamics. A realtime C-code is generated, using ACADO toolkit and qpOASES solver, with multiple shooting technique for discretization and Gauss-Newton iteration algorithm, which has a significantly small computation time, thus enabling real-time implementation of proposed technique. MATLAB simulations is used to assess the validity of the proposed technique.

#### **5:30 Planning for Non-player Characters Using HTN and Visual Perception**

Ibrahim Mahmoud and Dieter Wloka (University of Kassel, Germany)

Serious games are designed and built for an educational primary purpose other than pure entertainment. While team planning and cooperation is essential for the success of the goal of the game, it also plays an essential role in enhancing the believability of the game. Our serious game is in the domain of emergency management; firefighters in accidents situations. Two contributions are presented in this paper; firstly, enhanced visual perception system that mimic center of attention in humans eye for each NPC along with a short-term memory (working memory) so that NPCs will have access to only limited information and have to build their plans and make their decisions based on what they can perceive from their surrounding environment. Secondly, a distributed HTN planning approach is implemented based on SHOP for the domain of our serious game. Five modules were developed in this part; Controller, World Model, Domain, Interface and HTN Planner. There is two level of planning; team level plans and individual level plans. Plans are generated online based on the information gathered from the visual perception system and stored in the working memory. Our experiment shows the effectiveness of the proposed approach to create generate plans.

**Wednesday, October 7, 8:40 AM - 10:20 AM**

**Wed.am1.A: Parallel/Distributed and Internet Modelling, Semantic-Web/Ontologies**

Chairs: Dominik Luczak (Poznan University of Technology, Poland), Nima TaheriNejad (TU Wien, Austria)

**8:40 *Throughput Evaluation of Irregular Routing Algorithm for 2-Dimensional Mesh Network-on-Chip***

Ladan Momeni (Islamic Azad University, Ahvaz Branch, Iran); Arshin Rezazadeh (Shahid Chamran University of Ahvaz, Iran)

Communication performance of NoC depends seriously on efficient routing algorithms. Modifying irregular routing algorithms which are based on fault-tolerant algorithms, they can be utilized by irregular networks. In this paper, a wormhole-switched routing algorithm for irregular 2-dimensional (2-D) mesh interconnection Network-on-Chip is evaluated, where the same virtual channels is used to pass oversized nodes (ONs). A well-known wormhole-switched routing algorithm for 2-D mesh interconnection network, fault-tolerant-routing (FTR), uses virtual channels (VC) to pass faulty blocks such as f-ring and f-chain, while only one virtual channel is used when a message does not encounter any fault. One of the key issues in the design of NoCs is the development of an efficient communication system to provide high throughput and low latency interconnection networks. IIR algorithm increases the throughput of physical links more than FTR with lower average message delay. Simulation of both FTR and evaluated algorithm, IIR, for the same conditions presented. As the simulation results show, IIR has a higher performance compared to FTR algorithm. The results also show that our algorithm has better performance with 100% traffic load in Network-on-Chip.

**8:40 *Gradual development of an IoT architecture for real-world things***

Nicoleta-Cristina Gaitan, Gaitan Gheorghita and Ioan Ungurean (Stefan cel Mare University of Suceava, Romania)

The Internet of Things (IoT) is a great challenge of our time that will lead, as many scientists argue, to the fourth industrial revolution with major benefits for people's everyday life. As the IoT is still a new field of research, there are various viewpoints regarding it. In this paper we propose an IoT architecture relied on the middleware. The basic principles, and also the strengths of the proposed architecture are the following: it uses mature standards with open source implementations; it ensures increased flexibility and scalability that allow the integration of a large number of current and future technologies; it includes facilities for unitary description of data exposed by THINGS; it decouples the address space of the local objects from the global address space seen in IoT; it is modular and hierarchic, with clear interfaces between hierarchical levels; it ensures data security.

