Organizer
IEEE Control System Society Chapter Malaysia

Secretariat
IEEE Control System Society Chapter Malaysia

Secretariat Contact Information:
Mohd Nasir Taib
Zakaria Hussain
Saiful Zaimy Yahaya
Iza Sazanita Isa
Ramli Adnan
Siti Noraini Sulaiman
Nooritawati Md Tahir
Norhazimi Hamzah
Muhammad Khusairi Osman
Khairul Azman Ahmad
Rozan Boudville
Abdul Rahim Ahmad

Contact Information:
ICCSCE 2014 Secretariat
c/o: Saiful Zaimy Yahaya
Faculty of Electrical Engineering
Universiti Teknologi MARA
13500 Permatang Pauh
Pulau Pinang
Malaysia

Email:
szaimy79@gmail.com
adnanramli@yahoo.com
Tel: 603-55433012
Fax: 603-55435077
ORGANIZING COMMITTEE

Patron
Dean, Faculty of EE, UiTM
Campus Director of UiTM Pulau Pinang

General Chair
Prof. Dr. Mohd Nasir Taib

Vice Chair / Treasurer
Dr. Zakaria Hussain

Secretary
Saiful Zaimy Yahaya
Iza Sazanita Isa

Publication Chair
Assoc. Prof. Dr. Ramli Adnan
Dr. Siti Noraini Sulaiman

Technical Program Chair
Assoc. Prof. Dr. Nooritawati Md. Tahir
Norhazimi Hamzah

Local Arrangement Chair
Rozan Boudville

Publicity, Sponsor & Registration Chair
Dr. Muhammad Khusrui Osman

Webmaster
Khairul Azman Ahmad
Abd Rahim Ahmad
The Organizing and Technical Committees of 2014 IEEE International Conference on Control System, Computing and Engineering (ICCSCE 2014) would like to express gratitude to all reviewers for the volunteering support and contribution in the reviewing process.

Abdellah, Derghal
Abdullah, Derghal
Abdolreza, Dehghani Tafti
Abdul Rahim, Ahmad
Adi Izhar, Che Ani
Ahmad Fadzil, M Hanif
Ahmad Firdaus, Ahmad Zaidi
Ahmad Rashidy, Razali
Aimi Syamimi, Abdul Ghaifar
Amer Abu Bakar
Ali, Yazici
Amir, Mukhtar
Ammar Ahmed, Alkahtani
Ammar, Al-Jodah
Anmol, Sharma
Anthony, Chan
Artemios, Voyiatzis
Aslina, Abu Bakar
Asnor Juraiza, Ishak
Ateeq-Ur-Rehman, Shaheen
Atheer Akram, Abdulrazzaq
Autthasith, Arrayangkool
Azizah, Ahmad
Azira, Che Soh
Bahruddin, Ismail
Balbir, Singh
Bestoun, S. Ahmed
Biju, Issac
Ching Leong, Leow
Claudio, Leao Torres
Dayang Suhaida, Awang Damit
Dinesh, Sathyamoorthy
Edi, Kurniawan
Elmer, Magsino
Emilia, Noorsal
Emilio, Jimenez
Faraj Faqhat, El Dabee
Faridah, Abdul Razak
Faruque, Reza
George, Pavlides
Golnoush, Abaee
Grzegorz, Debita
Haider, Alsabbagh
Hamzah, Ahmad
Handy, Ali Munir
Hoi Leong, Lee
Humaira, Nisar
Irni Hamiza, Hamzah
Iza Sazanita, Isa
Kamarulzahar, Daud
Khairul Azman, Ahmad
Kim Soon, Gan
Lenin, Gopal
Linda, Mohd Kasim
M. Emre, Celebi
Mazlina, Mamat
Mohamad Fadli, Zolkipli
Mohd Badril, Nor Shah
Mohd Daud, Alang Hassan
Mohd Fauzi, Ismail
Mohd Nasir, Taib
Mohd Shawal, Jadin
Mohsen, Kazemi
Muhammad Azhar, Omar
Muhammad Khusairi, Osman
Muhammad Naufal, Mansor
Musayyab, Ali
Nazirah, Md. Tarmizi
Nor Muzliyaf, Mahyuddin
Norashikin, Yahya
Norhazimi, Hamzah
Norizam, Sulaiman
Normasni, Ad Fauzi
Nur Dalilah, Ahmad Sabri
Rajorshee, Raha
Ramli, Adnan
Rana Fayyaz, Ahmad
Razaimi, Ghazali
Rozan, Boudville
Saiful Izwan, Suliman
Saiful Zaimy, Yahaya
Seema, Shah
Shabirjan, Abd Hamid
Shahidah, Sadimin
Siti Noraini, Sulaiman
Somasundar, Kannan
Subhojoyoti, Bose
Toufique Ahmed, Soomro
Ying-Jen, Chen
Yusnita, Ali
Zakaria, Hussain
Zhe, Chen
Zul Hasrizal Bin, Bohari
# Table of Contents

