2014 UKSim-AMSS 16th International Conference on Computer Modelling and Simulation

(UKSim 2014)

Cambridge, United Kingdom
26-28 March 2014
Table of Contents

Welcome Message from the Chairs ............................................................................................................................xiv
Conference Organization .............................................................................................................................................xv
International/Technical Program Committee ...........................................................................................................xvi
International Reviewers ..............................................................................................................................................xvii
Technical Sponsors .....................................................................................................................................................xix

Plenary Abstracts

Keynote Speaker-1: How will Computers Evolve over the Next 10 Years? ...............................................................1
Frank Wang

Keynote Speaker-2: How I Became a Computational Scientist ..................................................................................2
J. Mailen Kootsey

Keynote Speaker-3: Similarity-Based IPR and e-Forensics, -Modeling and Simulation in HC Interactive Learning Environment ..........................................................................................................................5
Patrick S.P. Wang

Keynote Speaker-4: Artificial Intelligence and Emotion Actuator Design ..............................................................8
Dong Hwa Kim

Session 01.A: Neural Networks

An Efficient Architecture for Floating Point Based MISO Neural Networks on FPGA ........................................12
Antonino Laudani, Gabriele Maria Lozito, Francesco Riganti Fulginei, and Alessandro Salvini

Optimal Estimation of Penalty Value for On Line Multiple Choice Questions Using Simulation of Neural Networks and Virtual Students’ Testing ........................................................................................................18
Hassan M.H. Mustafa, Mohammed H. Kortam, Ibrahim H. Assaf, Ayoub Al-Hamadi, and Nada M. Al-Shenawy

Reducing Complexity of Echo State Networks with Sparse Linear Regression Algorithms ....................................26
Vladimir Ceperic and Adrijan Baric
Artificial Intelligence for Ethology: Neural Networks in the Prediction of Human Behavior ..................................................32
Demetrios Koutsomanis

Empirical Evaluation of Whitening and Optimization of Feature Learning .................................................................36
Nouman Qadeer and Xiabi Liu

Session 03.C: Evolutionary Computation
Hybridization and the Collaborative Combination of Algorithms: Case Study: The Container Loading Problem ............................................................................................................................40
Ayodeji Remi-Omosowon, Richard Cant, and Caroline Langensiepen

Prediction of Jet Engine Parameters for Control Design Using Genetic Programming ..................................................45
Giovanna Martínez-Arellano, Richard Cant, and Lars Nolte

A Novel Communication Technique for Nanorobots Swarms Based on Evolutionary Strategies ......................................................................................................................51
Sara Yousef Serry Elsayed Ahmed, Taha ElAraif, and Safaa Elsayed Amin

Improved Hybridized Bat Algorithm for Global Numerical Optimization ...............................................................57
Adis Alihodzic and Milan Tuba

Session 05.E: Adaptive Dynamic Programming and Reinforcement Learning
Convergence Analysis using non-squares estimators to approximate the solution of HJB-Riccati equation for the design DLQR via HDP ..................................................................................63
Jonathan A. Queiroz, Patricia H.M. Rêgo, João V.F. Neto, Cristiane da Silva, Ewaldo Santana, and Allan Kardec Barros

PNLMS-based Algorithm for Online Approximated Solution of HJB Equation in the Context of Discrete MIMO Optimal Control and Reinforcement Learning ..............................................................................69
Márcio Eduardo G. Silva, João Viana da Fonseca Neto, and Francisco das Chagas de Souza

RLS Algorithms and Convergence Analysis Method for Online DLQR Control Design via Heuristic Dynamic Programming ........................................................................................................77
Watson R.M. Santos, Jonathan A. Queiroz, João Viana da F. Neto, Patricia H. M. Rêgo, Ewaldo Santana, and Gustavo Andrade

Session 06.F: Bioinformatics and Bioengineering
Characteristics of Human Arm Impedances: A Study on Daily Movement .................................................................84
Tasnuva Tabashhum Choudhury, Md Mozasser Rahman, and Md Raisuddin Khan