**9:00 *A PHP application library for web-based power systems analysis***

Simon Agamah (City University London, United Kingdom); Lambros Ekonomou (School of Mathematics, Computer Science and Engineering, City University, United Kingdom)

Web-based power systems analysis applications are delivered via web servers that run scripting languages such as PHP. The role of the web server is usually to pass results and data between a front-end web browser and specialised back-end computation software which carries out the actual simulations and analysis. More recent versions of the web scripting languages have the computational capabilities required for power systems analysis and can handle the responsibility of modelling networks and analysing them. This provides an opportunity for a slimmer 2-tier framework in which the web server also acts as the application server. A methodology for carrying out power flow calculations on a web server using PHP is described in this paper and the outcome is a PHP application library for carrying out such analysis. The library may be easily included in PHP web applications that require specific power systems analysis functions thereby allowing them access this functionality without relying on third party software separate from the web server on which they already run. The performance of the application library is also measured and discussed.

#### **9:20 Potentials of web standards for automation control in manufacturing systems**

Borja Ramis Ferrer, [Sergii Iarovyi](#), [Andrei Lobov](#) and [Jose Luis Martinez Lastra](#) (Tampere University of Technology, Finland)

Web standards developed mainly by W3C and OASIS shape general IT domain and its applications. Due to the scale of web applications, the web standards have matured to deal with the typical situations of finding the right node on the network, reconfiguring the routing for messaging, using common standards for representing graphical information and many others. Industrial manufacturing can benefit from the web standards due to the interoperability and simplified application integration. This article reviews the current use of web standards in the industrial automation domain. In addition, the manuscript describes and discusses the potentials of using web standards at all the levels of automation system: from high level web-based user interfaces to the industrial controllers, which are located in the lowest layer of the well-known automation pyramid. Aligned with such description, the article presents a framework for Open, Knowledge Driven Manufacturing Execution Systems (OKD-MES), which allows using systematically web standards and technologies in factories.

#### **9:40 Usability Degree for Arabized Open Source Software: PhpMyBibli Integrated Library System as a Case Study**

[Nawras Ali Othman](#) (BAU, Amman, Jordan); [Fares Othman](#) (The University of Jordan, Jordan); [Fawaz Ahmad Al-Zaghoul](#) (The University of Jordan & Computer Center Director, Jordan); [Ahmad Alzaghoul](#) (Postgraduate Student at UPM, Spain)

The purpose of this study is to quantify the quality of the Arabized open source software with respect to its original version in the Arability framework, which aims to control the quality of Arabic and Arabized software. As a case study, the Arability degree of usability for the open source PhpMyBibli integrated library system (OS PMB ILS) is computed based on responses collected via a questionnaire from Arab librarians who either use the original French PMB or test the underdeveloped Arabized version. The usability of the original and Arabized PMB is quantified using the ISO quality model and fuzzy multi criteria technique. Then the Arability degree of usability for Arabized PMB is computed. The results show that the quality of the Arabized PMB does not match that of the original and it requires some improvement. Therefore, this paper offers an approach to quantifying Arability degree of usability for Arabized open source software.

## **Wednesday, October 7, Wed.am1.B: Discrete Events, Mobile/Ad hoc Networks and Performance Engineering**

Chairs: Alberto Leggieri (Università degli Studi di Roma "Tor Vergata" & SIT Sordina IORT Technologies, Italy), Mahdiyar Sarayloo (Università Politecnica delle Marche, Italy)

### **8:40 *Modeling, Validation and Continuous Integration of Software Behaviors for Embedded Systems***

Vladimir Estivill-Castro, [Rene Hexel](#) and [Josh Stover](#) (Griffith University, Australia)

We propose to test software models with software models. Model-Driven Software Development proposes that software is to be constructed by development high level models that directly execute or generate most of the code. On the other hand, Test-Driven development proposes to produce tests that validate the functionality of the code. This paper brings both together by using Logic-Labeled Finite-State Machines to deploy executable models of embedded systems and also to configure the corresponding test. The advantage is the much more efficient validation of the models, with also more robust and durable representations. While eventually the final system ought to be formally verified, the proposal here ensures that much more effective and efficient development and quality assurance occurs saving the costly exercise of model-checking until the system is highly likely to meet all requirements.