*Copyright*  
Page ii

*Organizing Committee*  
Page iii

*Technical Reviewers*  
Page iv

*Table of Contents*  
Page v

## Paper Title & Authors

<table>
<thead>
<tr>
<th>Paper Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>De-noising of Noisy MRI Brain Image Using the Switching-based Clustering Algorithm</td>
<td>1</td>
</tr>
<tr>
<td>Siti Noraini Sulaiman, Siti Mastura Che Ishak, Iza Sazanita Isa &amp; Norhazimi Hamzah</td>
<td></td>
</tr>
<tr>
<td>Hazardous Based Area Mapping for Surveillance Monitoring</td>
<td>7</td>
</tr>
<tr>
<td>Altahir A. Altahir, Vijanth S. Asirvadam, Nor Hisham Hamid &amp; Patrick Sebastian</td>
<td></td>
</tr>
<tr>
<td>Tracing of Retinal Blood Vessels through Edge Information</td>
<td>13</td>
</tr>
<tr>
<td>Siti Khadijah Mohd Zaki, Mohd Asyraf Zulkifley &amp; Ain Nazari</td>
<td></td>
</tr>
<tr>
<td>Incorporating Simulation Tools in the Teaching of Digital Logic Design</td>
<td>18</td>
</tr>
<tr>
<td>P.W.C. Prasad, Abeer Alsadoon, Azam Beg &amp; Anthony Chan</td>
<td></td>
</tr>
<tr>
<td>Human Behavioral Analytics System for Video Surveillance</td>
<td>23</td>
</tr>
<tr>
<td>Junn Min Pang, Vooi Voon Yap &amp; Chit Siang Soh</td>
<td></td>
</tr>
<tr>
<td>Fuzzy Inference Approach for Autonomous Ground Vehicle Navigation in Dynamic Environment</td>
<td>29</td>
</tr>
<tr>
<td>Auday AI-Mayyahi &amp; William Wang</td>
<td></td>
</tr>
<tr>
<td>A Non Parametric Partial Histogram Bayes Learning Algorithm for Classification Applications</td>
<td>35</td>
</tr>
<tr>
<td>Haider O. Lawend &amp; Anuar M. Muad</td>
<td></td>
</tr>
<tr>
<td>Modeling Camera Coverage Using Imagery Techniques for Surveillance Applications</td>
<td>40</td>
</tr>
<tr>
<td>Altahir A. Altahir, Vijanth S. Asirvadam, Nor Hisham Hamid &amp; Patrick Sebastian</td>
<td></td>
</tr>
<tr>
<td>Image Segmentation for Lung Region in Chest X-ray Images using Edge Detection and Morphology</td>
<td>46</td>
</tr>
<tr>
<td>Mohd Nizam Saad, Zurina Muda, Noraidah Sahara &amp; Hamzaini Abdul Hamid</td>
<td></td>
</tr>
<tr>
<td>An Efficient Cooperative Load Balancing Approach in RSU-based Vehicular Ad Hoc Networks (VANETs)</td>
<td>52</td>
</tr>
<tr>
<td>Analysis and Feasibility Study of Plant Disease using E-Nose</td>
<td>58</td>
</tr>
<tr>
<td>Low Cost USB 16-bit Photon Counter for Spectral Delayed Luminescence System</td>
<td>64</td>
</tr>
<tr>
<td>Mohd Najeb Jamaludin, Mohsen Kazemi &amp; M.B. Malarvili</td>
<td></td>
</tr>
<tr>
<td>PID Position Control of 7-DOF Three-Fingered Robotic Hand for Grasping Task</td>
<td>70</td>
</tr>
<tr>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Development of 7-DOF Three-Fingered Robotic Hand for Industrial Work</td>
<td>75</td>
</tr>
<tr>
<td>Implementation Study of Path-Based AOCV Model on Pessimism Reduction for 20nm Technology</td>
<td>80</td>
</tr>
<tr>
<td>Pua Siaw Fuang &amp; Nor Muzlifah Mahyuddin</td>
<td></td>
</tr>
<tr>
<td>A Simultaneous Cost-risk Reduction Optimisation in JIT Systems using Genetic Algorithms</td>
<td>84</td>
</tr>
<tr>
<td>Faraj El Dabee, Romeo Marian &amp; Yousef Amer</td>
<td></td>
</tr>
<tr>
<td>Implementation Study of Path-Based AOCV Model on Pessimism Reduction for 20nm Technology</td>
<td>80</td>
</tr>
<tr>
<td>Pua Siaw Fuang &amp; Nor Muzlifah Mahyuddin</td>
<td></td>
</tr>
<tr>
<td>A Simultaneous Cost-risk Reduction Optimisation in JIT Systems using Genetic Algorithms</td>
