



# **The 14<sup>th</sup> International Arab Conference on Information Technology (ACIT'2013)**

**Khartoum, December 17-19, 2013**

**Organized by**

Sudan University of Science and Technology

**Collage of Computer Science and Information Technology**

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## **ABSTRACT PROCEEDINGS**

**Co-Editors**

Dr. Rania A. Mokhtar, Dr. Abdelgaffar H. Ahmed

## PREFACE

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Welcome to the International Arabic Conference on Information Technology (ACIT). The ACIT is considered the official scientific conference for the colleges of Computer and Information Society, stemming from the association of Arab Universities.

Following the successful previous ACIT conferences, the 14th ACIT' 2013 this year is organized by Sudan University of Science and Technology (SUST) in collaboration with the permanent base of the General Secretariat of ACIT, which is hosted by Zarga University, Jordan. ACIT' 2013 this year takes place in Khartoum, the capital of the Republic of the Sudan from 17 to 19 December 2013. The purpose of the current proceedings is to bring together researchers and those interested in the IT advances in the Arabic world.

All the submissions of the ACIT' 2013 were subjected to a peer-reviewed process by an international programme committee. The total number of the received papers was 150 papers. 87 papers of them were accepted (the acceptance rate is 58%).

The keynote speakers are Dr. Hussein Suleman (University of Cape Town, South Africa), Prof. Robert P.W. Duin (Delft University of Technology, The Netherlands) and Dr. Laurie Butgereit (The Council for Scientific and Industrial Research, Pretoria, South Africa). For the first time in the conference history, ACIT' 2013 includes three different tutorial sessions on Database Performance Modeling, Pattern Recognition and Cloud Computing and will be conducted by Dr. Rasha Izzeldin Mohammed (Imperial College London, UK), Dr. David Martinus Joannes (Delft university of Technology, The Netherlands) and Mr. Mehdi Bahrami (University of California, Merced, USA), respectively.

Our gratitude goes to programme committee members (reviewers, organizers and volunteers) for their efforts to make ACIT' 2013 successful.

“Programme Committee”

# CONTENTS

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<b>PREFACE</b> .....	<b>ii</b>
<b>TABLE OF CONTENTS</b> .....	<b>iii</b>
<b>STEERING COMMITTEE</b> .....	<b>vii</b>
<b>ORGANIZING COMMITTEE</b> .....	<b>viii</b>
<b>TECHNICAL COMMITTEE</b> .....	<b>viii</b>
<b>PROGRAMME</b> .....	<b>xii</b>
<b>KEYNOTE SPEAKER</b> .....	<b>1</b>
<b>Dr. Laurie Butgereit</b>	
DOING RESEARCH IN MOBILE EDUCATION IN THE DEVELOPING WORLD .....	1
<b>Prof. Robert P.W. Duin</b>	
NON-EUCLIDEAN PROBLEMS IN PATTERN RECOGNITION .....	2
<b>Dr. Hussein Suleman</b>	
THE D (IN ICT4D) IS FOR DEVELOPMENT .....	3
<b>TUTORIALS</b> .....	<b>4</b>
<b>Dr Rasha I. M. Osman</b>	
PERFORMANCE MODELLING OF DATABASE SYSTEMS .....	4
<b>Prof. David Martinus Joannes</b>	
PATTERN RECOGNITION: CAN WE LEARN SOMETHING FROM COMPUTERS? .....	5
<b>Mr. Mehdi Bahrami</b>	
CLOUD COMPUTING: ARCHITECTURE, MIGRATION, OPPORTUNITIES, CHALLENGES AND BEST PRACTICES.....	6
<b>PAPERS</b> .....	<b>7</b>
<b>13. Global Analysis on Subconscious Feature Applied to Emotional BDI Architecture</b> .....	<b>8</b>
<i>Benlazaar Sid Ahmed, Algeria</i>	
<b>28. Redesign of Bellman-Ford Shortest Path Algorithm</b> .....	<b>8</b>
<i>Ahmed Musa, Sudan</i>	
<b>33. A Transform Based 3D- Speech Scrambling Using Multi-Wavelet: Design and Evaluation</b> .....	<b>8</b>
<i>Hana'a M. A. Salman, Iraq</i>	
<b>35. Persistent Scheduler Based Call Admission Control for Long Term Evolution (3GPP) Networks</b> ....	<b>8</b>
<i>Vijay Franklin and Paramasivam K, India</i>	
<b>36. Classifying Images by Canny Mask Segmentation and Laplacian Sigmas in Content Based Image Retrieval System</b> .....	<b>9</b>
<i>Ensaf A. ALZurqa, Yemen</i>	

<b>50. K Semantics for Dynamic Software Architectures.....</b>	<b>9</b>
<i>Sahar Smaali, Aicha Choutri and Faiza Belala, Algeria</i>	
<b>58. A Hierarchical Fusion Strategy based Multimodal Biometric System .....</b>	<b>10</b>
<i>Youssef Elmir, Zakaria Elberrichi and Réda Adjoudj, Algeria</i>	
<b>65. Mathematical Relationship between External Events in Real-Time Systems and Errors Generated In These Systems .....</b>	<b>10</b>
<i>Hamid Saghir Saad Al-Raimi and Jamil Abdulhamid Moh'd Saif, Yemen</i>	
<b>68. A Novel Mechanism for Securing Cloud Computing .....</b>	<b>11</b>
<i>Yasir Abdelgadir Mohamed, Sudan</i>	
<b>76. Applying Model Driven Architecture Approach to Develop Software Systems – Case Study .....</b>	<b>11</b>
<i>Mohammed Abdalla Osman Mukhtar, Sudan</i>	
<b>87. Towards a Framework for the Curricula of Information Systems in the Arab Universities .....</b>	<b>11</b>
<i>Suleiman Hussein Mustafa, Jordan</i>	
<b>92. Hash Algorithm for Data Integrity based on Matrix Combination .....</b>	<b>12</b>
<i>Rushdi Hamamreh, and Jamoos M., Palestinian</i>	
<b>97. From UML 2.0 Interaction Fragments to PROMELA Code Using A Graph Transformation Using ATOM3 .....</b>	<b>12</b>
<i>Abdelkrim Amirat, Algeria</i>	
<b>98. Speech Compression based on Psychoacoustic Model and A General Approach for Filter Bank Design using Optimization.....</b>	<b>12</b>
<i>Mourad Talbi, Chafik Barnoussi and Cherif Adnane, Tunisia</i>	
<b>108. Centroid-Based Arabic Classifier .....</b>	<b>13</b>
<i>Abduelbaset Goweder, Mohummed Elboashi and Ali Elbekai, Libya</i>	
<b>114. Contrast Improvement of Chest Organs in Computed Tomography Images using Image Processing Technique.....</b>	<b>13</b>
<i>Yousif Abdallah and Magdolin Siddig, Sudan</i>	
<b>121. Explanations in Recommender Systems: Overview and Research Approaches .....</b>	<b>13</b>
<i>Mohammed Z. Al-Taie, Iraq</i>	
<b>122. Scaled Bayes Image Denoising Algorithm using Modified Soft Thresholding Function.....</b>	<b>14</b>
<i>Sami M. A. Gorashi, KSA</i>	
<i>Sabahaldin A. Hussain, Sudan</i>	
<b>132. Extreme Programming: Strengths and Weaknesses .....</b>	<b>14</b>
<i>Ahmad Dalalah, SA</i>	
<b>133. Multimedia Education System for Deaf and Hear Impairment Children.....</b>	<b>14</b>
<i>Nour Eldin Elshaiekh, B. Mursi, and M. Hussein, Sudan</i>	
<b>134. Formal Development of Reconfigurable Manufacturing Systems .....</b>	<b>15</b>
<i>Laid Kahloul and Allaoua Chaoui, Algeria</i>	
<i>Karim Djouani, France</i>	
<b>136. Social Web Services Development Based on MDA: Extending WSDL to Inject Social-QoS .....</b>	<b>15</b>
<i>Hichem Bouchakour Errahmani and Sidi Mohammed Benslimane, Algeria</i>	
<b>143. Using Combinatorial Particle Swarm Optimization to Automatic Service Identification .....</b>	<b>15</b>
<i>Mohamed El Amine Chergui and Sidi Mohamed Benslimane, Algeria</i>	
<b>146. Eye Detection and Iris Center Tracking with Eyelashes Occlusion Correction .....</b>	<b>16</b>

	<i>Md Sohel Rana, Md Abdul Awal and Md Zahidul Islam, Bangladesh</i>	
<b>149. A Dynamic Programming Approach to Document Clustering based on Term Sequence Alignment</b>		<b>16</b>
	<i>Muhammad Rafi and Mohammad Shahid Shaikh, Pakistan</i>	
<b>153. Real Time Finger Binary Recognition using Relative Finger-Tip Position</b>		<b>16</b>
	<i>Asaduz Zaman, and Md Abdul Awal, Bangladesh</i>	
	<i>Chill Woo Lee, South Korea</i>	
	<i>Md Zahidul Islam, Bangladesh</i>	
<b>155. Integrating AHP Application for Project Management</b>		<b>17</b>
	<i>Waled Alzober, Libya</i>	
	<i>Abdul Razak Yaakub, Malaysia</i>	
<b>156. A New Multidimensional Model for the OLAP of Documents based on Facets</b>		<b>17</b>
	<i>Omar Khrouf, Kaïs Khrouf and Jamel Feki, Tunisia</i>	
<b>158. Comparison of the Workflow Management Systems Bizagi, ProcessMaker, and Joget</b>		<b>17</b>
	<i>Farh Mohamed Zeinelbdeen Abdelgader, Omer O. Salih Dawood and Musa Mohamed Elhafiz Mustafa, Sudan</i>	
<b>159. Using Nested Tables and Multi-pitch Adjusting in Harmony Search (NTMHS) to Solve Timetabling Problem in Object-Relational Model</b>		<b>18</b>
	<i>Wadee Al-Qubati, Ammar Zahary and Abdualkadir Alabbadi, Yemen</i>	
<b>163. Predicting Stock Prices using Data Mining Techniques</b>		<b>18</b>
	<i>Qasem A. Al-radaideh, Adel Abu Assaf and Eman Alnagi, Jordan</i>	
<b>164. UsualSpace; Evolutive-Agents Modelling and Analysis</b>		<b>18</b>
	<i>Mohamed Dbouk and Ihab Sbeit, Lebanon</i>	
	<i>Hamid Mcheick, Canada</i>	
	<i>Haytham Douaihy, Lebanon</i>	
<b>165. Simplified Online Signature Verification through Uncompromised Electrode Reduction in Data Gloves</b>		<b>19</b>
	<i>Andrews Samraj and Kalvina Rajendran, India</i>	
	<i>Shohel sayeed, Malaysia</i>	
<b>166. Investigation of High Performance Schmitt Trigger at Nanoscale CMOS Technology</b>		<b>19</b>
	<i>Anshul Saxena, Akansha Shrivastava, Shyam Akashe and D. C. Chaurasia, India</i>	
<b>167. ARSYPAR: A Tool for Parsing the Arabic Language based on Supervised Learning</b>		<b>19</b>
	<i>Nabil Khoufi, Souhir Louati, Chafik Aloulou and Lamia Hadrich Belguith, Tunisia</i>	
<b>176. Implementing the Classical Poker Method for Testing Randomness in Parallel with MATLAB</b>		<b>20</b>
	<i>Wael M. F. Abdel-Rehim, Egypt</i>	
<b>181. Signature Verification System Based on Support Vector Machine Classifier</b>		<b>20</b>
	<i>Ahmed Abdelrahman and Ahmed Abdallah, Sudan</i>	
<b>183. Management of QoS and Data Freshness in Real-Time Data Warehouses using Feedback Control Scheduling</b>		<b>21</b>
	<i>Issam Hamdi, Emna Bouazizi and Jamel Feki, Tunisia</i>	
<b>184. إعداد معلمي الرياضيات لإدماج تكنولوجيا الاتصال والمعلومات في تدريسهم بناءً على إطار TPACK</b>		<b>21</b>
	<i>نهى عمر عبدالله، السودان</i>	
	<i>يوهانس كرونيه، جنوب افريقيا</i>	
	<i>عزالدين محمد عثمان، السودان</i>	