### **9:00 *A New Efficient and Secure Mutual Authentication Protocol For RFID Systems***

Samad Rostampour (Islamic Azad University, Ahvaz Branch, Iran); [Mojtaba Eslamnezhad](#) (SRBIAU, Iran)

Radio Frequency Identification (RFID) is one of the promising technologies for fast and automatic identification of different objects. This system operates without human intervention. Moreover, it processes many simultaneous requests in a very short time span. While RFID applications are increasing, at the same time many activities are doing about their security. Providing the highest level of security and lowest degree of complexity is the most challenging part in the design and construction of RFID systems. In this paper, we present a new authentication protocol, which provides a high degree of security. In addition, it has a less complexity and convolution. In this protocol, a public key encryption method has been utilized which is an NP-hard problem and its possibility of breaking is very weak. The authentication operation is performed at high-speed in few steps. Therefore, its implementation is appropriate for mobile devices with limited resources. In terms of security, we analyzed the proposed protocol. The results approve that offered protocol is a resilient and robust mechanism against well-known RFID attacks

### **9:20 *Security of an anonymous RFID authentication protocol and its improvement***

Mahsa Fathi (Ahvaz Azad University, Iran); [Elham Tavakol](#) (Azad University Mahshar, Iran)

Radio Frequency Identification (RFID) is a method for automatic object identifying. The authentication process causes to improve the security level of RFID systems. ARAP is an anonymous authentication protocol, which claims that, can provide a high security level and privacy. In this paper, we show that ARAP is vulnerable to the impersonation and the desynchronization attacks. We disclose the secret parameter in the tag and clone it. In addition, we propose a new protocol, which can achieve mutual authentication to address the ARAP problems. The improved protocol is very simple and well-suited for RFID systems. We analyze the improved protocol and explain that it is resistant against RFID attacks such as the replay, the impersonation, the desynchronization and the traceability attacks.

**9:40 A Simulation Study of the Stochastic Compensation Effect for Packet Reordering in Multipath Data Streaming**

Dmitry G. Korzun (Petrozavodsk State University, Russia); [Dmitriy Kuptsov](#) (NA & Aalto University, Finland); [Andrei Gurtov](#) (Aalto University, Finland)

Multipath routing gains clear network performance advantages for data streaming. The level of packet reordering, however, becomes higher: distant packets are reordered, the application performance is reduced due to head-of-line blocking at the destination, and a large resequencing buffer is needed for sorting incoming packets. In this paper, we study the stochastic compensation effect to reduce packet reordering. If a source randomizes packet scheduling into multiple paths of random transmission delays, then these two sides of randomness "quench" each other. We perform simulation experiments to test this hypothesis in various multipath configurations and compare deterministic vs. randomized scheduling. The experiments show the existence of the stochastic compensation effect and its considerable influence on the application performance. We expect that utilization of this effect in networking applications can essentially improve the application performance when the path diversity of underlying networks is high.

**10:00 Performance Comparisons of Wireless Mesh IP Video Surveillance Models**

Smart Lubobya, [Mqhele E. Dlodlo](#) and [De Jager Gerhard](#) (University of Cape Town, South Africa); [Ackim Zulu](#) (University of Zambia, Zambia)

This paper investigate the wireless mesh IP video surveillance models and evaluates their performance in terms of throughput, End-to-End delay and jitter. Wireless Mesh Network(WMN) consists of either a wireless or wired backbone network from which Mesh Gateways (MGs), Access Points (APs), wireless Mesh Routers (MRs) and Mesh Client (MCs) are linked together through carefully designed topologies. WMN networks have the advantage of high reliability, scalability and low capital outlay. The H.264/AVC standard is a joint standard for video compression promoted by the International Telecommunication Union Telecom Sector and the ISO/IEC. The H.264/AVC standard specifies four video formats: Common Intermediate Format (CIF), Quarter CIF (QCIF), Sub Quarter CIF (SQCIF) and 4CIF. Results in this work show that flow throughput is half the network throughput when the hop count for a given topology is two. Additionally, at a fixed number of nodes, the Tree Mesh topology outperformed the Fork Mesh and Cross Mesh topology by a factor of 2.8 and 7 in End-to-end and jitter terms respectively.