<td>84</td>
</tr>
<tr>
<td>Faraj El Dabee, Romeo Marian &amp; Yousef Amer</td>
<td></td>
</tr>
<tr>
<td>Review on Two Dimensional Code of Noncoherent OCDMA Systems</td>
<td>90</td>
</tr>
<tr>
<td>Rasim Azeez Kadhim, Hilal Adnan Fadhil, S. A. Aljunid &amp; Mohamad Shahrazel Razalli</td>
<td></td>
</tr>
<tr>
<td>Temporal Hemispheric Dominance of Omega-3 : Measurement of Theta and Delta Brainwaves Using EEG</td>
<td>95</td>
</tr>
<tr>
<td>Muhammad Yahya &amp; Zunairah Hj Murat</td>
<td></td>
</tr>
<tr>
<td>Feasibility Studies of Arduino Microcontroller Usage for IPMC Actuator Control</td>
<td>101</td>
</tr>
<tr>
<td>Muhammad Aliff Rosly, Zahurin Samad &amp; Muhammad Farid Shaari</td>
<td></td>
</tr>
<tr>
<td>Deploying Clustered Wireless Sensor Network by Multi-Robot System</td>
<td>107</td>
</tr>
<tr>
<td>Reza Arezoumand &amp; Syamsiah Mashohor</td>
<td></td>
</tr>
<tr>
<td>Exploitation Selection of Alpha Parameter in Gravitational Search Algorithm of PID Controller for Computational Time Analysis</td>
<td>112</td>
</tr>
<tr>
<td>Mohammad Saiful Islam Aziz, Sophan Wahyudi Nawawi, Shahdan Sudin &amp; Norhaliza Abd Wahab</td>
<td></td>
</tr>
<tr>
<td>Review- Coating Methods of Carbon Nanotubes and Their Potential Applications</td>
<td>118</td>
</tr>
<tr>
<td>Yaseen Naser Jurn, M. F. Malek, Wei-Wen Liu, Haider K. Hoomod &amp; Amal Abbas Kadhim</td>
<td></td>
</tr>
<tr>
<td>Constrained Distributed Estimation Based on Consensus Algorithm for Mobile Robots Tracking</td>
<td>124</td>
</tr>
<tr>
<td>Zeinab R. Yousef &amp; Mohammad B. Menhaj</td>
<td></td>
</tr>
<tr>
<td>A Comparative Analysis on Pixel-Based Blind Cloning Techniques</td>
<td>130</td>
</tr>
<tr>
<td>Mariam Saleem, M. Qasim Altaf &amp; Qaiser Chaudry</td>
<td></td>
</tr>
<tr>
<td>The Prediction of Debris Flow Distribution on Merapi Volcano in Central Java which Involves Measurements at Several Locations through the Ensemble Kalman Filter</td>
<td>136</td>
</tr>
<tr>
<td>Bandung Arry Sanjoyo, Mohamamd Hariadi &amp; Mauridhi Hery Purnomo</td>
<td></td>
</tr>
<tr>
<td>GPGPU Based Hybrid Multi-Pattern Algorithm Design for High-Speed Intrusion Detection System</td>
<td>141</td>
</tr>
<tr>
<td>Awsan Abdulrahman Hasan, Nur’ Aini Abdul Rashid &amp; Atheer Akram Abdulrazzaq</td>
<td></td>
</tr>
<tr>
<td>On Improvement of Transient Stage of Composite Nonlinear Feedback Control Using Arbitrary Order Set Point Filters</td>
<td>147</td>
</tr>
<tr>
<td>Veli-Pekka Pyrhönen &amp; Hannu Koivisto</td>
<td></td>
</tr>
<tr>
<td>Artificial Immune Algorithm in Solving the Channel Assignment Task</td>
<td>153</td>
</tr>
<tr>
<td>Saiful I. Suliman, Graham Kendall &amp; Ismail Musirin</td>
<td></td>
</tr>
<tr>
<td>Gossip Algorithm Approach and AODV in Vessel Messaging System: A Comparison of Performance</td>
<td>159</td>
</tr>
<tr>
<td>Qurrotul Aini, Mauridhi Hery Purnomo &amp; Achmad Affandi</td>
<td></td>
</tr>
<tr>
<td>Ballistic Limit of Aluminium Tank: An experimental Study</td>
<td>164</td>
</tr>
<tr>
<td>M. R. Aziz, W. Kuntjoro &amp; N. V. David</td>
<td></td>
</tr>
</tbody>
</table>
Investigation of Impedance Modeling for a Unit Cell of the Circle Loop Frequency Selective Surface at 2.4GHz
Noor Azamiah Md Fauzi, Mohamad Zoinol Abidin Abd Aziz, Maizatul Alice Meor Said, Mohd Azlishah Othman, Badru Hisham Ahmad, Mohd Kadim Suaidi, Mohamad Hafize Ramli, Nornikman Hassan & Mohd Fareq Abd Malek