<b>186. Security in Virtual Private Networks: A Review .....</b>	<b>21</b>
<i>Yasir Mohamed and E. Osman, Sudan</i>	
<b>191. Extending the Technology Acceptance Model for Mobile Government Systems .....</b>	<b>22</b>
<i>Nisreen Beshir Osman, Sudan</i>	
<b>192. Biometry: Face Recognition Applying Logistic .....</b>	<b>22</b>
<i>Emir Kremic and Abdulhamit Subasi, Bosnia and Herzegovina</i>	
<b>194. Challenges of Computer Crime Investigation in North Africa's Countries .....</b>	<b>22</b>
<i>Mohamed Sarrab, Sultanate of Oman</i>	
<i>Hamza Aldabbas, Jordan</i>	
<i>Mahmoud Elbasir, UK</i>	
<b>AUTHOR INDEX.....</b>	<b>24</b>

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Zakaria Elberrichi, University Djillali Liabes, Algeria  
Ziyad Al-Khinalie, Multimedia University, Malaysia  
Zohra Reguieg, University Saad Dahlab of Blida, Algeria

## PROGRAMME

<i>Conference Days Time Table</i>	<i>9:00 -11:00 am</i>	<i>11:00- 12:00 pm</i>	<i>12:00 -1:30 pm</i>	<i>1:30- 2:30 pm</i>	<i>2:30 - 4:30 pm</i>			
<i>Day I Tuesday 17-12</i>	<b>Opening Ceremony</b> <i>Friendship Hall</i>	<i>Coffee Break Friendship Hall</i>	<b>Keynote Speech I</b> <i>Grand Ballroom</i>	<i>Lunch</i>	<b>Paper Session</b>			
					<i>Churchill Hall</i>	<i>Nile Hall</i>	<i>Meeting Room 2</i>	
<i>New Timing for Day II &amp; Day III</i>	<i>9:00 – 10:30 am</i>	<i>10:30- 11:00 am</i>	<i>11:00 -1:00 pm</i>	<i>1:00- 2:30 pm</i>	<i>2:30 - 4:30 pm</i>			
<i>Day II Wednesday 18-12</i>	<b>Keynote Speech II</b> <i>Grand Ballroom</i>	<i>Coffee Break</i>	<b>Paper Session</b>			<b>Tutorials</b>		
			<i>Churchill Hall</i>	<i>Nile Hall</i>	<i>Meeting Room 2</i>	<i>Churchill Hall</i>	<i>Nile Hall</i>	<i>Grand Ball</i>
<i>Day III Thursday 19-12</i>	<b>Keynote Speech III</b> <i>Grand Ballroom</i>		<b>Paper Session</b>			<b>Closing Ceremony</b> <i>Grand Ballroom</i>		
			<i>Churchill Hall</i>	<i>Nile Hall</i>	<i>Meeting Room 2</i>			

\* Paper presentation by authors will not take more than 20 minutes, including questions.

## Schedule of Paper Sessions

Day I                      Tuesday                      17 <sup>th</sup> of December 2013					
<b>Keynote Speech I</b> Speaker: <i>Dr. Hussein Suleman</i> - University of Cape Town, South Africa			Title: <b>ICT for Development (ICT4D)</b> Time: 12:00 – 1:30 PM                      Location: <i>Grand Ballroom</i> Chair: <i>Mohammed Elammari</i>		
<b>Lunch Break 1:30 - 2:30 PM</b>					
<b>Paper Session 2:30 - 4:30 pm</b>					
<b>Location: Churchill Hall</b>		<b>Location: Nile Hall</b>		<b>Location: Meeting Room # 2</b>	
<b>Computer Network and Information Security</b> Session Chairs: <i>Abdallah Shoushan</i> <i>Wesam Bhaya</i>		<b>Software Engineering</b> Session Chairs: <i>Khalid Mahar</i> <i>Mohamed Awad</i>		<b>AI and Expert System</b> Session Chairs: <i>Mohammed Radi</i> <i>AbdulRahman Gabir</i>	
PI D	TITLE	PID	TITLE	PID	TITLE
35	<b>Persistent Scheduler Based Call Admission Control for Long Term Evolution (3GPP) Networks</b> <i>Vijay Franklin.</i>	50	<b>A K Semantics for Dynamic Software Architectures</b> <i>Sahar Smaali, Aicha Choutri, Faiza Belala</i>	13	<b>Global analysis on Subconscious Feature Applied to Emotional BDI Architecture</b> <i>Sid Ahmed Benlazaar.</i>
130	<b>Leakage Current and Dynamic Power Analysis of finfet based 7T SRAM at 45 nm Technology</b> <i>Saurabh Khandelwal, Dr Balwinder Raj, Dr R D Gupta.</i>	76	<b>Applying Model Driven Architecture Approach to Develop Software Systems - Case Study</b> <i>Mohammed Mukhtar.</i>	58	<b>A Hierarchical Fusion Strategy based Multimodal Biometric System</b> <i>Youssef Elmir, Zakaria Elberrihi, Reda Adjoudj.</i>
133	<b>Multimedia Education System for Deaf and Hear Impairment Children</b> <i>Nour Eldin Elshaiekh, Banan Mursi, Mohammed Hussein.</i>	87	<b>Towards a Framework for the Curricula of Information Systems in the Arab Universities</b> <i>Suleiman Mustafa.</i>	108	<b>Centroid-Based Arabic Classifier</b> <i>Abduelbaset Goweder, Mohammed Elboashi, Ali elbekai.</i>
166	<b>Investigation and Optimization of high performance Schmitt trigger at Nanoscale CMOS Technology</b> <i>Anshul Saxena, Akansha Shrivastava, Shyam Akashe.</i>	97	<b>From UML 2.0 Interaction Fragments to PROMELA Code Using A Graph Transformation Using AtoM3</b> <i>Abdelkrim Amirat</i>	121	<b>Explanations in Recommender Systems: Overview and Research Approaches</b> <i>Mohammed Al-Taie.</i>
				163	<b>Predicting Stock Prices using Data Mining Techniques</b> <i>Qasem Al-Radaideh, Adel Abu Assaf.</i>
				192	<b>Biometry: Face Recognition Applying Logistic Model Trees</b> <i>Emir Kremic, Abdulhamit Subasi.</i>

**Day II                      Wednesday                      18<sup>th</sup> of December 2013**

**Keynote Speech II**

Speaker: *Dr. Robert P.W. Duin* - Delft University of Technology, The Netherlands

Title: **Non-Euclidean Problems in Pattern Recognition**

Time: **9:00 – 10:30 AM**                      Location: *Grand Ballroom*

Chair: *Thiab Taha*

*Coffee Break 10:30 - 11:00 AM*

**Paper Session 11:00 -1:00 pm**

Location: <i>Churchill Hall</i>		Location: <i>Nile Hall</i>		Location: <i>Meeting Room # 2</i>	
<i>Computer Network and Information Security</i> Session Chairs: <i>Mohamed Saleh Abdelaal, Ali AlSharafi</i>		<i>Software Engineering</i> Session Chairs: <i>Ahmed Hamed Taher Ali Alrashahy</i>		<i>Algorithm and Application</i> Session Chairs: <i>Safwan AlSalaimeh Abu Aglaa Babiker</i>	
PID	TITLE	PID	TITLE	PID	TITLE
33	<b>A Transform Based 3D- Speech Scrambling Using Multi-Wavelet: Design and Evaluation</b> <i>Hanaa Salman.</i>	132	<b>Extreme Programming: Strengths and Weaknesses</b> <i>Ahmad Dalalah..</i>	167	<b>ARSYPAR: A Tool for Parsing the Arabic language based on Supervised Learning</b> <i>Nabil Khoufi, Souhir Louati, Chafik Aloulou, Lamia Hadrich Belguith.</i>
68	<b>A Novel Mecanism for Securing Cloud Computing</b> <i>Yasir Mohamed</i>	134	<b>Formal development of reconfigurable manufacturing systems</b> <i>Laid Kahloul, Allaoua Chaoui, Karim Djouani.</i>	146	<b>Improved Eye Detection and Iris Center Tracking with the Outer Corner Eyelashes Occlusion Correction</b> <i>Sohel Rana, Zahidul Islam, Chil woo Lee.</i>
165	<b>Simplified Online Signature Verification through Uncompromised Electrode Reduction in Data Gloves</b> <i>Andrews Samraj, Kalvina Rajendran, Shohel Sayeed.</i>	136	<b>Social Web Services Development Based on MDA: Extending WSDL to Inject Social-QoS</b> <i>Hichem Bouchakour Errahmani, Sidi Mohammed Benslimane.</i>	28	<b>Redesign of Bellman-Ford Shortest Path Problem</b> <i>Ahmed Musa.</i>
186	<b>Security in Virtual Private Networks: A review</b> <i>Eman Osman, yasir Mohamed.</i>	141	<b>A software product line for e-learning applications</b> <i>Amina GUENDOOUZ, Djamel Bennouar.</i>	51	<b>Implementing Denoising by Bionic Wavelet Transform BWT in FPGA to simulate a hearing aid</b> <i>Salaheddine Derouiche, Bachir Djedou, Chabbi Charef.</i>
194	<b>Challenges of Computer Crime Investigation In North Africa's Countries</b> <i>Mohamed Sarrab, Hamza Aldabbas, Mahmoud Elbasir.</i>	191	<b>Extending the Technology Acceptance Model for Mobile Government Systems</b> <i>Nisreen Beshir Osman.</i>	65	<b>Mathematical relationship between external events in real-time systems and errors generated in these systems</b> <i>Hamid Al-Raimi, Jamil Saif.</i>
92	<b>Hash Algorithm for Data Integrity based on Matrix Combination</b> <i>Rushdi Hamamreh, Mohammed Jamoos.</i>		-	98	<b>Speech Compression based on Psychoacoustic Model and a General Approach for Filter Bank Design using Optimization</b> <i>Talbi Mourad, Cherif Adnane.</i>

*Lunch Break 1:00 – 2:30 PM*

**Tutorial Sessions 2:30 – 4:30 PM**

Day III

Thursday

19<sup>th</sup> of December 2013**Keynote Speech III**

Speaker: *Dr. Laurie Butgereit* - The Council for Scientific and Industrial Research (CSIR), South Africa

Title: **Doing Research in Mobile Education in the Developing World**Time: **9:00 – 10:30AM**Location: *Grand Ballroom*Chair: *Izzeldin Kamel***Coffee Break 10:30 - 11:00 AM****Paper Session 11:00 -1:00 pm**