A Unit Quaternion Based SOM for Anatomical Joint Constraint Modelling .................................................................89
Glenn L. Jenkins and Michael E. Dacey

New Antenna Design for Hyperthermia Treatment of Human Head .............................................................................96
Maged Aldhaeebi and Ibrahim Elshafiey

Analysis of the “GPATD”: Geometrical Influence on Blood Clot Extraction Using CFD Simulation ................................101
Gregorio Romero, M. Luisa Martinez, Gillian Pearce, and Julian Wong
<table>
<thead>
<tr>
<th>Session 07.G: Computational Finance and Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock Price Prediction Using the ARIMA Model ..........................................................106</td>
</tr>
<tr>
<td>Adebiyi A. Ariyo, Adewumi O. Adewumi, and Charles K. Ayo</td>
</tr>
<tr>
<td>Upgraded Firefly Algorithm for Portfolio Optimization Problem ....................................113</td>
</tr>
<tr>
<td>Milan Tuba and Nebojsa Bacanin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 08.H: Data and Semantic Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Prototype for a Data Mining Based Pathfinder to Sudanese Universities ......................119</td>
</tr>
<tr>
<td>Eltayeb Abuelyaman and Atifa Elgimari</td>
</tr>
<tr>
<td>Arabic Text Root Extraction via Morphological Analysis and Linguistic Constraints ............125</td>
</tr>
<tr>
<td>Amal Alsaad and Maysam Abbod</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 09.I: Games, VR, and Visualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAVE: An Emerging Immersive Technology—A Review ....................................................131</td>
</tr>
<tr>
<td>Siddhesh Manjrekar, Shubhrika Sandiya, Deesha Bhosale, Sravanthi Kanchi, Adwait Pitkar, and Mayur Gondhalekar</td>
</tr>
<tr>
<td>Visualisation on Nonplanar Surfaces Using Projector ................................................137</td>
</tr>
<tr>
<td>Oleksandr Godoba, Svetlana Antoshchuk, and Jürgen Sieck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 11.K: Intelligent Systems and Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Travel Path Optimization System Using Ant Colony Optimization ........................142</td>
</tr>
<tr>
<td>Jerry Kponyo, Yujun Kung, and Enzhan Zhang</td>
</tr>
<tr>
<td>Transaction Management in Fully Temporal System ......................................................148</td>
</tr>
<tr>
<td>Michal Kvet, Karol Matiáško, and Marek Kvet</td>
</tr>
<tr>
<td>Influence Discovery in Semantic Networks: An Initial Approach ....................................154</td>
</tr>
<tr>
<td>Marcello Trovati and Ovidiu Bagdasar</td>
</tr>
<tr>
<td>iCloud Traffic Control and Monitoring .................................................................159</td>
</tr>
<tr>
<td>Vladimir Hahanov, Eugenia Litvinova, Wajeb Gharibi, and Svetlana Chumachenko</td>
</tr>
<tr>
<td>Knowledge Representation, Reasoning and Systems Thinking under Uncertainty ..................163</td>
</tr>
<tr>
<td>Ben Khayut, Lina Fabri, and Maya Abukhana</td>
</tr>
<tr>
<td>Data Mining Approach: Relevance Vector Machine for the Classification of Learning Style Based on Learning Objects .............................................................170</td>
</tr>
<tr>
<td>Nor Liyana Mohd Shuib, Haruna Chiroma, Rukaini Abdullah, Mohammad Hafiz Ismail, Ahmad Sofiyuddin Mohd Shuib, and Nur Faizah Mohd Pahme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 12.L: Hybrid and Soft Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipelined Numerical Integration on Reduced Accuracy Architectures for Power System ..........176</td>
</tr>
<tr>
<td>Georgios Lilis, Theodoros Kyriakidis, Guillaume Lanz, Rachid Cherkaoui, and Maher Kayal</td>
</tr>
</tbody>
</table>
Session 15.O: e-Science and e-Systems
Designing an Innovative Computer Networking Course Using Junosphere ................................................................. 182
  Maria Salama and Ahmed Shawish