Denoising of Auditory Brainstem Response via Diffusion and Wavelet Transform
Jiwa Abdullah & Hassan Hamid Ekal

Maximizing the Network Lifetime of Clustered-based WSN Using Probability of Residual Energy
Jiwa Abdullah & Saltihie Zeni

Experimental Studies of Touching Sensation of Human Fingertip Force Based on Weights

Improving Reliability in Cell-Based Evolve Hardware Architecture Using Fault Tolerance Control
Chanin Wongyai, Pradondet Nilagupta

Swarm Intelligence and Neural Network for Data Classification
Waheed Ali H. M. Ghanem & Aman Jantan

Robust Palm Print Verification System Based on Evolution of Kernel Principal Component Analysis
Noor Salwani Ibrahim, Haryati Jaafar & Dzati Athiar Ramli

Comparison of MLP Network Training Algorithms for Fault Classification in Transmission Lines
M. N. Mahmud, M. N. Ibrahim, M. K. Osman, Z. Hussain

Multi-Band Planar Printed Monopole Antenna for Wireless Communication System
M. H. Ramli, M. Z. A. Abd Aziz, M. A. Othman & A. H. Dahalan

Design of Broadband Dual-Polarized Antenna with Single Slanted Feed

Human Sincerity Factors for Adaptation in Software Agents
Nur Huda Jaafar, Nora Mohd Basir, Mohd Sharifuddin Ahmad & Azhana Ahmad

Android-based Home Door Locks Application via Bluetooth for Disabled People
N. H. Ismail, Zarina Tukiran, N. N. Shamsuddin & E. I. S Saadon

Integration of Tilt Sensors as a Device for Monitoring Rehabilitation Process
Safyazan Salim, Wan Nurshazwani Wan Zakaria, Azrai Nizhan & M. Mahadi Abdul Jamil

Investigation of Broadband Inverted Suspended Rectangular Patch Linear Polarized Antenna

Development of a Network-Enabled Traffic Light System
Aizuddin Onn, Safyazan Salim, Muhammad Shukri Ahmad & Muhammad Mahadi Abdul Jamil

Localizing Pipe Inspection Robot using Visual Odometry
Hamed Habibi Aghdam, Herdawatie Abdul Kadir, Mohd Rizal Arshad & Munir Zaman

A Frequency Domain Interpolation Method for Damping Ratio Estimation
Jiawei Xue & Ruipeng Diao
System Identification of Electro-hydraulic Actuator System with Pressure and Load Effects
R. Ghazali, C. C. Soon, H. I. Jaafar, Y. M. Sam & M. F. Rahmat
256

Improved Input Shaping Technique for a Nonlinear System
Mohammad Javad Maghsoudi, Z. Mohamed, A. R. Husain & Hazriq Izzuan Jaafar
261

Correlation between PWM Modulation of an Induction Motor Inverter and Radiated Electromagnetic Acoustic Noise
Vigren Radha & Zaidi M.Ripin
267

Adaptive Control of Aerial Manipulation Vehicle
Somasundar Kannan, Marouane Alma, Miguel A. Olivares-Mendez & Holger Voos
273

Investigation of SRR Slot on Monopole Antenna
279

Monopole Antenna with Slot SRR on Hybrid Material
284

FPGA-in-the-Loop Co-simulation of Reentrant Arrhythmia Mechanism in One Dimensional (1D) Ring-Shaped based on FitzHugh-Nagumo Model
Nur Atiqah Adon, Farhananhani Mahmud, Mohammad Hairol Jabbar & Norliza Othman
288

Synthesis of Sampling Modes for Adaptive Control
Rajorshee Raha, Aritha Hazra, Akash Mondal, Soumyajit Dey, Partha Pratim Chakrabarti & Pallab Dasgupta
294

Mandarin Syllables Speech Trainer Based on F1 and F2 Formant Frequencies
Mazlina Mamat, Rosalyn R. Porle, Norfararicyanti Parimon & Lek Choy Yean
299

The Optimum Selection of Wavelet Transform Parameters for the Purpose of Fault Detection in an Industrial Robot
Alaa Abdulhady Jaber & Robert Bicker
304

Reactive Memory Model for Ant Colony Optimization and Its Application to TSP
Rafid Sagban, Ku Ruhana Ku Mahamud & Muhamad Shahbani Abu Bakar
309

Self-tuning Fuzzy Fractional-order PI Controller: Design and Application in Steam Distillation Process
Mazidah Tajjudin, Norlela Ishak, Mohd Hezri Fazalul Rahiman, Norhashim Mohd Arshad & Ramli Adnan
315

Fork-Like Shaped Monopole Antenna with Defected Parasitic Elements and Ring Slots
322