Location: Churchill Hall		Location: Nile Hall		Location: Meeting Room 2		Location: Presidential Hall	
<b>Database System</b> Session Chairs: <i>Izzilden Osman</i> <i>Ali AlDaoud</i>		<b>Software Engineering</b> Session Chairs: <i>Ahmad Khasawneh</i> <i>Mohammed Radwan</i>		<b>Algorithm and Application</b> Session Chairs: <i>Osama Rais</i> <i>Nael Hirzallah</i>		<b>Image Processing</b> Session Chairs: <i>Hassan Ibrahim</i> <i>Ahmed AlNubi</i>	
PID	TITLE	PID	TITLE	PID	TITLE	PID	TITLE
120	A framework for component and aspect oriented programming in java <i>Batoul Hocine, Djamal Bennouar.</i>	142	Challenges Facing Small and Medium Enterprises for Implementing Software Process Improvement <i>Mohammed Merghany, Viju G K, Khalid Ahmed, Mohammed Jassim.</i>	54	Parametric expressive speech model from xml file using transitory emotions <i>Mahmoud Neji.</i>	36	Classifying Images by Canny Mask Segmentation and Laplacian Sigmas in Content Based Image Retrieval System <i>Ensaf ALZurqa.</i>
138	Geometric Transformation of User Queries in Information Retrieval on the Web <i>Aicha Aggoune, Abdelkrim Bouramoul, Mohamed Khireddine.</i>	143	Using Combinatorial Particle Swarm Optimization to Automatic Service Identification <i>Mohamed El Amine, Sidi Mohamed Benslimane.</i>	118	Mathematical Modeling and Technical Decision by using Fuzzy Method <i>Wail Mahmud Lafta Al-waely.</i>	114	Contrast Improvement of Chest Organs in Computed Tomography Images using Image Processing Technique <i>Yousif Abdallah, Magdolin Siddig.</i>
156	A New Multidimensional Model for the OLAP of Documents Based on Facets <i>Omar Khrouf, kaïs Khrouf.</i>	164	UsualSpace; Evolutive-Agents modeling and analysis <i>Mohamed Dbouk.</i>	149	A dynamic programming approach to document clustering based on term sequence alignment <i>Rafi Muhammad, Shahid Mohammad.</i>	122	Scaled Bayes Image Denoising Algorithm Using Modified Soft Thresholding Function <i>Sabahaldin A. Hussain Alqaisi.</i>
159	Using Nested Tables and Multi-pitch Adjusting in Harmony Search (NTMHS) to Solve Timetabling Problem in Object-Relational Model <i>Wadee Al-Qubati, Ammar Zahary, Abdulkadir Al-Abbadi.</i>	158	Comparison of The Workflow Management Systems Bizagi, ProcessMaker and Joget <i>Mohamed Abdelgader, Omer Dawood, Mohamedelhafiz Musa.</i>	176	Implementing The Classical Poker Method For Testing Randomness In Parallel With MATLAB <i>Wael Mohamed Fawaz.</i>	153	Real Time Finger Binary Recognition using Relative Finger-Tip Position <i>Asaduz Zaman, Md Zahidul Islam, Chil Woo Lee.</i>
170	New Distributed Research-Oriented Version Control System: Towards Total Traceability of Research Collaboration <i>Safa Taieb, Layth Sliman, benoit charroux, Yvan Stroppa, Fathelalem Fadlalla.</i>	155	Integrating AHP Application for Project Management <i>Waled Alzober, Abdul Razak Yaakub.</i>	181	Signature Verification System Based on Support Vector Machine Classifier <i>Ahmed Abdelrahman, Ahmed Abdallah.</i>		-

183	<b>Management of QoS and Data Freshness in Real-Time Data Warehouses using Feedback Control Scheduling</b> <i>Issam Hamdi, Emna Bouazizi, Jamel Feki.</i>	-	184	<b>Preparing Mathematics Teachers to Integrate ICT in Teaching using TPACK Framework</b> <i>Noha Omer, Izzeldin Osman, Johannes Cronjé.</i>	-
<b>Lunch Break 1:00 – 2:30 PM</b>					
<b>Closing Ceremony 2:30 –3:00 PM</b>					

## Schedule of **Tutorial** Sessions

No Tutorial	Tutorial Topic	Tutorial Presenter	Date & Time	Chair	Location
Tutorial I	<b>Performance Modeling of Database Systems</b>	<b>Dr. Rasha I. M. Osman</b> Imperial College London, UK	<i>Day II Wednesday 18-12 2:30 - 4:30 pm</i>	Mohammed Alam	Churchill Hall
Tutorial II	<b>Pattern recognition: can we learn something from computers?</b>	<b>Prof. David Martinus Joannes</b> Delft university of Technology, The Netherlands		Mahmoud Ali	Nile Hall
Tutorial III	<b>Cloud Computing: Architecture, Migration, Opportunities, Challenges and Best Practices</b>	<b>Mr. Mehdi Bahrami</b> University of California, Merced, USA		Yaser Hanafy	Grand Ballroom



### **Dr. Laurie Butgereit**

Dr. Laurie is the founder and driving force behind the "Dr Math" mobile mathematics tutoring project which has been running since 2007 in South Africa.

### **DOING RESEARCH IN MOBILE EDUCATION IN THE DEVELOPING WORLD**



Dr Math allows primary and secondary school pupils to obtain help with their mathematics homework from volunteer tutors using mobile technology on their cell phones using text based chat facilities. Since 2007, Dr Math has helped tens of thousands of school pupils with the help of hundreds of volunteer tutors. Although most of the volunteer tutors are also in South Africa there are a growing number of tutors in Ghana, United States, and Europe. In fact, if anybody wants to volunteer to help tutor mathematics over cell phones, just speak with Laurie after her talk today. In 2011, the Dr Math project received a "Technology in Government Award" in the category of ICT in Education from the United Nations Economic Commission for Africa. More recently, in November this year (just last month), Dr Math has been nominated as one of the world's top 100 "most inspiring social innovations using digital technology".

### **Abstract**

In this session the presenter will chat with the audience about "Doing Research in Mobile Education in the Developing World." You know, it's easy to research in mobile education in countries where there is high speed low cost Internet and a stable electricity supply. It is much more challenging to do research in mobile education and, actually, any mobile services including health or mobile government, in a region which has low bandwidth, intermittent connectivity and an electricity supply which is affected by thunderstorms and subject to overloading.

## **Prof. Robert P.W. Duin**

Dr. Duin is the main developer of PRTools, a toolbox for pattern recognition and contributed.

### **NON-EUCLIDEAN PROBLEMS IN PATTERN RECOGNITION**



Robert P.W. Duin received the Ph.D. degree in applied physics in 1978 from Delft University of Technology, The Netherlands, for a thesis on statistical pattern recognition. He is currently with the Faculty of Electrical Engineering, Mathematics and Computer Science of the same university.

During 1980-1990, he studied and developed hardware architectures and software configurations for interactive image analysis. After that he became involved with pattern recognition by neural networks. For many years he studied the design, evaluation, and application of algorithms that learn from examples, including neural network classifiers, support vector machines, classifier combining strategies, and one-class classifiers.

From 2000 he started to investigate alternative object representations for classification and he thereby became interested in dissimilarity-based pattern recognition. The significance of non-Euclidean representations for pattern recognition is at this moment his main research interest.

Dr. Duin is the main developer of PRTools, a toolbox for pattern recognition and contributed to the field with numerous journal articles and conference papers. He served in many editorial boards and co-chaired a number of conferences and workshops. He is a past-associate editor of the IEEE Transactions on Pattern Analysis and Machine Intelligence. He is a Fellow of the International Association for Pattern Recognition (IAPR). In 2006 he was the recipient of the Pierre Devijver Award for his contributions to statistical pattern recognition.

#### **Abstract**

Regularities in the world are human defined. The patterns in the observations are there because human experts define them and recognize them as such. Automatic pattern recognition tries to bridge human judgment with measurements made by artificial sensors. This is done in two steps: representation and generalization. Traditional object representations in pattern recognition, like features and pixels, either neglect possibly significant aspects of the objects, or neglect their dependencies and structure.

In this presentation human observations and recognition are reconsidered. The direct experience of dissimilarities between objects will be used as a basis. From this starting point pattern recognition systems can be defined in a natural way by pair wise object comparisons. This results in the dissimilarity representation for pattern recognition.

An analysis of dissimilarity measures optimized for performance shows that they tend to be non-Euclidean. The Euclidean vector spaces, traditionally used in pattern recognition and machine learning may thereby be suboptimal. We will show this by some examples. Causes and consequences of non-Euclidean representations will be discussed. It is conjectured that human judgment of object differences result in non-Euclidean representations as the entire objects, including their structure, is taken into account.

## **Dr. Hussein Suleman**

Hussein Suleman is an Associate Professor in Computer Science at the University of Cape Town.

### **THE D (IN ICT4D) IS FOR DEVELOPMENT**



Hussein Suleman is an Associate Professor in Computer Science at the University of Cape Town. His research is situated within the Centre for ICT for Development (ICT4D) and the Digital Libraries Laboratory. Hussein's main research interests are in digital libraries, ICT4D, information retrieval, cultural heritage preservation, Internet technology, high performance computing and computer science education. He has in the past worked extensively on architecture and interoperability issues related to digital library systems, with a growing emphasis on the relationship between low resource conditions and such architectures. This has evolved into a focus on ICT for development (ICT4D); this is a new research area in computer science that looks into the application of ICT to solve key developmental problems, as defined locally or by multinational agencies like the United Nations.

He completed his undergraduate degrees and MSc at the then University of Durban-Westville (now University of Kwazulu-Natal) and finished a PhD at Virginia Tech in 2002, in the area of component-based digital libraries. He actively advocates for Open Access in South Africa, and works closely with the Networked Digital Library of Theses and Dissertations (NDLTD), which promotes/supports the adoption of electronic theses and dissertations and generally digital libraries worldwide. He currently manages the South African ETD portal as well as the international ETD Union Archive. He collaborates with the Centre for Curating the Archive at UCT, developing software tools for preservation, dissemination and discovery for the Bleek and Lloyd and related collections. He is a member, representing South Africa, in the international Multilingual and Multifaceted Information Access EU collaboration project and the Citizen Cyberscience Centre, which focuses on volunteer computing for development.

#### **Abstract**

ICT for Development (ICT4D) is a relatively new field in computing that is loosely associated with research that benefits the developing world. Recently, this loose definition has been questioned because development is not clearly defined and has been redefined to suit a variety of research agendas. Some critics consider research in ICT4D to have far too much of an emphasis on the ICT and only a minor relationship with the D for development. This may be attributed to a lack of understanding or appreciation for developmental issues among ICT researchers. Clearly there is a need for reflection within the research and practitioner community.

This presentation will focus on the key issues and problems plaguing what are otherwise a noble and promising area of research. It will provide some thoughts on how to navigate the emerging minefield to eventually realise the original vision of ICT as an enabler for human/social development.