Session 16.P: Robotics, Cybernetics, Engineering, Manufacturing and Control
Predicting EMG Based Elbow Joint Torque Model Using Multiple Input ANN Neurons 
for Arm Rehabilitation .................................................................................................................................................. 189
  Mohd Hafiz Jali, Tarmizi Ahmad Izzuddin, Zul Hasrizal Bohari, Mohamad Fani Sulaima, 
  and Hafez Sarkawi
Path Planning for Process Modelling in Chemical Engineering .................................................................................. 195
  Edvards Valbahs, Ilo Dreyer, and Peter Grabusts
Acrobot Stable Walking in Hybrid Systems Notation .................................................................................................. 200
  Milan Anderle and Sergej Čelikovský
Monitoring Concepts for a 3D Printer Applied to Build a Human Outpost on the Moon ............................................. 206
  Valentina Colla, Enrico Dini, Giovanni Cesaretti, Xavier De Kesteliers, 
  and Laurent Pambaguiain
PCA Learning for Non-brain Waves-Controlled Robotic Hand (Prosthesis): Grasp Stabilization and Control ................................................................. 211
  Ebrahim Mattar

Session 17.Q: Methodologies, Tools, and Operations Research
Statistical Estimation of Error Probability in a Digital Wireless Communication Network ........................................... 217
  Clement Temaneh-Nyah
Cyclic Schedules for Pipeline Assembly Processes ...................................................................................................... 221
  Marta Flamini, Gaia Nicosia, and Andrea Pacifici
A Horadam-Based Pseudo-Random Number Generator .............................................................................................. 227
  Ovidiu D. Bagdasar and Minsi Chen
Rasterising Epidemiological Host Data Efficiently .................................................................................................... 232
  Matthew Patrick, Richard O.J.H. Stutt, and Christopher A. Gilligan
Forecast Uncertainty in Procurement Decisions for Cloud Storage ................................................................. 238
  Maurizio Naldi

Session 18.R: Discrete Event and Real Time Systems
Optimized Timing Parameters for Real-Time Adaptive Traffic Signal Controller ...................................................... 244
  Ahmad Aljaafreh and Naeem Al-Oudat
Colored Petri Net Model for Discrete System Communication Management on the European Rail Traffic Management System (ERTMS) Level 2 .................................................................................. 248
  Adnen El Amraoui and Khaled Mesghouni
Shortest Path Search in Dynamic Reliability Space: Hierarchical Coloured Petri Nets Model and Application to a Pipeline Network .............................................................................................................. 254
  Hela Kadri and Belhassen Zouari

Preprocessing Approach Identifying and Removing Noise which Affects Shape .................................................260

*Sadaf Sajjad and Shehzad Khalid*

A Modified Neural Filtering Algorithm for Tracking of Chaotic Signals .............................................................265

*Engin Cemal Mengüç and Nurettin Acir*

Real-Time Hand Tracking and Gesture Recognition Using Semantic-Probabilistic Network ........................................269

*Mykyta Kovalenko, Svetlana Antoshchuk, and Juergen Sieck*

Spoken Arabic Digits Recognition Using Discrete Wavelet ..............................................................................275

*Mohammed Elrgaby, Abdwahab Amoura, and Ali Ganoun*

Isoline Based Image Colorization ..................................................................................................................280

*Adam Popowicz and Bogdan Smolka*

Automatic Rooftop Detection Using a Two-Stage Classification .......................................................................286

*Bikash Joshi, Hayk Baluyan, Amer Al. Hinai, and Wei Lee Woon*

H.265 Codec over 4G Networks for Telemedicine System Application ..............................................................292