Design and Process Simulation of P-Well Guard Ring Si Avalanche Photodiode
Suhaila Isaak & Wan Haszerila Wan Hasan
327

Novel Moiré-Pattern Based Tilt Sensor for Slope Movement Sensing: Repeatability Study
Isabelle Chan Shieu Juinn, Mani Maran Ratnam & Fauziah Ahmad
332

Evaluation of Digital Speckle Filters for Ultrasound Images
Fara Nabila Radzi & Norashikin Yahya
337

Use of Technological Tools for Parkinson’s Disease Early Detection: A Review
Q. W. Oung, M. Hariharan, S. N. Basah, S. Yaacob, M. Sarillee & H. L. Lee
343
Prediction of 4 Hours Ahead Flood Water Level Using Improved ENN Structure: Case Study Kuala Lumpur
Fazlina Ahmat Ruslan, Abd Manan Samad, Zainazlan Md Zain & Ramli Adnan

Determination of Static Diagonal Controllers to Achieve Diagonal Dominance for TITO Systems at Fixed Frequencies
Ilhan Mutlu & Mehmet Turan Soylemez

Design of Reversible Multiplexer/De-Multiplexer
Lenin Gopal, Nikhil Raj, Nyap Tet Clement Tham, Alpha Agape Gopalai & Ashutosh Kumar Singh

Illumination Normalization of Non-Uniform Images Based on Double Mean Filtering
Wan Azani Mustafa, Haniza Yazid & Sazali Yaacob

Automatic Assessment Mark Entry System Using Local Binary Pattern (LBP) and Salient Structural Features
Lim Lam Ghai, Suhaila Badarol Hisham & Norashikin Yahya

Assessment of Knee Joint Abnormality Using Acoustic Emission Sensors
Mohamed Sarillee, M. Harirharan, Anas M. N., Omar M. I., Aishah M. N. & Q.W. Oung

Interpretation of Human Thought Using EEG Signals and LabVIEW
Norizam Sulaiman, Cheng Chee Hau, Amran Abdul Hadi, Mahfuzah Mustafa & Shawal Jadin

Human Activity Recognition: A Review
Ong Chin Ann & Lau Bee Theng

A New Approach for Error Minimization of Piezoelectric Sensor Output Variations using Fuzzy Logic
Rana Fayyaz Ahmad, Aamir Saeed Malik, Hafeezullah Amin, Nidal Kamel, Raheel Zafar & Abdul Qayyum

A Comparative Study on the Implementation of Reversible Binary Coded Decimal (BCD) Adder Performance on Field Programmable Gate Array (FPGA)
Nyap Tet Clement Tham, Alpha Agape Gopalai, Lenin Gopal & Ashutosh K. Singh

Enhancement of MRI Human Thigh Muscles Segmentation by Template-based Framework
Ezak Ahmad, Moi Hoon Yap, Hans Degens & Jamie McPhee

Low-Altitude UAiCs Flight Planning Design of Meandering Channel at Small Catchment
Nazirah Md. Tarmizi, Muhd Saifarudin Che Mat, Ramli Adnan, Abd Manan Samad, Khairil Afendi Hashim & Khairul Azhar Zainuddin

Reversible Logic Gate Implementation as Switch Controlled Reversible Full Adder/Subtractor
Lenin Gopal, Adib Kabir Chowdhury, Alpha Agape Gopalai, Ashutosh Kumar Singh & Bakri Madon

Tree Age Estimation by Tree Diameter Measurement using Digital Close Range Photogrammetry (DCRP)
Muhd Saifarudin Chek Mat, Mohammad Asyraf Mohd Nor, Jezan Md Diah, Mokhtar Azizi Mohd Din, Khairil Afendi Hashim & Abd. Manan Samad

Spatial Planning Challenge in Influence of Traditional Malay House Design into Future Resort Design
Siti Asmaa’ Hasshim, Azman A. Rahman, Mazzueen Md. Khalid & Abd Manan Samad
7 Hours Flood Prediction Modeling Using NNARX Structure: Case Study Kedah
Ramli Adnan, Abd Manan Samad, Zainazlan Md Zain & Fazlina Ahmat Ruslan

BMTutor Research Design: Malay Sentence Parse Tree Visualization
Yusnita Muhamad Noor & Zulikha Jamaludin

Effect of Temperature towards Electrical Conductivities of Low Concentration of AL2O3 Nanofluid in Electrically Active Cooling System
Muhammad Zuhaili Razali, Mohd Shahril Ahmad Khiair, Irnie Azlin Zakaria & Wan Ahmad Najmi Wan Mohamed

Comparative Study of Text-to-Speech Synthesis Techniques for Mobile Linguistic Translation Process
Phanchita Chomwihoke & Manop Phankokkruad