**Dr. Rasha I. M. Osman**

## **PERFORMANCE MODELLING OF DATABASE SYSTEMS**



Rasha Osman is currently a visiting Research Associate at the Department of Computing, Imperial College London where she is a member of the Analysis, Engineering, Simulation and Optimization of Performance Research Group. She received a PhD in Software Performance Engineering from the University of Bradford, UK (2010). Prior to that, she obtained an MSc (2001) and a BSc (1995) in Computer Science both from the Faculty of Mathematical Sciences, University of Khartoum, Sudan. Her research interests focus on studying the performance and scalability of self-tuning DBMS and cloud data stores using stochastic performance models. In addition, she had considerable industrial experience in designing and maintaining database systems in Sudan. She has published numerous papers on performance evaluation of database systems in international conferences and journals. Rasha is a recipient of the 2012 L'Oréal-UNESCO For Women in Science Pan Arab Regional Fellowship and the Schlumberger Foundation Faculty for the Future Fellowship (2011). She has served on the organization committee of several conferences and workshops and as a reviewer for international conferences and journals. She is a Fellow of the Higher Education Academy (UK), a Senior Member of the IEEE and a member of the IEEE Computer Society and the British Computer Society.

### **Abstract**

The Internet, mobile and scientific computing and the ubiquitous deployment of networking infrastructures have created the big data revolution. A large proportion of this data is stored in databases and is managed by database management systems. Performance of these systems is a critical issue linked to user satisfaction and/or revenue, especially in cloud environments. This tutorial will overview the contribution of the performance engineering community to modelling and analyzing the performance of database systems. We will start with an introduction to queuing theory and performance modelling. This will be followed by taxonomy of queuing network models of database systems in the literature. We will look into the accuracy of the modelling assumptions used in these studies in comparison to real database systems and workloads. Finally, we will overview current contributions to modelling concurrency control in relational database systems.

## **Prof. David Martinus Joannes**

Professor David M.J. Tax is assistant professor in the Pattern Recognition Laboratory at the Delft University of Technology.

### **PATTERN RECOGNITION: CAN WE LEARN SOMETHING FROM COMPUTERS?**



[David M.J. Tax] studied physics at the University of Nijmegen, The Netherlands in 1996, and received Master degree with the thesis "Learning of structure by Many-take-all Neural Networks". After that he had his PhD at the Delft University of Technology in the Pattern Recognition group, under the supervision of R.P.W. Duin. In 2001 he promoted with the thesis 'One-class classification'. After working for two years as a Marie Curie Fellow in the Intelligent Data Analysis group in Berlin, at present he is assistant professor in the Pattern Recognition Laboratory at the Delft University of Technology. His main research interest is in the learning and development of detection algorithms and (one-class) classifiers that optimize alternative performance criteria like ordering criteria using the Area under the ROC curve or a Precision-Recall graph. Furthermore, the problems concerning the representation of data, multiple instance learning, simple and elegant classifiers and the fair evaluation of methods have focus. Good representation and suitable performance measures should not only lead to good classifiers, but should also help the user in understanding the problems that he is solving.

#### **Abstract**

Pattern recognition tries to formalize the recognition of objects. What s seemingly very easy for humans, like the recognition of a face, a handwritten piece of text or a song, appears to be hard to do automatically by a computer. An essential step in the development of a pattern recognition system is the use of example data: objects for which a human expert or another (typically expensive) experimental setup supplies the desired output label. With the given labelled examples, many pattern recognition systems have been successfully developed. The success of pattern recognition is so large, that it is also applied to areas where the classification is very hard, even for experts. Now the question arises if it would be possible that an expert can learn something from a well-performing pattern recognition system? Can a human learn something from a pattern recognition model? this tutorial gives a basic introduction to the field of pattern recognition, dealing with representation, generalization and evaluation. It will discuss issues on the complexity of classifiers, and the interpretability of the outcomes and the pattern recognition models.

**Mr. Mehdi Bahrami**

**CLOUD COMPUTING: ARCHITECTURE, MIGRATION, OPPORTUNITIES, CHALLENGES AND BEST PRACTICES**



Mehdi Bahrami is affiliated to University of California, Merced. He is one of the Senior Software Analyst in Lian Processor Co. He was also a lecturer of Computer Science. Mehdi has published several technical papers in the areas of grid computing systems, distributed computing systems, software architecture in particular for cloud computing systems. He was a Coeditor-in-Chief, editor, reviewer of different international Computer Science journals and Springer journals. He was on the Technical Editorial Boards of several IEEE and computer science international conferences. Mehdi has a strong experience on software engineering and developing software application for different platforms, such as Web based systems,

Microsoft Windows based systems and Android based systems. He is also a pioneer of Cloud Template Architecture. His research interest includes Software Architecture, Cloud Software Architecture, Cloud Computing Systems, Grid Computing Systems and Software Engineering.

**Abstract**

Software architecture has emerged as an important sub-discipline of software engineering; particularly in the realm of the large system development such as cloud computing systems. Cloud computing systems are constructed from many components, the organization of the overall system and the software architecture presents a new set of design problems. This level of design has been addressed in high-level design for developing any application in a cloud computing systems. In this tutorial we provide an introduction to the emerging field of cloud computing software architecture. We begin by considering of what means of architecture and cloud computing systems, why we need software architecture for cloud computing systems as a complex system, our motivation for study and research about software architecture, facts, goals, a number of common architectural styles upon which many systems are currently based and show how different styles can be combined in a single design. In this tutorial, we highlight some of the major problems and how people have an opportunity to persuade their innovations in this field. After that we will consider some issues in designing cloud computing architectures and selecting appropriate supporting technology. Then we present three case studies to illustrate how architectural representations can improve our understanding of cloud computing software systems. Finally, we survey some of the outstanding problems in the field, and consider a few of the promising research directions.

# **PAPER ABSTRACTS**

13

### Global Analysis on Subconscious Feature Applied to Emotional BDI Architecture

*Benlazaar Sid Ahmed, Algeria*

**Abstract:** Emotions are the foreground of subconscious interaction, which gives human action-reaction more efficiency. Translation to intelligent agent can give an important influence on the realistic human behaviour of an agent-agent interaction, so that the decision making becomes a correlated architectural construction between Intelligence Quotient (IQ) and Emotional Quotient (EQ). This paper will be an extension of previous works in the area of emotional BDI (EBDI) to the subconscious feature.

**Keywords:** Emotions, Realistic human behaviour, subconscious architecture.

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28

### Redesign of Bellman-Ford Shortest Path Algorithm

*Ahmed Musa, Sudan*

**Abstract:** This This paper presents redesigns of Bellman-Ford Shortest Path algorithm. Bellman-Ford algorithm performs  $(|V|-1)$  scans over the list of edges to relax them, it has no cases. The redesigned algorithms perform only one scan in the best case and  $(|V|-1)$  scans in the worst case. The paper also shows that Bellman-Ford and its redesigns can be modified to compute point to point shortest paths.

**Key words:** Loop invariant, breadth first search, Dijkstra, bidirectional search.

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33

### A Transform Based 3D- Speech Scrambling Using Multi-Wavelet: Design and Evaluation

*Hana'a M. A. Salman, Iraq*

**Abstract:** Generally, in real time communication systems such as telephone, analogue radio, the means for assurance "end-to-end" security for speech is needed such as encryption. The techniques for speech encryption are either analogue scrambling or digital encryption, implemented in time domain or frequency domain, in one or two dimensional, also a combination of techniques are used. This paper presents the designed and evaluated of a three dimensional transformed speech scrambling system based on applying FFT in Galois Field "N" to the coefficients resulting from 3D multi-wavelet transforms. The proposed scrambling system consists of three main branches: sender, receiver and noisy channel. The subjective and objective tests were accomplished to investigate the residual intelligibility and the recovered speech quality under different channel conditions. The results depict that the proposed design technique is a promising way for speech scrambling, to guarantee the privacy of speech communication systems.

**Keywords:** Speech Scrambling, multi-wavelet, residual intelligibility.

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35

### Persistent Scheduler Based Call Admission Control for Long Term Evolution (3GPP) Networks

*Vijay Franklin and Paramasivam K, India*

**Abstract:** This In this paper, we propose to design a call admission control algorithm which schedules the channels for Real time and non-real time users. In Long Term Evolution (LTE) 3GPP Networks, several works were done on call admission control but these works rarely considers scheduling of resources to the real time and non-real time users. When the system meets traffic oriented performance degradation, maximum resources are utilized for load balancing and to maintain the consistent quality. In order to avoid the channel degradation and improve the Quality of Service (QoS), the call requests are classified into New Call (NC) request and Handoff Call (HC) request and the type of services are classified as VoIP and video. Then based upon the Received



Signal Strength (RSS) value, the channel is estimated as good channel or bad channel. Resource allocation is made for VoIP users based on traffic density. Then non-VoIP users and the non-real time users are allocated resource blocks using the channel condition based marginal utility function. When there are no sufficient resources to allocate, it allocates the resources of bad channel users there by degrading their service. We have designed the network topology with  $G(n)$  and  $B(n)$  for representing the available good and bad channels. We investigate the performance degradation when the real time, Non real Time, video and VOIP environments based on RSS threshold value. Comparison is made with the VOS in terms of the parameters like throughput, bandwidth, delay, fairness and rate. our proposed method provides good performance and quality. From our simulation results we show that this admission control algorithm provides channel quality and prioritizes the handover calls over new calls which allocates resources to all kinds of users.

**Keywords:** CBR, CAC, LTE, QoS.

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36

### **Classifying Images by Canny Mask Segmentation and Laplacian Sigmas in Content Based Image Retrieval System**

*Ensaf A. ALZurqa, Yemen*

**Abstract** - Content-based image retrieval draws many of its methods from the field of image processing and is regarded by some as a subset of that field. It differs from these fields principally through its emphasis on the retrieval of images with desired characteristics from a collection of significant size. "Content-based" means that the search will analyse the actual contents of the image. The term 'content' in this context might refer colors, shapes, textures, or any other information that can be derived from the image itself. Without the ability to examine image content, searches must rely on metadata such as captions or keywords, which may be laborious or expensive to produce. In this paper, we work on specific "eggs" by using different laplacian sigmas and canny mask, to retrieve the images from the data base that are related to the original one. The main objectives of our work are classifying an image as belonging to a specific category and retrieving images that are similar to database by showing statistical results of the different sigmas values in our CBIR system.

**Keywords:** Enhancement procedures, image adjustment, canny mask segmentation, image analysis, laplacian sigmas

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50

### **K Semantics for Dynamic Software Architectures**

*Sahar Smaali, Aicha Choutri and Faiza Belala, Algeria*

**Abstract:** Recently, several research works propose multi formalisms based models to define rigorously the static and dynamic concepts of software architecture. Further, these models are used to assess the architectural quality and to predict final system characteristics. The objective of this paper is to address both structural and behavioural viewpoints, involved in software architecture specification, with a unique formal model. Our contribution is twofold; on the one hand, it gives an operational semantics definition based on rewriting logic, to the architecture structural constructs and their behaviour actions. On the other hand, we define a transparent ADL-Maude translation. Thus, the resulting Maude architectural specification is executable and analyzable even if the code is unfamiliar to the user.

**Keywords:** Architecture Description Language, Behavior, Operational semantics, Maude, K-Framework, Model checking.

## A Hierarchical Fusion Strategy based Multimodal Biometric System

*Youssef Elmir, Zakaria Elberrichi and Réda Adjoudj, Algeria*

**Abstract:** Biometric performance improvement is a challenging task. In this paper, a hierarchical strategy based on multimodal biometric identification systems is presented. This strategy relies on a combination of several biometric traits using a multi-level biometric fusion hierarchy. The multi-level biometric fusion includes a pre-classification fusion with optimal feature selection and a post-classification fusion based on the similarity of maximum of scores. The proposed solution enhances biometric recognition performances based on suitable feature selection and reduction such as principal component analysis (PCA), as much as not all of the feature vectors components support the performance improvement degree.