*Salah M. Saleh Al-Majeed, Shavan K. Askar, and Martin Fleury*

A Morphological Approach to Persian Handwritten Text Line Segmentation .......................................................298

*Abdollah Amirkhani-Shahraki, Amir Ebrahimi Ghahnavieh, and Seyyed Abdollah Mirmahdavi*

Gas Leakage Detection Using Thermal Imaging Technique ..............................................................................302

*Mohd Shawal Jadin and Kamarul Hawari Ghazali*

Detection Improvised Explosive Device (IED) Emplacement Using Infrared Image ..............................................307

*Kamarul Hawari Ghazali and Mohd Shawal Jadin*

---

**Session 19.S1: Natural Language Processing/Language Technologies**

Electronic Multilingual Arabic Dictionary Based on Root -Word with Self-Assessment ....................................311

*Muhammad Nasir Ibrahim, Siti Noormaya Bilmas, Abuagla Babiker, and Mariani Idroas*

---

**Session 20.T: Industry, Business, Management, Human Factors and Social Issues**

Interval Estimation of the Herfindahl-Hirschman Index under Incomplete Market Information ........................................318

*Maurizio Naldi and Marta Flamini*

Simulating Critical Infrastructure Cascading Failure ............................................................................................324

*Áine MacDermott, William Hurst, Qi Shi, and Madjid Merabi*

Response Time Analysis of Firefighting Operations Using Discrete Event Simulation ..............................................330
Esra Aleisa and Mehmet Savsar

Experimental Measurements and Computer Simulations of FL and CFL for Harmonic Studies ..........................................................335
Muhyaddin J.H. Rawa, David W.P. Thomas, and Mark Sumner

Experimental Measurements and Computer Simulations of Home AppliancesLoads for Harmonic Studies ..................................................................340
Muhyaddin J.H. Rawa, David W.P. Thomas, and Mark Sumner

Aircraft Ground Routing and Scheduling Optimization ........................................................................................................345
Ludovica Adacher and Marta Flamini

Home Energy Management in Smart Grid with Renewable Energy Resources ...............................................................351
Yimin Zhou, Yanfeng Chen, Guoqing Xu, Chunhua Zheng, and Ming Chang

Decentralized Assignment for Intelligent Electric Vehicles to Recharge Stations ...............................................................357
Ludovica Adacher, Federica Pascucci, and Gabriele Oliva

Modeling and Simulation of a Lead-Acid Battery Packs in MATLAB/Simulink: Parameters Identification Using Extended Kalman Filter Algorithm ........................................................................363
Rami Yamin and Ahmed Rachid

A Simulation Study of the Sarir Field-Tobruk Terminal Crude Oil Pipeline ................................................................................369
Awad Shamekh, Salah Masheiti, and Soad Ben Soud

Session 22.V: Parallel, Distributed, and Software Architectures and Systems

Implementation and Performance Analysis of a Parallel Oil Reservoir Simulator Tool Using a CG Method on a GPU-Based System ........................................................................................................375
Leila Ismail, Jamal Abou-Kassem, and Bibrak Qamar

An Efficient Memory Model for Implementing Image Resizing Algorithms in a Distributed Environment ........................................................................................................381
Syed Ali and Liaqat Hayat

Improved MapReduce k-Means Clustering Algorithm with Combiner ......................................................................................386
Prajesh P. Anchalia

Empirical Utilization Analysis for High Performance and Grid Computing ..................................................................................392
Kholood Al Tabash, Ahmad Barradah, and Raed Al-Shaikh

Verification and Performance Evaluation of Parallel Pipelined Communications Using Petri Nets ..........................................................................................................................399
Stavros Souravlas and Manos Roumeliotis

Optimal Pipeline Performance via Transactional Slice with No Branch Prediction Overhead ..................................................................................405
Shahnawaz Talpur, Feng Shi, Xiaojun Wang, Chen Xu, Yizhou Wang, and Shahnawaz Farhan Khahro
### Session 23.W: Internet Modelling, Semantic Web, and Ontologies