**10:35 AM - 12:35 PM**

## **Wed.am2.A: Circuits, Sensors and Devices**

Chairs: Evgeniy Krastev (St. Kl. Ohridski University of Sofia, Bulgaria), Edgardo J Roldan-Villasana (Instituto de Investigaciones Electricas & Simulation Department, Mexico)

### **10:35 *Mobile Controlled Wheelchair***

Roger Achkar, Gaby H Abou Haidar, Hasan Dourgham, Dani Semaan and Hashem Araji (American University of Science and Technology, Lebanon)

Scientists and socialists have worked very hard to help the elderly and the disabled to adopt methods that can help them interact with society and smooth their mobility during everyday activities, rather than be dependent on others, or on using the traditional tools, mainly the wheel-chair. However, this technology has basic drawbacks since the disabled still are not able to reach the wheelchair if it is placed far from them. The aim of this project is to introduce an automated ambulation tool, entitled "Mobile Controlled Wheelchair" that helps the users to locate their wheelchairs' position and move it via specific android application to the desired destination. This application also provides the user with the ability to control the wheelchair even when sitting on it; moreover, the user can give orders to adjust the path. The encouraging results set a path for implementing this concept in more aid-systems.

### **10:55 *SimSiVIDS: Modelling of an Inductive Sensor for Traffic Applications***

José Lamas-Seco and Paula M. Castro (University of A Coruña, Spain); Adriana Dapena (University of Coruña, Spain); Francisco J. Vazquez-Araujo(University of A Coruña, Spain); Begoña García Zapirain (University of Deusto, Spain)

In this work we develop a model of an inductive loop detector for traffic applications in intelligent transportation systems. Our goal is to work out an appropriate model that allows us to obtain the vehicle inductive signatures by means of a simulator to extract some features and/or study several performances without making use of expensive, not only in time but also in resources, tests in real scenarios using our hardware prototype. As it is shown with the results obtained using both the prototype and the inductive sensor simulator, the vehicle signatures in time and frequency domains exhibit similar characteristics, which validates the model proposed in this work. Moreover, a spectral feature extracted from the signatures in the frequency domain is studied using our software, giving us as a result that such an indicator suffers negligible variations with the vehicle speed or acceleration, but depends on its length i.e., on the vehicle type. This remarkable dependence can be exploited for vehicle classification tasks.

### **11:15 *Low Power CMOS 8:1 Injection-Locked Frequency Divider with LC Cross-Coupled Oscillator***

Junho Yu (ChungBuk National University, Korea); Nam-Soo Kim and Sehyuk An (Chungbuk National University, Korea); Jusang Park and Yongsik Kim(ChungBuk National University, Korea)

This paper proposes a high performance frequency divider which is composed of injection-locked frequency divider (ILFD) and current-mode logic (CML) frequency divider. The multiple-block divider is to obtain the broad-band and high frequency operation in phase-locked loop (PLL). ILFD has a similar structure with LC cross-coupled oscillator which operates at 20 GHz. 3 stages of ILFD are supposed to provide the operation of divide-by-8 (/8) with low power consumption and are to adjust the frequency alignment with the LC cross-coupled oscillator. CML frequency divider which is used as the 2nd block of divider applies an inductive peaking structure in order to increase the bandwidth. The proposed frequency divider which has the /8 ILFD and /32 CML frequency divider is integrated with 0.18  $\mu\text{m}$  CMOS process and operates in the conventional PLL. Simulation test shows the low power consumption of 13.2 mW at the input frequency of 20 GHz.

### **11:35 Microwave-band Circuit-level Semiconductor Laser Modeling**

Mikhail Belkin (Moscow State Technical University MIREA, Russia); Iakovlev Vladimir (RTI-research S.A., Switzerland)

Semiconductor laser is a key component of advanced telecom (fiber-to-wireless systems) and defense (phased-array antenna radar, electronic warfare systems) networks based on microwave photonic technology. All of them are the examples of an intimate integration of photonics, microwave electronics, and planar antenna technologies for producing a complicated functional module in a multichannel analog environment. So, designing such a module is a matter of accurate model representation of semiconductor laser diode naturally combined with other microwave electronic circuitry. Following this demand some models for edge-emitting semiconductor laser as well as for vertical cavity surface-emitting semiconductor laser (VCSEL) based on equivalent circuit representation that is a requisite of active microwave device modeling have been proposed. In this paper the design principles of the updated nonlinear equivalent-circuit model including noise sources are proposed. Simulation of a long-wavelength vertical-cavity surface emitting laser module using the off-the-shelf software tool NI AWR Design Environment is exemplified.