**Keywords:** Multimodal biometric fusion, hierarchical fusion, PCA.

## Mathematical Relationship between External Events in Real-Time Systems and Errors Generated In These Systems

*Hamid Saghir Saad Al-Raimi and Jamil Abdulhamid Moh'd Saif, Yemen*

**Abstract:** Real-time operating systems are basically designed to work with a very high efficiency as well as in critical environments which require a fast response to external events according to their specific time without any delay. Real-time operating systems depend on time as a basic and important parameter, the systems' inability of fast response to events and their execution within a strict determined time is regarded as an acceptable, where such systems were designed to function with high reliability to fulfil the real-time's restrictions. Errors that may happen to these systems might lead to a huge loses either human or material, so time-limit of the external events' response is very restricted, but the delay of speed response due to the work's nature of these systems remains always possible, causing occurrence of errors. Due to the complexity that accompany the work of these systems, this paper focus on demonstrating the relationship between the external events and the generated errors of these systems as well as interpreting it mathematically, knowing that relation is regarded as of a great importance issue. If the allowed errors went beyond the limits the system would lose its real-time feature, as a result disqualifying it of being a real-time system, because these systems were basically designed to work in positions of great importance that never allow errors to occur, such as power generation stations, nuclear reactors and so on.

**Keywords:** Real-Time System, Characteristic Function, errors in Real-time Systems, Inverse Fourier Transform, Exponential Distribution, Dead Lines, Multi Tasking and Multi Threading

### العلاقة الرياضية بين الأحداث الخارجية في أنظمة الزمن الحقيقي والأخطاء المتولدة في هذه الأنظمة

**الملخص:** نظم التشغيل في الزمن الحقيقي مصممة في الأساس للعمل بكفاءة عالية جداً و في بيئات حرجة جداً، البيئات التي تعمل فيها هذه الأنظمة تتطلب سرعة الاستجابة للأحداث الخارجية وفقاً للزمن المحدد لها بدون تأخير. تعتمد نظم التشغيل في الزمن الحقيقي على الزمن كوسيط هام وأساسي، ويعد عدم قدرة هذه النظم على سرعة الاستجابة للأحداث و تنفيذها في الزمن المحدد لها من أهم الشروط للعمل في الزمن الحقيقي. إن الأخطاء التي يمكن أن تحدث في هذه الأنظمة قد تسبب خسائر مادية و بشرية كبيرة. لذا فإن تجاوز الحدود الزمنية في الاستجابة للأحداث الخارجية من قبل أنظمة الزمن الحقيقي خصوصاً الأحداث الحرجة منها أمر غير مقبول. لكن التأخير في سرعة الاستجابة للأحداث بسبب طبيعة عمل هذه النظم يضل أمر وارد، الأمر الذي يترتب عليه حدوث أخطاء. بسبب التعقيدات التي ترافق عمل هذه الأنظمة يركز البحث على كشف العلاقة بين الأحداث التي تأتي للنظام من الخارج وكذا الأخطاء التي تتولد في هذه الأنظمة وتفسير هذه العلاقة بطرق رياضية. إن معرفة العلاقة بين الأحداث الخارجية التي تأتي للنظام وبين الأخطاء التي قد تسبب في فشل النظام أمر بالغ الأهمية. لأن هذه الأخطاء إذا تجاوزت الحدود التي يسمح بها النظام، يفقد النظام خصائص العمل في الزمن الحقيقي. و بفقدان هذه الخصائص يصبح النظام غير مؤهل للعمل في الزمن الحقيقي لأن هذه الأنظمة صممت في الأساس للعمل في مواقع بالغة الأهمية كمحطات توليد الطاقة، و المفاعلات النووية و غيرها من الأماكن الهامة التي لا تسمح بحدوث أخطاء.

### A Novel Mechanism for Securing Cloud Computing

*Yasir Abdelgadir Mohamed, Sudan*

**Abstract:** As more and more information on individuals and companies are placed in the cloud, concerns are beginning to grow about just how safe an environment it is. Despite of all the hype surrounding the cloud, enterprise customers are still reluctant to deploy their business in the cloud. However, security has always been seen as the biggest barrier to putting applications in the cloud<sup>2</sup>. In cloud computing, the data and applications are hosted across various servers that together constitute the cloud. For the user to access these programs or data, they need to be transmitted from server to server and finally to the user. While this transmission happens, it is possible for an intruder to gain unauthorized access. Also, in cloud computing, unlike in a secure network where access from outside the network can be completely prohibited, anybody with an access to the credentials can login from anywhere over the Web.

**Keywords:** Security, cloud computing; tracing protocol.

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### Applying Model Driven Architecture Approach to Develop Software Systems – Case Study

*Mohammed Abdalla Osman Mukhtar, Sudan*

**Abstract:** Model-Driven Architecture (MDA) has been initiated by Object Management Group (OMG) as a new approach to design and develop a complex system. Some developers argue that this approach is still relatively unripe and still need more supporting tools to become mature enough. In this paper, we try to convince those opponents by applying MDA approach in specific case study to proof that MDA has become most preferable technique to develop or reengineer a wide range of software products. The idea behind MDA is both simple and grand, because it is trying to decouple the definition of application systems functionality from technology platform that run on. The objective from this decoupling is to ensure that the functionality of the system can be preserved even there is changing affect the underlying technology platform. We also highlight the most important steps taken to generate the code from high level and low level system abstraction using formal models, excluding the last step which is delegated to generate the code from the last generated model. Case study provided to support the possibility of developing a complete software system using only OMG asset tools. Experiences learned from this case study can be applied to all similar cases.

**Keywords:** MDA, PIM, PSM, QVT, Mapping Specification, Model Transformation.

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### Towards a Framework for the Curricula of Information Systems in the Arab Universities

*Suleiman Hussein Mustafa, Jordan*

**Abstract:** The purpose of this study was to investigate the current status of IS curricula in the United States (USA) and the Arab countries of the Middle East (ME) and, based on the results, to propose a general framework for designing or evaluating IS curricula. Forty IS programs were covered in this study, twenty from the USA and twenty from the ME. The curricula of these programs were analyzed and categorized on the basis of the knowledge areas covered by the core courses. Descriptive statistics were used for seeking similarities and differences between these programs. The results have shown common patterns across IS programs in the USA, while wide variation exist in the IS curricula in the ME. However, a general pattern seem to characterize the curricula of the IS programs covered in the study which has been used to propose a general framework. The framework presents a set of general guidelines, specifies the knowledge areas that make up the backbone of the IS curriculum, and suggests a list of core courses that appear to have some consensus among the majority of programs, and a list of elective IT-related courses.

**Keywords:** Information Systems, IS Education, IS Undergraduate Programs, IS Curricula.

### Hash Algorithm for Data Integrity based on Matrix Combination

*Rushdi Hamamreh, and Jamoos M., Palestinian*

**Abstract:** In this paper, we propose a secure Hash Algorithm with the focus on *Data Integrity*. A hash function, is a function that takes some message of any length as input and transforms it into a fixed-length output called a hash value, in DILH the hash value length 1152 bits. Many types of hash functions have been defined but, the most widely used in many of the cryptographic applications currently are hash functions based on block ciphers. This algorithm based on linear combination of matrices to find non-invertible matrix, that takes advantage about of the compact representation of a set of numbers in a matrix and strong collision resistance.

**Keywords:** Hash function, Collisions, one-way cryptography, DILH, non-invertible matrix.

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### From UML 2.0 Interaction Fragments to PROMELA Code Using A Graph Transformation Using AToM3

*Abdelkrim Amirat, Algeria*

**Abstract:** A main challenge in software development process is to bring error detection to first phases of the software life cycle. The Verification and Validation (V&V) of UML diagrams is of interest in a number of applications such as detecting flaws at the design phase for software security, where it is crucial to detect security flaws before they can be exploited. In this paper, we propose an approach using a transformation tool to create a PROMELA code based model from UML interactions expressed in sequence diagram to use in SPIN model checker to simulate the execution and to verify properties written in Linear Temporal Logic (LTL). Graph transformation is used as an approach of model transformation to propose a graph grammar for the translation using AToM3 tool.

**Keywords:** UML2.0, Sequence diagram, Graph transformation.

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### Speech Compression based on Psychoacoustic Model and A General Approach for Filter Bank Design using Optimization

*Mourad Talbi, Chafik Barnoussi and Cherif Adnane, Tunisia*

**Abstract:** In this paper we propose a new speech compression technique based on the application of a psychoacoustic model combined with a general approach for Filter Bank Design using optimization. This technique is a modified version of the compression technique using a MDCT (Modified Discrete Cosine Transform) filter banks of 32 filters each and a psychoacoustic model. The two techniques are evaluated and compared with each other by computing bits before and bits after compression. They are tested on different speech signals and the obtained simulation results show that the proposed technique outperforms the second technique and this in term of compressed file size. In term of speech quality, the outputs speech signals of the proposed compression system are with good quality. This is justified by SNR, PSNR, NRMSE and PESQ computation.

**Keywords:** speech compression, psychoacoustic model, Filterbank Design, optimization, bits before/bits after compression

### Centroid-Based Arabic Classifier

*Abduelbaset Goweder, Mohummed Elboashi and Ali Elbekai, Libya*

**Abstract:** Nowadays, enormous amounts of accessible textual information available on the Internet are phenomenal. Automatic text classification is considered an important application in natural language processing. It is the process of assigning a document to predefined categories based on its content. In this paper, the well-known Centroid-based technique developed for text classification is considered to be applied on Arabic text. Arabic language is highly inflectional and derivational which makes text processing a complex and challenging task. In the proposed work, the Centroid-based Algorithm is adopted and adapted to be applied to classify Arabic documents. The implemented algorithm is evaluated using a corpus containing a set of Arabic documents.

The experimental results against a dataset of 1400 Arabic text documents covering seven distinct categories reveal that the adapted Centroid-based algorithm is applicable to classify Arabic documents. The performance criteria of the implemented Arabic classifier achieved roughly figures of 90.7%, 87.1%, 88.9%, 94.8%, and 5.2% of Micro-averaging recall, precision, F-measure, accuracy, and error rates respectively.

**Keywords:** Arabic Text Classification, Machine Learning, Text Mining, Centroid-based Algorithm.

### Contrast Improvement of Chest Organs in Computed Tomography Images using Image Processing Technique

*Yousif Abdallah and Magdolin Siddig, Sudan*

**Abstract:** Image enhancement allows the observer to see details in images that may not be immediately observable in the original image. Image enhancement is the transformation or mapping of one image to another. The enhancement of certain features in images is accompanied by undesirable effects. We proposed that to achieve maximum image quality after denoising, a new, low order, local adaptive Gaussian Scale Mixture model and median Filter were presented, which accomplishes nonlinearities from scattering a new nonlinear approach for contrast enhancement of soft tissues in CT images using both clipped binning and nonlinear binning methods. The usual assumption of a distribution of Gaussian and Poisson statistics only lead to overestimation of the noise variance in regions of low intensity (small photon counts), but to underestimation in regions of high intensity and therefore to non-optimal results. The contrast enhancement results were obtained and evaluated using MatLab program in 50 CT images of the chest and abdomen from two CT studies. The optimal number of bins, in particular the number of gray-levels, is chosen automatically using entropy and average distance between the histogram of the original gray-level distribution and the contrast enhancement function's curve.