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Reliability and Availability Analysis Using Markov Method</td>
<td>423</td>
</tr>
<tr>
<td>Lela Mirtskhulava, Revaz Kakubava, Natela Ananiashvili, and Giorgi Gugunashvili</td>
<td></td>
</tr>
<tr>
<td>Network Modeling for Improving Scalability Using Graph Contraction Scheme</td>
<td>428</td>
</tr>
<tr>
<td>Joon Heo and Taehwan Kim</td>
<td></td>
</tr>
<tr>
<td>Ontology Modelling Methodology for Temporal and Interdependent Applications</td>
<td>434</td>
</tr>
<tr>
<td>Sakirulai Isiaq and Taha Osman</td>
<td></td>
</tr>
<tr>
<td>Modelling Trust in Semantic Web Applications</td>
<td>440</td>
</tr>
<tr>
<td>Gregory Albiston, Taha Osman, and Evtim Peytchev</td>
<td></td>
</tr>
<tr>
<td>New Framework for Semantic Search Engine</td>
<td>446</td>
</tr>
<tr>
<td>Arooj Fatima, Cristina Luca, and George Wilson</td>
<td></td>
</tr>
<tr>
<td>Website Search Engine Optimization: Geographical and Cultural Point of View</td>
<td>452</td>
</tr>
<tr>
<td>Fawaz AL Zaghouli, Osama Rababah, and Hussam Fakhouri</td>
<td></td>
</tr>
<tr>
<td>Challenges in Information Retrieval from Unstructured Arabic Data</td>
<td>456</td>
</tr>
<tr>
<td>Hussein Khalil and Taha Osman</td>
<td></td>
</tr>
<tr>
<td>Aggregation Loss Bandwidth in the Last Mile Residential Internet</td>
<td>462</td>
</tr>
<tr>
<td>Christopher Windmill</td>
<td></td>
</tr>
<tr>
<td>A Simulation and Prediction Model for Internet Traffic and QoS Based on 1-Step Markov-Chain</td>
<td>468</td>
</tr>
<tr>
<td>Johannes K. Chiang and Yao-Hung Lin</td>
<td></td>
</tr>
</tbody>
</table>

### Session 24.X: Mobile/Ad hoc Wireless Networks, Mobicast, Sensor Placement, Target Tracking

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of CBR Traffic on Routing Protocols in MANETs</td>
<td>474</td>
</tr>
<tr>
<td>Yudhvir Singh, Amit Kumar, Prabha Rani, and Sunil Kumar Kaushik</td>
<td></td>
</tr>
<tr>
<td>An Analysis of the Effect of Synaptic Weight Configuration for a Neural Network Enabled Handover for Heterogeneous Networks</td>
<td>479</td>
</tr>
<tr>
<td>Sean Hayes, Enda Fallon, Ronan Flynn, and Niall Murray</td>
<td></td>
</tr>
<tr>
<td>Optimization of Power-Efficient Wireless Mesh Networks in Outdoor Environment in Japan</td>
<td>485</td>
</tr>
<tr>
<td>Kohei Kamimura and Hitoshi Hayashi</td>
<td></td>
</tr>
<tr>
<td>BYOT Network Solutions for Enterprise Environment</td>
<td>489</td>
</tr>
<tr>
<td>Arya Sedigh, Carlene Campbell, and Kapilan Radhakrishnan</td>
<td></td>
</tr>
<tr>
<td>Cluster Glue—Improving Service Reachability in PKI Enabled MANET</td>
<td>494</td>
</tr>
<tr>
<td>Peter Vilhan and Ladislav Hudec</td>
<td></td>
</tr>
</tbody>
</table>
Dual Handover vs. QoS for Real Time Broadband Video Streaming over WiMAX Networks ................................................................. 500
  Salah M. Saleh Al-Majeed and Martin Fleury