Face Recognition Technique using Gabor Wavelets and Singular Value Decomposition (SVD)
Lim Song Li & Norashikin Yahya

Novel Algorithm for Exudate Extraction from Fundus Images of the Eye for a Content Based Image Retrieval System
C. Gururaj, D. Jayadevappa & Satish Tunga

High Resolution Micro-Computed Tomography Imaging and Modelling of Porous Copper Sample
Mohamad Tzhaquib Fadhllullah Thafarallah, Wan Ahmad Najmi Wan Mohamed, Nor Amalina Nordin & Hairil Rashmizal Abdul Razak

Analysis of Interaction User Interface Patterns and Usability Study in Computer Assisted Instruction for Tablet PC
Ganaporn Thongmool & Manop Phankokkruad

Saddaf Rubab, Mohd. Fadzil Hassan & Ahmad Kamil Mahmood

WSDMDA: An Enhanced Model Driven Web Engineering Methodology
Mohammed Abdalla Osman Mukhtar, Mohd Fadzil Hassan, Jafreezal Jaafar & Lukman Ab. Rahim

Real-time Rotation Invariant Hand Tracking Using 3D Data
M. Zabri Abu Bakar, Rosdiyana Samad, Dwi Pebrianti, Nicolaas Lim Yong Aan

Detecting ROIs in the Thermal Image of Electrical Installations
Mohd Shawal Jadin, Kamarul Hawari Ghazali & Soib Taib

Curvelet Transform Sub-Difference Image for Crowd Estimation
Adel A. Hafeez Allah, Syed A. Abu Bakar & Wasim A. Orfali

Cardiac Excitation Modeling: HDL Coder Optimization towards FPGA stand-alone Implementation
Norliza Othman, Farhanahani Mahmud, Abd Kadir Mahamad, M. Hairol Jabbar & Nur Atiqah Adon

Evaluation of PI vs Fractional-order PI Controller for Steam Temperature Control
Mazidah Tajjudin, Norlela Ishak, Mohd Hezri Fazalul Rahiman, Norhashim Mohd Arshad & Ramli Adnan

RF Simulator for Cryptographic Protocol
Mohd Anuar Mat Isa, Habibah Hashim, Jamalul-lail Ab Manan, Syed Farid Syed Adnan & Ramlan Mahmood

A Survey on Robust Repetitive Control and Applications
Edi Kurniawan, Zhenwei Cao, Oka Mahendra & Riyo Wardoyo
Performance Measure of Airline Websites Using Analytical Hierarchy Process & Fuzzy Analytical Hierarchy Process
P. D. D. Dominic & Humera Khan

A Review in Feature Extraction Approach in Question Classification Using Support Vector Machine
Anbuselvan Sangodiah, Rohiza Ahmad & Wan Fatimah Wan Ahmad

A Review: Comparison Between Different Type of Filtering Methods on the Contrast Variation Retinal Images
Wan Azani Mustafa, Haniza Yazid & Sazali Yaacob

Image Thumbnail Based on Fusion for Better Image Browsing
Boon Tatt Koik & Haidi Ibrahim

Single Scale Self Quotient Image and PNN for Infant Pain Detection
Muhammad Naufal Mansor, Ahmad Kadri Junoh, Amran Ahmed, Muhammad Khusairi Osman

Combination Filters for COPE Database
Muhammad Naufal Mansor, Ahmad Kadri Junoh, Amran Ahmed & Muhammad Khusairi Osman

MANET Security: A Survey
Mohammed M. Alani

An Investigation of Single-Walled Carbon Nanotubes Bundle Dipole Antenna at THz Frequencies
Yaseen Naser Jurn, M. F. Malek, Wei-Wen Liu & Sawsen Abdulahadi Mahmood

Compressed Sensing Based Nearfield Electromagnetic Imaging
Muhammad Naveed Tabassum, Ibrahim Elshafiey & Mubashir Alam

Dynamic Programming based Comparison including QuickBird and IKONOS Satellite Stereo Images for Monitoring Vegetation Near Power Poles
Abdul Qayyum, Aamir Saeed Malik, Mohamad Naufal Mohamad Saad, Mahboob Iqbal, Rana Fanyyaz Ahmad & Tuan Ab Rashid Tuan Abdullah

Threading Optimization of the AEMB Microprocessor
Mostafa Mohamed, Patrick Sebastian, Lo Hai Hiung, Shawn Tan Ser Ngiap

Use of Non-Identical Multiple Delayed Resonators in Active Suspension Systems of Railway Vehicles
Oytun Eriş, Ali Fuat Ergenç & Salman Kurtulan

Segmentation Assessment of Activated Sludge Flocs at Different Magnifications for Wastewater Treatment
Muhammad Burhan Khan, Humaira Nisar, Ng Choon Aun Yasir Salih & Aamir Saeed Malik