### **11:55 Design of 0.35 $\mu\text{m}$ CMOS Temperature Sensor for Automatic Refresh Cycle in DRAM Memory Cell**

Sehyuk An (Chungbuk National University, Korea); Junho Yu, Jusang Park and Yongsik Kim (Chungbuk National University, Korea); Nam-Soo Kim (Chungbuk National University, Korea)

This paper proposes a low power CMOS smart temperature sensor which is composed of temperature-to-pulse generator (TPG), time-to-digital converter (TDC), and frequency selector. The multiple-block system is to obtain the self-refresh operation for a low power memory cell. Temperature-to-pulse generator (TPG) is composed with two delay-lines which are obtained by the circuit of CMOS inverter. The propagation delay time of CMOS inverter has a dependency on temperature. The inverter-based delay line and feedback topology are applied in TDC. The small-size time-mode temperature sensor is designed with 0.35- $\mu\text{m}$  CMOS process. Six different digital outputs are obtained for the temperature ranges of - 40 ~ 100 oC. Simulation test shows that the proposed temperature sensor is operated with the low power dissipation of 0.075  $\mu\text{W}$  per sample and die-area of 0.06 mm<sup>2</sup>.

### **12:15 Memristors' Potential for Multi-bit Storage and Pattern Learning**

Nima TaheriNejad (TU Wien, Austria); Sai Manoj Pudukotai Dinakarrao (Technical University of Vienna, Austria); Axel Jantsch (Royal Institute of Technology (KTH), Sweden)

Memristor is a two-terminal device, termed as fourth element, and characterized by a varying resistance depending on the charge (current) flown through it. This leads to many interesting characteristics for memristor, including a memory of its past states, demonstrated in its resistance. Smaller area and power consumed by memristors compared to conventional memory devices, make them a more suitable choice for applications needing large memory. In this paper we explore one of the unique properties of memristors which extends their suitability by allowing storage of multi-bit data in a single memristor. Their ability of storing multi-bit patterns will be shown via a simplified proof and simulations. This characteristic can be advantageous for many applications. In this paper particularly, we briefly discuss its advantages in pattern learning applications.

## **Wed.am2.B: Internet Modelling and Circuits, Sensors & Devices**

Chairs: Elizaveta Motovilova (Singapore University of Technology and Design, Singapore), Abdullah M Tashtoush (Yarmouk University, Jordan)

### **10:35 *Query Reformulation Using Crop Characteristic in Specific Domain Search***

Azilawati Azizan (UiTM Perak, Malaysia); Zainab Abu Bakar (Universiti Teknologi MARA & Faculty of Computer & Mathematical Sciences, Malaysia)

Retrieving relevant information from Web is a challenging task. This is due to the size and rapid growth of the Web content. The existence of great search engine such as Google or Bing has simplified our searching mission. But those search engines is only efficient if the user submit query that precisely represent the user's search intent to the system. The fact is users are bad in translating their search intent into a query format for the search system to process. Therefore, users reformulate their queries several times for getting more relevant results. The aim of this paper is to present evaluation of seven distinct techniques employed in query reformulation process. This work proposes the use of crop characteristic category element in reformulating query, as well as combination with ontology and query keyword elements. The experimental result shows that the use of crop characteristic category in reformulating query has significantly improved the search results performance.

### **10:55 *Efficient Design of a Coplanar Adder/Subtractor in Quantum-dot Cellular Automata***

Milad Sangsefidi (Sadjad University, Iran); Morteza Karimpour (Sharif University of Technology, Iran); Mahdiyari Sarayloo (Università Politecnica delle Marche, Italy)

Scaling of CMOS devices being aggressively decreasing by reduce of transistor dimensions. However, such level of integration leads to many physical limit and transistors cannot get much smaller than their current size. Quantum-dot Cellular Automate is a novel technology which significantly reduces physical limit of CMOS devices implementation; thus, it can be an appropriate candidate to be substituted for CMOS technology. In addition to high integration density of QCA circuits, other unique specifications such as high speed and low power consumption encourage researchers to utilize this technology instead of CMOS technology. In this paper, a new layout of XOR gate is presented in QCA technology; then, it is exploited to design an 8-bit controllable inverter. Finally, using the proposed design and last adder circuit provided by ourselves in our previous work, an 8-bit adder/subtractor is designed. All the designed circuits have used coplanar clock-zone based crossover. The most prominent characteristics of designed circuits include very high operation speed, very low complexity, small area, completely coplanar design, and also avoiding rotated cells in us designs for Avoidance of Construction Challenges QCA Circuits. The mentioned characteristics are considerably improved in our proposed structure comparing to its counterparts.