**Keywords:** Contrast Improvement, Chest Organs, Computed Tomography and Image Processing Technique

### Explanations in Recommender Systems: Overview and Research Approaches

*Mohammed Z. Al-Taie, Iraq*

**Abstract:** Recommender systems are software tools that supply users with suggestions for items to buy. However, it was found that many recommender systems functioned as black boxes and did not provide transparency or any information on how their internal parts work. Therefore, explanations were used to show why a specific recommendation was provided. The importance of explanations has been approved in a number of fields such as expert systems, decision support systems, intelligent tutoring systems and data explanation systems. It was found that not generating a suitable explanation might degrade the performance of recommender systems, their applicability and eventually their value for monetization. Our goal in this paper is to provide a comprehensive review on the main research fields of explanations in recommender systems along with suitable examples from literature. Open challenges in the field are also manifested. The results show that most of the

work in the field focus on the set of characteristics that can be associated with explanations: transparency, validity, scrutability, trust, relevance, persuasiveness, comprehensibility, effectiveness, efficiency, satisfaction and education. All of these characteristics can increase the system's trustworthiness. Other research areas include explanation interfaces, over and underestimation and decision making.

**Keywords:** Recommender Systems, Explanations, Explanation Styles, Explanation Attributes, Decision Making, Research Approaches.

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122

### **Scaled Bayes Image Denoising Algorithm using Modified Soft Thresholding Function**

*Sami M. A. Gorashi, KSA*

*Sabahaldin A. Hussain, Sudan*

**Abstract:** Image denoising is an active area of research and probably one of the most studied problems in the image processing fields. In this paper, a new adaptive threshold estimation and thresholding function are proposed for image denoising in wavelet domain. The proposed threshold estimation includes the effect of image subband bit size at each decomposition level in the calculation of the Bayesian based threshold value. The proposed thresholding function uses exponential weight to shrink the noisy coefficients. The experimental results show that the performance of the proposed denoising algorithm is superior to that of the conventional wavelet denoising approaches.

**Keywords:** Wavelet transform, Thresholding function, Image denoising.

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132

### **Extreme Programming: Strengths and Weaknesses**

*Ahmad Dalalah, SA*

**Abstract:** Extreme Programming (XP) is an agile software development methodology. It is a lightweight methodology combining a set of existing software development practices.

This paper aims to discuss the strengths and weaknesses of the Extreme Programming methodology through examining the characteristics of the twelve software development practices of the XP methodology.

**Keywords:** Extreme programming, Release, Exploration Phase, System Metaphor

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133

### **Multimedia Education System for Deaf and Hear Impairment Children**

*Nour Eldin Elshaiekh, B. Mursi, and M. Hussein, Sudan*

**Abstract:** The deaf and impairments students always facing problem of communicating with their teachers and colleagues which may affect negatively in their education and attitudes, there must be any kind of tool to facilitate and enhance the education components for them. Multimedia Education System for Deaf and Hear Impairment Children is application system designed to help a learning media for that kind of children (3-5 Years) to understand the basics of language, math, etc... Taha Talaat Center (TTC) is the case we used and it is one of Al-amal schools for deaf and dumb education in Khartoum, Sudan. In schools they use traditional ways that is not attractive and don't improve child's Intelligence and there's no specialist teachers to teach this kind of children and our system project will provide modern ways to teach and improve child's intelligence by using computerized games and to be more attractive by using multimedia like images, videos, animations etc. Dark Basic Professional and 3D MAX, Photoshop, Fps creator, movie maker, 3d world studio were used to build and implement the system. By using this system children will be more efficiency and more intelligence, help teachers and families to teach the children by easy way.

**Keywords:** Multimedia Education System, Education of Deaf and Hear Impairment children, sign language.

### Formal Development of Reconfigurable Manufacturing Systems

*Laid Kahloul and Allaoua Chaoui, Algeria  
Karim Djouani, France*

**Abstract:** Reconfigurable Manufacturing Systems (RMS) allows the system to update itself in order to treat new requirements or to avoid accidental damages. This reconfiguration offers more efficiency and power to manufacturing systems. However reconfigurability brings new challenges to designer and developers of this kind of systems. Insuring the reliability of the system will be a hard task. The use of formal methods is a solution to prove correctness and so to satisfy the reliability question. In the present work, we are interested in the use of high level Petri nets (Reconfigurable Object Nets) to specify reconfigurations in reconfigurable Manufacturing Systems (RMS). This high level formal tool allows catching the dynamicity aspect inherent to RMS, to simulate their behaviour, and to verify their properties.

**Keywords:** Reconfigurable Manufacturing Systems, Formal specification, Graph transformation, High level nets, Reconfigurable Object Nets

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### Social Web Services Development Based on MDA: Extending WSDL to Inject Social-QoS

*Hichem Bouchakour Errahmani and Sidi Mohammed Benslimane, Algeria*

**Abstract:** Injecting social networks principles into service oriented architecture falls into our research work on social Web services. This paper will focus on social Web services design and development by examining the description, discovery, and binding specifications of Web services from a social perspective. We look at approaches that adopt models to represent systems. Models may also be transformed into other models and the transformation itself is a model. Model-driven architecture is free of social elements that could be taken into account in the process of design systems. This raises questions about the appropriateness of model-driven architecture for social Web services design and development, unless proper actions are carried out to enhance model-driven architecture with appropriate means. In this paper we address the following list of issues: how are social aspects of services identified, represented, and structured in a model, how to specify a service joining a social network, how to transform social models into implementation models (e.g., SWSDL for Social WSDL), how to provide an automatic tool for this transformation?

**Keywords:** Web Service, Social Network, Model Driven Architecture.

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### Using Combinatorial Particle Swarm Optimization to Automatic Service Identification

*Mohamed El Amine Chergui and Sidi Mohamed Benslimane, Algeria*

**Abstract:** Service Oriented Architecture (SOA) has become one of the most suitable choices to ensure flexibility of the information system. But despite the consensus on the benefits of this type of architecture there are divergences in the approach to be followed for the development of this architecture. However, it is recognized that the success of a project based on service-oriented architecture requires proper services identification. Existing Service identification approaches are often prescriptive and based on the architect's experience thus could result in non-optimal designs which results in complicated dependencies between services. In this paper, an automated approach for identifying business services has been proposed by adopting several design metrics based on top-down decomposition of processes. This approach takes a business processes as input and produces a set of business services using a multi-objective combinatorial particle swarm optimization algorithm. The experimentation results denote that our approach achieves faster results and better performance.

**Keywords:** Service Identification, Combinatorial Particle Swarm Optimization, Service Oriented Architecture, Business Process Modeling.

### Eye Detection and Iris Center Tracking with Eyelashes Occlusion Correction

*Md Sohel Rana, Md Abdul Awal and Md Zahidul Islam, Bangladesh*

**Abstract:** Eye detection and iris center tracking is one of the most challenging problems in computer vision area. In this paper, we propose a new method for eye detection and iris center tracking with removing eyelashes occlusion. To do so firstly, we detect the face region using Haar classifier. Eyes region is detected by vertical and horizontal edge information. For accurate measurement of iris center, the intensity of the detected eye sub image is scaled. Otsu thresholding method is used for extracting binarization of eye sub image. Then, exact iris contour has selected from two largest iris contour candidates. Finally, ellipse fitting method is applied in the selected iris contour. The center of the ellipse will be the center of iris. A center correction method also has been explained for correction of the inaccurate center detection due to thick patched lower intensity eyelashes with iris.

**Keywords:** Iris center, Edge maxima searching, Intensity scaling, Ellipse fitting, Eyelashes occlusion

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### A Dynamic Programming Approach to Document Clustering based on Term Sequence Alignment

*Muhammad Rafi and Mohammad Shahid Shaikh, Pakistan*

**Abstract:** Document clustering is unsupervised machine learning technique that, when provided with a large document corpus, automatically sub-divides it into meaningful smaller sub-collections called clusters. Currently, document clustering algorithms use sequence of words (terms) to compactly represent documents and define a similarity function based on the sequences. We believe that the word sequence is vital in determining the contextual information of a document. A frequent sequence, maximal sequence or multi-word sequence cannot alone give good contextual information. These sequences can affect the local similarity computation and can compromise the accuracy of the final clusters. Motivated by this, we propose in this paper a dynamic programming approach to document clustering based on term sequence alignment. There are three main contribution through this research: (i) a document representation model is proposed based on sequence of term used, (ii) a similarity measure is defined that uses term sequence alignment score to assign relatedness for a pair of documents, and (iii) a dynamic programming based hierarchical agglomerative clustering (HAC) algorithm is proposed to cluster the documents. Moreover, the closely related works, (a) Frequent Itemset-based Hierarchical Clustering (FIHC) and (b) Text document clustering based on frequent word meaning sequences (CFWS) are extensively evaluated in comparison of proposed algorithm, on classical text mining datasets. The proposed algorithm significantly improves the quality of the clusters produced and is comparable to state-of-the-art text/document clustering algorithms.

**Keywords:** Document clustering, sequence alignment, dynamic programming, algorithm design

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### Real Time Finger Binary Recognition using Relative Finger-Tip Position

*Asaduz Zaman, and Md Abdul Awal, Bangladesh*  
*Chill Woo Lee, South Korea*  
*Md Zahidul Islam, Bangladesh*

**Abstract:** In this paper, we propose a method to recognize real time Finger Binary number shown by hand gesture using relative finger-tip position using procedural and logical way. Using relative finger-tip position knowledge, the process will be able to identify binary sequence of finger-tip positions making a way to recognize hundreds of finger-gestures using only two hands. The proposed method uses a color based segmentation to identify skin area from image frames and connected component detection to detect hand region. The experimental results show that the process is able to recognize finger binary with a satisfactory accuracy.

**Keywords:** Finger binary, Relative finger-tip position, color based segmentation, connected component



### **Integrating AHP Application for Project Management**

*Waled Alzober, Libya*

*Abdul Razak Yaakub, Malaysia*

**Abstract:** Project management considers theme as the most vibrant and dynamic multi-disciplinary. Project management includes situations of decision making that are complex, thus the discerning methods to make a sound decisions are required. AHP has been used as a managerial decision tool in many industries. For most cases in project management, AHP has been used as a standalone methodology. In an attempt to extend the use of integrated AHP applications to areas that regarding to project management issues, this paper aims to introduce the integrated AHP application for dealing with project management issues. Combined AHP with some meta-heuristics approaches will be suitable to solve the problem related of the project management.

**Keywords:** Decision support system; Multi Criteria Decision Making; Project management; Analytical hierarchy process; Neural Network; Tendering Processes.

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### **A New Multidimensional Model for the OLAP of Documents based on Facets**

*Omar Khrouf, Kais Khrouf and Jamel Feki, Tunisia*

**Abstract:** The OLAP (On-Line Analytical Processing) systems provide a multidimensional analysis of voluminous databases by generating a synthetic vision of data. Several studies have focused on the application of these OLAP techniques on structured and semi-structured data, and more specifically XML documents. In this context, we propose a new multidimensional model for the OLAP of XML documents. The proposed model is based on a combination of different standard facets extracted from documents in order to provide more opportunities of analyses for decision makers compared to the classical multidimensional models (star model, snowflake model and constellation model).The proposed model in this paper, said "CobWeb model" is a multidimensional model based on the star model, it is composed by a set of dimensions related to each other, each of which represents one facet.