  Vijey Thayananthan and Fahd Bahazaq

**Session 25.Y: Performance Engineering of Computer and Communication Systems**

Performance Evaluation of the Wireless Tree Wi-Fi Video Surveillance System ......................................................... 511
  Smart C. Lubobja, Mqhele E. Diololo, and Gerard de Jager

A Dynamic Programming Approach to the Rank Aggregation Problem ............................................................. 517
  Yu Lu and Ying He

Optimization of Power-Efficient Vehicular Networks in Rate Adaptation Algorithms ............................................. 525
  Kenneth S. Nwizege, Emmanuel D. Nwiiuwe, and Michael MacMammah

Simulating the Long Term Evolution (LTE) Downlink Physical Layer ................................................................. 531
  Chafia Yahiaoui, Mohamed Bouhali, and Christian Gontrand

Performance Evaluation of a Path Diversity-Based Video Streaming Approach over Best Effort Networks .......... 536
  Dana Hussein, Mohamed Hassan, and Taha Landolsi

A Prediction Scheme for VBR Video Traffic Using a Fast Orthogonal Search Algorithm ................................... 542
  Mohamed Hassan, Mohamed Atia, and Aboelmagd Nourredin

**Session 26.Z: Circuits, Sensors, and Devices**

CST Simulation on Monopole Sensor for Determination of Malaysian Local Oranges
Sweetness Quality Non-destructively ......................................................................................................................... 548
  Rafidah Rosman, Mohamad Ngasri Dimon, and You Kok Yeow

Low-Power and Wideband LC-VCO for WiMAX in CMOS Technology ............................................................. 553
  Mohammed Aqeeli, Zhirun Hu, Xianjun Huang, Abdullah Alburai, and Cahyo Muvianto

A Low–Power and High–Efficiency CMOS Transmitter for Wireless Sensor Network Application ........................................ 558
  Mutasem Odeh, Ibrahim Abdo, and Fadi R. Shahrouy

A Modeling Environment for the Simulation and Design of Charge Redistribution DACs
Used in SAR ADCs .................................................................................................................................................. 562
  Stefano Brenna, Andrea Bonetti, Andrea L. Lacaita, and Andrea Bonfanti

Novel Encoding Method for Non-contact IC Card or RFID Systems ....................................................................... 568
  Shota Yokojima and Hitoshi Hayashi

Suppressing Chaos in Uncertain Nonautonomous Oscillators ............................................................................... 571
  Ashraf A. Zaher

Modeling and Simulation of a Pressure Sensing Solution Based on Silicon Carbide for Harsh Environment Applications ......................................................... 576
  Joseph Riad, Mourad N. El-Gamal, and Hani Ragai
Transparent Current Mirrors Using a-GIZO TFTs: Simulation with RBF Models and Fabrication .......................................................... 582
  Pydi Bahubalindruni, Vítor Tavares, Cândido Duarte, Nuno Cardoso, Pedro Oliveira, 
Pedro Barquinha, Rodrigo Martins, and Elvira Fortunato

A Novel Distributed Parameter Model of a Blumlein-Line Laser Circuit Including 
the Effect of Time Varying Spark-Gap Inductance and Resistance ......................................................... 587
  Mohamed Twati

Shadow Filter for Orthogonal Modification of Center Frequency and Bandwidth 
with Constant Q Factor .......................................................................................................................... 591
  Anshika Upadhyay

A Miniaturized Lumped-Element In-phase Power Divider with a Simple Layout ................................................. 595
  Youichi Nakayama and Hitoshi Hayashi

The Memory-Conservation Theory of Memristance .................................................................................. 599
  Ella Gale

Design and Simulation of a Wide Temperature Range Frequency-to-Data Converter 
Based on Threshold Voltage Dependent Thermal Sensor ........................................................................... 605
  Chee-Chiang Derrick Tiew, Muhammad Muzaiyan Bin Abdul Khalik, and Chan Nyein Aye

Author Index .................................................................................................................................................. 612