### **11:15 *A Low Cost Open-Controller for Interactive Robotic System***

Juan Jacinto, Villegas (Scuola Superiore Sant'Anna & International Doctoral Programme in Emerging Digital Technologies, Italy); Carlo Avizzano, Emanuele Ruffaldi and Massimo Bergamasco (Scuola Superiore Sant'Anna, Italy)

This paper presents the design and development of a new low cost device that allows real-time control application of a robotic system using novel methodologies of component based design: processor in the loop tuning and low/high level control. The particular design of this electronic board allows to control up to three permanent magnet (PM) DC motors per board that can be attached to magnetic or optical encoders. A triple USB connection can be used to program, debug and control simultaneously the different features of the board. Debug is allowed (for process analysis) using Matlab/Simulink external mode as well as traditional code analysis protocol within the developer toolchain. The controller board has been developed for academic activities, but has also proven to be valid and robust in prototype application. The paper describes the design and hardware system, the development toolchain and evaluation test is presented and discussed.



### **11:35 Computational Model of a Buncher Cavity for Millimetric Klystron**

Alberto Leggieri (Università degli Studi di Roma "Tor Vergata" & SIT Sordina IORT Technologies, Italy); Davide Passi and Franco Di Paolo (Università degli Studi di Roma "Tor Vergata", Italy); Giovanni Saggio (University of Tor Vergata, Rome, Italy)

A computational model of a Buncher cavity for millimetric klystron following a Multiphysics approach is proposed in this paper. In the range of these narrow dimensions, device is critically exposed to multiple physics effects, due to the power dissipations and external environment. This analysis is based on a Multiphysics modeling approach, in order to prevent alterations of the electromagnetic behavior of the device during the operation. The proposed device is integrated with a carbon nanotube cold cathode in order to reduce thermal expansion and cooled by an opportune airflow that regulates the temperature distribution to compensate the resonant frequency shift. Electromagnetic fields and scattering parameters have been computed in operative conditions. This study provides a strategy to chose the appropriate materials and geometrical shapes.

### **11:55 Theoretical Analysis and Sensitivity Modeling of an Energy Detector for IR-UWB Applications**

Oswaldo Ramos Sparrow (IM2NP, France); Gilles Jacquemod (University of Nice, France); Sylvain Bourdel (Grenoble Alpes Université, IMEP-LAHC, France)

Traditionally, the UWB non-coherent receivers are often based on the same architecture: a low noise amplifier (LNA) followed by an energy detector (ED). ED consists on a circuit that performs a quadratic function (called squarer) cascaded by an integrator and decision stage. The detection is based on recovered energy of the signal. This paper deals with the theoretical and behavioral modeling of a IR-UWB front-end system, using MATLAB and ADS-PTOLEMY simulators. The main objective of this paper is to make a comparative trial of the sensitivity of an integrator based energy detector and a low pass filter based energy detector. We demonstrated that the use of an integrator for the energy detector improve the sensitivity when several pulses are used in one symbol whereas a filter performs better for unique pulse signaling.

### **12.15 Shape based object detection for partially occluded objects under front lighting techniques**

Priya Loganathan (Anna University & Rajalakshmi Engineering College, India); Sheila Anand (Anna University, India)

Object detection is one of the most important key areas in case of visual recognition. Finding partially occluded objects is quite difficult in a production line even though the system is using most prominent algorithms especially for object detection. To address this problem and to satisfy the industrial needs an algorithm is proposed in this paper which has been focused on object recognition problems in computer vision under partial occlusion. It uses appropriate image pyramid level and the pre generated models for the object detection. Around 95.2% of efficiency can be obtained using the proposed algorithm and the work has been presented here using front lighting technique. The proposed algorithm has been implemented with an experimental set up, the time taken for the step over execution and the results were discussed.

**10:35**