**Keywords:** XML documents, Standard facets, OLAP, Multidimensional model

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### **Comparison of the Workflow Management Systems Bizagi, ProcessMaker, and Joget**

*Farh Mohamed Zeinelbdeen Abdelgader, Omer O. Salih Dawood and Musa Mohamed Elhafiz Mustafa, Sudan*

**Abstract:** This paper presents comparison study among three of the most famous Business Process Management Systems, Bizagi, ProcessMaker, and Joget. Bizagi is close source, while ProcessMaker and Joget are open source. The comparison framework has been developed based on the most features that needed to be interacted when developing workflow system. Simple business process has been used as case study that describes the online application for master applicants at modern Arab university. Systems have been developed using those tools. After that the comparison was done according to the framework. Finally the results are pointing according the given measurement. According to our framework and selected features the study found that the Bizagi has the best performance and the second is ProcessMaker. However, this by no means is a complete comparison. In business process modelling Bizagi outperforms the other tools. However in form aspects ProcessMaker and Joget outperform Bizagi.

**Keywords:** Bizagi, ProcessMaker, Joget, Workflow, BPM, comparison and performance

### Using Nested Tables and Multi-pitch Adjusting in Harmony Search (NTMHS) to Solve Timetabling Problem in Object-Relational Model

*Wadee Al-Qubati, Ammar Zahary and Abdualkadir Alabbadi, Yemen*

**Abstract:** In this paper, we conduct our novel approach called NTMHS that employs nested tables and multi-pitch adjusting in harmony search algorithm to solve timetabling problem in database object-relational model. Our approach examines the ability of object-relational model to provide structural storage, indexed and organized processing for query. In NTMHS, timetables are produced depending on structure of nested tables that effectively deal with multi-pitch adjusting within the algorithm of harmony search. NTMHS approach has been implemented and applied to a proposed model for semester-based course timetables of Computing and Information Technology Faculty at the University of Science and Technology. Results show that NTMHS idea led to overcome hard and soft constraints of timetabling process in an effective way, short time, and the absence of conflicts.

**Keywords:** Object relational modal, nested table, Harmony Search (HS), Timetabling, Multi-pitch Adjusting, New Harmony (NH), pitch Adjusting Rate (PAR), harmony memory (HM)

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### Predicting Stock Prices using Data Mining Techniques

*Qasem A. Al-Radaideh, Adel Abu Assaf and Eman Alnagi, Jordan*

**Abstract:** Forecasting stock return is an important financial subject that has attracted researchers' attention for many years. It involves an assumption that fundamental information publicly available in the past has some predictive relationships to the future stock returns. This study tries to help the investors in the stock market to decide the better timing for buying or selling stocks based on the knowledge extracted from the historical prices of such stocks. The decision taken will be based on decision tree classifier which is one of the data mining techniques. To build the proposed model, the CRISP-DM methodology is used over real historical data of three major companies listed in Amman Stock Exchange (ASE).

**Keywords:** Data Mining, Data Mining, Data Classification, Decision Tree, Future stock return, data mining techniques, decision tree classifiers, CRISP-DM methodology, Amman Stock Exchange.

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### UsualSpace; Evolutive-Agents Modelling and Analysis

*Mohamed Dbouk and Ihab Sbeit, Lebanon*

*Hamid Mcheick, Canada*

*Haytham Douaihy, Lebanon*

**Abstract:** This paper stands for an analytical approach modelling and exploring an evolutive usual-space. The space that we consider is intended to emerge heterogeneous evolutive business-agents (e.g. Factories, Hospitals, Sport-Centres, etc.). The space stimulates an analytical multi-layered structure where agents have multiple-states based on analytical characteristics (analytical dimensions), they are multidimensional and inter-dependable; they evolve, interact and transit. The approach aims to provide an analytical methodology that shows how agents evolve in space, how evolution triggers other agent's evolution, and provides solutions for analysis and predicting future state for "agents". Finally, key features that illustrate that we call "hyper-space navigational framework" basis and foundations are deeply exposed in this approach, and experimented with an instructive case study.

**Keywords:** Evolutive agents, Hyper-space modelling, Multi-State modelling, GIS-like frameworks, Business intelligence

### Simplified Online Signature Verification through Uncompromised Electrode Reduction in Data Gloves

*Andrews Samraj and Kalvina Rajendran, India  
Shohel sayeed, Malaysia*

**Abstract:** The signature verification through data glove signals has overheads of cost, time and complexity in data dimensions. A novel approach to reduce channels by prudently selecting the most essential channels will result in reduced cost, processing time and low level complexity. The reduction in electrodes should not compromise the accuracy and security. A continuous search to find the most significant channels helps distinguishing them from less contributing channels by various experiments. Here in this work the comparison of zone based channel groups were conducted to classify the SVD signal features through LDA and the performances of thumb zone based channels were found better than the little finger zone in contributing genuine features by the results obtained from various levels of experiments.

**Keywords:** Data gloves, Signature verification, Forgery detection, Wearable computing

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### Investigation of High Performance Schmitt Trigger at Nanoscale CMOS Technology

*Anshul Saxena, Akansha Shrivastava, Shyam Akashe and D. C. Chaurasia, India*

**Abstract:** In presented paper high performance Schmitt trigger circuit has proposed for wave shaping or cleaning process with low power consumption. Schmitt trigger is key component of communication system. We have configured Schmitt trigger using CMOS technology and in the CMOS device for achieving better performance so maintain the speed, power dissipation, size, reliability of the device, applying the different types of technique for reducing the power consumption like MTCMOS, VTCMOS, SVL, AVL on Schmitt trigger using cadence tool, simulation work has been done in 45 nm technology, in this technology power consumption (leakage power & active power), hysteresis width, propagation delay, transconductance have provided for Schmitt trigger circuit. AVL technique with 4T Schmitt trigger has given high efficiency in performance in comparison to other technique and enhance the parameters i.e. propagation delay (10.02 pW), leakage power (2.297 fW), active power (11.02 pW), hysteresis width (6.297 V), transconductance ( $20.12 \times 10^{-12}$  S), this type of circuit mainly use for low power processing systems.

**Keywords:** power analysis, cadence tool, Propagation delay, hysteresis width, transconductance, voltage gain.

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### ARSYPAR: A Tool for Parsing the Arabic Language based on Supervised Learning

*Nabil Khoufi, Souhir Louati, Chafik Aloulou and Lamia Hadrich Belguith, Tunisia*

**Abstract.** In this paper, we present a tool for parsing the Arabic language based on supervised machine learning. The used algorithm for the learning phase is the support vector machine. We also used the Penn Arabic Treebank as a learning corpus. Furthermore, we evaluated our parser following the cross validation method. The obtained results are very encouraging. We give at the end our vision to ameliorate the obtained results.

**Keywords:** Parsing system, Arabic Treebank, supervised Learning, Arabic language

### Implementing the Classical Poker Method for Testing Randomness in Parallel with MATLAB

*Wael M. F. Abdel-Rehim, Egypt*

**Abstract:** The problem of testing randomness is motivated by the need to evaluate of the quality of different random number generators used by many practical applications including computer simulations, cryptography, and communications industry. In particular, the quality of the randomness of the generated numbers affects the quality of such applications. In this paper we focus on one of the most popular approaches for testing randomness, Poker test. Two versions of Poker test are known: the classical Poker test and the approximated Poker test, where the latter has been motivated by the difficulties involved in implementing the classical approach at the time it is designed. Given a sequence of  $n$  random numbers to be tested, the basic Poker approach divides this sequence into groups of  $k=5$  numbers, observes which of the possible patterns is matched by each quintuple, computes the occurring probability of each of these patterns, and finally applies Chi-square test to check the randomness of such sequence. In [1], we showed that such approach can be implemented with no significant extra running time compared with the approximated approach. Motivated by certain applications we also implemented the Poker test with hands of four numbers ( $k=4$ ) instead of five, reducing the running time of the test [2]. Moreover we implemented the Poker test with hands of three numbers ( $k=3$ ) instead of four or five numbers, reducing significantly the running time of the test [3]. Furthermore we implemented the Poker test with hands of two numbers ( $k=2$ ), It was optimized for testing the randomness of sequences of sufficiently small sizes.

In this paper, motivated by certain practical applications such as cryptography and Monte Carlo simulation [7]. On the other hand, Pseudo-random numbers are often required for simulations performed on parallel computers [7]. We implement the classical Poker test in parallel with MATLAB using MEX-file with one, two, three and four threads and compare the performance. We show that the speedups of the implementation using two threads are close to three threads and both of them are greater than one thread. However, with four threads is significantly greater than one, two and three threads.

**Keywords:** Poker test, randomness, cryptography, secret keys, parallel random numbers test, Matlab Multithreading

### Signature Verification System Based on Support Vector Machine Classifier

*Ahmed Abdelrahman and Ahmed Abdallah, Sudan*

**Abstract:** The paper presents an off-line signature verification system using support vector machine technique. Global features are extracted from the signatures using radon transform. For each registered user in the system database a number of reference signatures are enrolled and aligned for statistics information extraction about his signature. Dynamic time warping algorithm is used to align two signatures. During support vector machine classifier training, a number of genuine and forged signatures are chosen. A test signature's verification is established by first aligning it with each reference signature for the claimed user. The signature is then classified as genuine or forgery, according to the alignment scores which are normalized by reference statistics, using standard pattern classification techniques. Using a database of 2250 signatures (genuine signatures and skilled forgeries) from 75 writers in the proposed signature verification system a performance of approximately 82% is achieved.

**Keywords:** signature verification, support vector machine, radon transform, dynamic time warping.

## Management of QoS and Data Freshness in Real-Time Data Warehouses using Feedback Control Scheduling

*Issam Hamdi, Emna Bouazizi and Jamel Feki, Tunisia*

**Abstract:** Today many organizations use data warehouse for strategic decision making. Today's real-time business stresses the potential to increasingly process volumes of data at a very high speed for competitiveness reasons. But the data warehouse must often deal with transient usage charges, due to the unpredictability of access to data. The purpose of this work is to maintain the behaviour of the Real-Time Data Warehouse (RTDWH) at a stable condition and reduce the number of transactions responsible for not meeting the deadline. In this paper, we propose an architecture called FCSA-RTDWH (Feedback Control Scheduling Architecture for Real-Time Data Warehouse). The main objectives of this approach are the following: guarantee the data freshness, enhance the deadline miss ratio even in the presence of conflicts and unpredictable workloads and, finally satisfy the requirements of users.

**Keywords:** —Real-Time Data Warehouse, Feedback Control Scheduling, Quality of service, Data freshness.

## إعداد معلمي الرياضيات لإدماج تكنولوجيا الاتصال والمعلومات في تدريسهم بناءً على إطار TPACK

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المعلم هو حجر الزاوية في العملية التعليمية، وإعداد المعلم الجيد المتمكن هو أحد مفاتيح تحقيق الغايات التعليمية والتي تتأثر بالتغيرات البيئية المحيطة. وفي هذا العصر، عصر ثورة التكنولوجيا والمعلومات، والذي أصبحت فيه التكنولوجيا هي الثابت المتغير في كافة المجالات أضحت موضوع إعداد المعلم يتأثر بمتغيرين هما: الإفادة من التكنولوجيا والتكنولوجيا المتطورة باستمرار.