Efficient Single-Band and Dual-Band Antennas for Microwave Imaging and Hyperthermia Treatment of Brain Tumors
Mohamed Mamdouh M. Ali, Osama Haraz, Ibrahim Elshafiey, Saleh Alshebeili & Abdell-Razik Sebak

A Preliminary Study on In-Vitro Lung Cancer Detection using E-nose Technology

The Preliminary Investigation of Electromagnetics Radiation for the Left Hemisphere Stroke
Iterative Closed-Loop Identification of MIMO Systems Using ARX-Based Leaky Least Mean Square Algorithm
Mohamed. A. Rahim, M. Ramasamy, Lemma D. Tufa & Abdelraheem Faisal

Classification of Elaeis Guineensis Disease-Leaf under Uncontrolled Illumination using RBF Network
Nooritawati Md Tahir, Shah Rizam Mohd Shah Baki, Muhammad Asraf Hairuddin & Nur Dalila Khirul Ashar

Design and Development of Simultaneous EEG-fMRI Data Acquisition Setup to Observe Brain Activity
Rana Fayyaz Ahmad, Aamir Saeed Malik, Nidal Kamel & Faruque Reza

Sensory Responses of Autism Via Electroencephalography for Sensory Profile
R. Sudirman & S. S. Hussin

A Database of Arabic Handwritten Characters
Mazen Abdullah Bahashwan & Syed A. Abu Bakar

Parameters Optimization for Handover between Femtocell and Macrocell in LTE-Based Network
Labeeb Mohsin Abdullah, Mohd Dani Baba & Sinan Ghassan Abid Ali

Thermal and Electrical Experimental Characterization of Ethylene Glycol and Water Mixture Nanofluids for a 400w Proton Exchange Membrane Fuel Cell
Irnie Azlin Zakaria, Zeno Michael, Aman Mohd Ihsan Mamad & Wan Ahmad Najmi Wan Mohamed

Multistimulator Backchannel Communication Link Implemented for Safety Information and Closed-loop Power Management
Emilia Noorsal, Kriangkrai Sooksood, Hongcheng Xu, Deepthi Sukumaran and Maurits Ortmanns

Implementation of Sugeno FIS in Model Reference Adaptive System Adaptation Scheme for Speed Sensorless Control of PMSM
Ahmad Asri Abd Samat, Dahaman Ishak, Shahid Iqbal & A. Idzwan Tajudin

Design of PID Controller for Ultra-sensitive Nano-g Resolution MEMS Tunneling Accelerometer
Subhojyoti Bose, Anuran Raychowdhury, Mamta Jatolia & Tarun Kanti Bhattacharyya

Optimization of FLC Parameters for Optimal Control of FES-assisted Elliptical Stepping Exercise using GA and PSO
S. Z. Yahaya, Z. Hussain, R. Boudville, F. Ahmad & M.N. Taib

Identification using Fractional-order Model: An Application Overview
Norlela Ishak, Nuzaihan Mhd. Yusof, Mohd. Hezri Fazalul Rahiman, Ramli Adnan & Mazidah Tajudin

Selection of PI Compensator Parameters for NCTF Controller Based on Practical Stability Limit
Wai-Keat Hee, Shin-Horng Chong & Aliza Che Amran

A New Robust Image Watermarking Method Using Dual Intermediate Significant Bits
Ghassan N. Mohammed, Azman Yasin & Akram M. Zeki

Author’s Index
Gossip Algorithm Approach and AODV in Vessel Messaging System: A Comparison of Performance

Qurrotul Aini
Dept. of Informatics
Syarif Hidayatullah State Islamic University
Jakarta, Indonesia
qurrotul.aini@uinjkt.ac.id

Mauridhi Hery Purnomo, Achmad Affandi
Dept. of Electrical Engineering
Institute of Technology Sepuluh Nopember (ITS)
Surabaya, Indonesia
hery@ee.its.ac.id, affandi@ee.its.ac.id

Abstract—Gossip algorithm has been applied in static ad hoc networks, in particular Wireless Sensor Network (WSN). The application of the gossip algorithm can serve as membership selection protocol, information dissemination, and network topology. The advantage of gossip algorithm can be implemented on mobile services including ad hoc network between fishing vessels called Vessel Messaging System (VMeS). VMeS is an ad hoc solution for vessels with 30 gross tonnages in Indonesia due to high operating costs for traditional fisherman; it means communication among fishing vessels were not installed with Vessel Monitoring System (VMS). This paper compares the performance results of two routing protocols in VMeS environment. To accomplish our goals, we selected three performance metrics: delay, throughput, and Packet Delivery Fraction (PDF). We performed simulations of two ad hoc routing protocols: AODV and AODV+G using NS-2.35. It shows that AODV+G only has average delay 20% better with 10 nodes in simulation 200 s both data rate, and other metrics show almost the same results. This indicates the possible implemented in AODV+G routing protocol in VMeS. Although, its need a way to improve delay performance to become optimum.