تتناول هذه الورقة دراسة مسحية عن إعداد معلم رياضيات قادراً على الإفادة من التكنولوجيا مستوعباً لتطورها. ولتحقيق ذلك كان الاتجاه لإدماج التكنولوجيا تكاملياً مع محوري إعداد المعلم (المحور التربوي و المحور الأكاديمي). لذا اعتمدت هذه الدراسة على إطار TPACK (Technological Pedagogical And Content Knowledge) الذي يهتم بهذا التكامل.

تستعرض الورقة المعارف والمهارات اللازمة للمعلم بناءً على مكونات إطار TPACK السبعة، كمحور أساسي أول، وتشير خلاصة الدراسة عن هذا المحور إلى ضعف في تحقيق مبدأ الإدماج تكاملياً. حيث مثلاً التركيز على التكنولوجيا كغاية في ذاتها أو إدخال التكنولوجيا على النهج التقليدي. كما تشير إلى الحاجة إلى مراجعة الاستراتيجيات الحالية بشأن إعداد المعلمين. كما تستعرض الورقة كمحور أساسي ثاني بيئة الإعداد ومكوناتها، والتي تشير في خلاصتها إلى وجود عدة معوقات تؤثر في الإفادة من التكنولوجيا مثل أن المناهج الحالية والأساليب التقليدية في التعليم لا تدعم مهارات التعلم و كذلك عدم كفاية التدريب في الاستخدام التربوي للتكنولوجيا وصعوبة الوصول إلى التسهيلات التقنية.

## Security in Virtual Private Networks: A Review

*Yasir Mohamed and E. Osman, Sudan*

**Abstract:** Previously, the remote user who works from a remote area connection through a modem usual for an organization using telephone lines, the server and another modem exist in the organization to respond to the user's connection to doing his job and is closing the line after the completion of the process. Disadvantages of this way the cost of phone bills, rent lines, slow connection speed, in addition to the phone line works during the period of contact.

The problem with the aforementioned method is that communication via the internet makes the information vulnerable for violation, the connection is not secure it holds risk, consequently it was necessary to find an alternate solution to the security problems and for this was issued VPN for low cost and protection of information. For that a firewall is placed in these virtual private networks to exclude of internet surfers and prevented access to the server of organization, but through some of the computers, which are selected by the organization.

The goal is to protect the information through an encrypted tunnel data and also confirm the identity of the connected device through the firewall, which will not accept any strange connection.

**Keywords:** Security, Virtual Private Network, encryption.

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191

### **Extending the Technology Acceptance Model for Mobile Government Systems**

*Nisreen Beshir Osman, Sudan*

**Abstract:** Mobile government systems allow users, ranging from individuals to businesses and government institutions, to have convenient access to information and government services. However, being able to assess users' acceptance to mobile government systems is one of the challenges that faces the adoption of these systems. Systems providers need to know in advance that systems would be accepted by the intended users; otherwise all the development effort would be wasted. The Technology Acceptance Model (TAM) has been widely used to assess the acceptance of new technologies. However, this model needs to be extended in order to accommodate the special nature of the mobile government systems. This paper proposes an extension to the Technology Acceptance Model (TAM) for mobile government systems based upon additional factors such as perceived ease of adoption, trust, and taking the system into use. The extended model also incorporates age, gender, education, mobile usage duration and profile as external variables in predicting system usage and acceptance. The paper also validates the model empirically based on a questionnaire that measures the constructs of the model and using a high fidelity prototype designed for Mobile-based Civil Registry System. The results showed strong positive correlations among all the studied constructs and therefore that all the constructs of the proposed Extended TAM (ETAM) are significantly positively related to predict users' acceptance of the mobile system. The results show furthermore that the most influential aspect on the future intention to use is the perceived value of the mobile system, and that the external variables of age and experience with the mobile system were proved not to be strong indicators of system use.

**Keywords:** Mobile Government Systems, User Acceptance, Technology Acceptance Model, TAM, ETAM.

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192

### **Biometry: Face Recognition Applying Logistic**

*Emir Kremic and Abdulhamit Subasi, Bosnia and Herzegovina*

**Abstract:** Artificial methods as pattern recognition, machine learning, and artificial neural network are used for facial recognition. In this paper we present a LMT where we have used following methods: extract skin color, and then converted into histogram values for performing LMT - logistic model tree. LMT is standard decision tree. The nodes of terminal are replaced with logic regression function. The accuracy of face recognition is 91%. We used histogram numerical values for performing supervised learning tasks for the prediction of nominal classes and numerical values. Here is presented LMT which adopts the idea of classification problems using logistic regression. We have run algorithm from our dataset.

**Keywords:** Face recognition, LMT, biometric security.

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194

### **Challenges of Computer Crime Investigation in North Africa's Countries**

*Mohamed Sarrab, Sultanate of Oman*

*Hamza Aldabbas, Jordan*

*Mahmoud Elbasir, UK*

**Abstract:** Computer crime is the use of information technology in any suspicious criminal activities. Recently, our life becomes increasingly depending on modern information technology; however, it becomes very important to improve the computer crime investigation procedure especially in cases of processing very

important and sensitive information such as government and military intelligence, banking information or personal private information. Cybercrime investigation helps detecting unauthorized access to any digital source information with the intent of modifying, destroying or stealing that digital data or information. Such suspicious actions can cause financial damages or important information loss; moreover, it might distribute or destroy high secret and private or confidential information. Therefore, this paper focuses mainly on highlighting the main challenges of the North Africa's countries (Libya, Tunis, Algeria, and Morocco) in computer crime investigation system by taking a look at the recent developments in the continent's Internet infrastructure and the need of information security laws in these particular countries.

**Keywords:** Computer Crime, Cybercrime, Computer Crime investigation procedure.

## AUTHOR INDEX

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<i>Abdelkrim Amirat, Algeria</i>	12
<i>Abdualkadir Alabbadi, Yemen</i>	18
<i>Abduelbaset Goweder, Libya</i>	13
<i>Abdul Razak Yaakub, Malaysia</i>	17
<i>Abdulhamit Subasi, Bosnia and Herzegovina</i>	22
<i>Adel Abu Assaf, Jordan</i>	18
<i>Ahmad Dalalah, SA</i>	14
<i>Ahmed Abdallah, Sudan</i>	20
<i>Ahmed Abdelrahman, Sudan</i>	20
<i>Ahmed Musa, Sudan</i>	8
<i>Aicha Choutri Algeria</i>	9
<i>Akansha Shrivastava, India</i>	19
<i>Ali Elbekai, Libya</i>	13
<i>Allaoua Chaoui, Algeria</i>	15
<i>Ammar Zahary, Yemen</i>	18
<i>Andrews Samraj, India</i>	19
<i>Asaduz Zaman, Bangladesh</i>	16
<i>B. Mursi, Sudan</i>	14
<i>Benlazaar Sid Ahmed, Algeria</i>	8
<i>Chafik Aloulou, Tunisia</i>	19
<i>Chafik Barnoussi, Tunisia</i>	12
<i>Cherif Adnane, Tunisia</i>	12
<i>Chill Woo Lee, South Korea</i>	16
<i>D. C. Chaurasia, India</i>	19
<i>E. Osman, Sudan</i>	21
<i>Eman Alnagi, Jordan</i>	18
<i>Emir Kremic, Bosnia and Herzegovina</i>	22
<i>Emna Bouazizi Tunisia</i>	21
<i>Ensaf A. ALZurqa, Yemen</i>	9
<i>Faiza Belala, Algeria</i>	9
<i>Farh Mohamed Zeinelbdeen Abdelgader, Sudan</i>	17
<i>Hamid Mcheick, Canada</i>	18
<i>Hamid Saghir Saad Al-Raimi, Yemen</i>	10
<i>Hamza Aldabbas, Jordan</i>	22
<i>Hana 'a M. A. Salman, Iraq</i>	8
<i>Haytham Douaihy, Lebanon</i>	18
<i>Hichem Bouchakour Errahmani, Algeria</i>	15
<i>Ihab Sbeit, Lebanon</i>	18
<i>Issam Hamdi, Tunisia</i>	21
<i>Izzeldin Osman, Sudan</i>	21
<i>Jamel Feki, Tunisia</i>	17, 21
<i>Jamil Abdulhamid Moh'd Saif, Yemen</i>	10
<i>Jamoos M., Palestinian</i>	12
<i>Johannes Cronjé, South Africa</i>	21
<i>Kaïs Khrouf, Tunisia</i>	17
<i>Kalvina Rajendran, India</i>	19
<i>Karim Djouani, France</i>	15



<i>Laid Kahloul, Algeria</i>	15	
<i>Lamia Hadrich Belguith, Tunisia</i>	19	
<i>M. Hussein, Sudan</i>	14	
<i>Magdolin Siddig, Sudan</i>	13	
<i>Mahmoud Elbasir, UK</i>	22	
<i>Md Abdul Awal, Bangladesh</i>	16	
<i>Md Sohel Rana, Bangladesh</i>	16	
<i>Md Zahidul Islam, Bangladesh</i>	16	
<i>Md Zahidul Islam, Bangladesh</i>	16	
<i>Mohamed Dbouk, Lebanon</i>	18	
<i>Mohamed El Amine Chergui, Algeria</i>	15	
<i>Mohamed Sarrab, Sultanate of Oman</i>	22	
<i>Mohammad Shahid Shaikh, Pakistan</i>	16	
<i>Mohammed Abdalla Osman Mukhtar, Sudan</i>	11	
<i>Mohammed Z. Al-Taie, Iraq</i>	13	
<i>Mohammed Elboashi, Libya</i>	13	
<i>Mourad Talbi, Tunisia</i>	12	
<i>Muhammad Rafi, Pakistan</i>	16	
<i>Musa Mohamed Elhafiz Mustafa, Sudan</i>	17	
<i>Nabil Khoufi, Tunisia</i>	19	
<i>Nisreen Beshir Osman, Sudan</i>	22	
<i>Noha Omer Abdalla, Sudan</i>	21	
<i>Nour Eldin Elshaiekh, Sudan</i>	14	
<i>Omar Khrouf, Tunisia</i>	17	
<i>Omer O. Salih Dawood, Sudan</i>	17	
<i>Paramasivam K, India</i>	8	
<i>Qasem A. Al-radaideh, Jordan</i>	18	
<i>Réda Adjoudj, Algeria</i>	10	
<i>Rushdi Hamamreh, Palestinian</i>	12	
<i>Sabahaldin A. Hussain, Sudan</i>	14	
<i>Sahar Smaali, Algeria</i>	9	
<i>Sami M. A. Gorashi, KSA</i>	14	
<i>Shohel sayeed, Malaysia</i>	19	
<i>Shyam Akashe, India</i>	19	
<i>Sidi Mohamed Benslimane, Algeria</i>	15	
<i>Souhir Louati, Tunisia</i>	19	
<i>Suleiman Hussein Mustafa, Jordan</i>	11	
<i>Vijay Franklin, India</i>	8	
<i>Wadee Al-Qubati, Yemen</i>	18	
<i>Wael M. F. Abdel-Rehim, Egypt</i>	20	
<i>Waled Alzoher, Libya</i>	17	
<i>Yasir Abdelgadir Mohamed, Sudan</i>	11	
<i>Yasir Mohamed, Sudan</i>	21	
<i>Yousif Abdallah, Sudan</i>	13	
<i>Youssef Elmir, Algeria</i>	10	
<i>Zakaria Elberrichi, Algeria</i>	10	