Keywords—gossip; routing protocol; VMS; VMeS; fishing vessel

I. INTRODUCTION

Food and Agriculture Organization recommends monitoring system of fishing vessels position satellite-based to prevent illegal fishing is called VMS, installed in particular for vessels more than 24 meters long (more than 300 gross tonnage). This system provides useful information which previously provided by vessel operators (Fig. 1). VMS is a monitoring system for position tracking satellite-based among fishing vessels, which is near real time (less than 30 minutes). Therefore, VMS can provide valuable information, in particularly fishing industry [1].

However, problems arise when a fishing vessel is not installed with VMS, due high operational costs for traditional fisherman with 30 gross tonnages. This situation experienced by many fishing vessels in the northern coast of Java, Indonesia. To communicate among them, they required an ad hoc network, i.e. a network consists of nodes which have the wireless links and work independently, self-organizing and configuring of fixed infrastructure. They operate both as communication end-points as well as routers, and enabling multihop communication [2].

Fig. 1. Vessel monitoring system [3].

One of the alternative solutions has establish a simple communication among fishing vessels for text information exchange called Vessel Messaging System (VMeS). Supporting ad hoc network in VMeS, [4] applied routing protocol AODV and analyzed the performance. Past more than five years, many authors proposed gossip algorithm approach in wireless sensor networks, in which distribution of information more efficient than flooding methods. There is an opportunity implement gossip algorithm in ad hoc maritime communication. Therefore, authors compare the performance of routing protocol when implemented in VMeS.

II. RELATED WORK

A. Vessel Messaging System

VMeS is a communication system based fishing vessel data transmitted over a radio channel HF/VHF. This system consists of an electronic message control center (base station), HF/VHF radio modem, and electronic messaging terminals installed on fishing vessel (Fig.2). The electronic message control center could help fishing vessels with send valuable message. The message can be information about position, location of fishing, fuel condition, sea water temperature, ocean salinity, and SOS signal for fishing vessels that surpass zone or fishing area of territory's country [5].
There is a research that has been done in developing Vessel Messaging System as a system of information exchange among fishing vessels with Ad hoc On-demand Distance Vector (AODV), Dynamic Source Routing (DSR), and Destination-Sequenced Distance Vector (DSDV) protocols. The simulation used NS-2 with 5 to 30 nodes, 802.11b protocol; three data rates 5.4 Mbps, 11 Mbps, and 54 Mbps has been done by applying existed routing protocols such as AODV, DSDV and DSR. Data analysis was based on Quality of Service (QoS) i.e. delay, throughput, and packet delivery fraction (PDF). This research has shown that an increasing number of connected nodes in a network, it causes delay of data transmission will be greater; data packets lost and percentage of successful reception of data will be smaller [4].

![Diagram of Vessel Messaging System](image)

Another previous studies for supporting communication among fishing vessels VMeS, has reported that built an interactive service web-based to know the position of vessels and messages between user's VMeS (family, government, ship owners) and fishermen at sea. It is recommended that bandwidth on web server is 96 kbps (upload) and 512 kbps (download), with access time 18:08 seconds. Refer to the test results, access time is not more than 20 seconds if the number of users 15 [6].

Another studies suggested that modem performance in VMeS introduced in low speed data transmission (about 30 to 120 characters per second). Modem performance includes error rate due to noise effects, the sequence of radio channel utilization time and test on ad hoc mode. Based on the test result, the modem can resist to noise until 4 dB signal to noise ratio. The length of data is chosen between 24 and 160 characters for compatibility with SMS system and time efficiency. Modem work in an ad hoc network mode with an intermediary node [7]. Also, [8] implemented SMS service from cellular technology. To synchronize this service in VMeS, SMS gateway and database system must be built. Refer to experiment that held in the sea, Rembang (Central of Java), data can be received well in receiver until 10 kilometers.

**B. Gossip Based Routing Protocol**

Gossip algorithm is a distributed algorithm, for exchange of information, and computational nodes on random network arbitrary. Because the network is temporary, many nodes join and leave the network; consequently it requires a robust algorithm [9].

Previous studies reported gossip algorithm implementation with the existing protocols such as AODV, and Zone Routing Protocol (ZRP) compared with the AODV flooding method, where each node forward a message with some probability [9]. The results indicated that nodes receive message depend on the probability of gossip and network topology. [9] has considered the probability of 0.6 till 0.8 to ensure each node receives a message for each execution. Simulation used NS-2, with IEEE 802.11 as a MAC layer protocol, consisting of 150 nodes. The simulation shows that gossip algorithm can reduce control traffic up to 35% compared to flooding and there is a significant increase in performance for all metrics [10].

A considerable other study has been published about routing protocol that implements gossip algorithm is AODV+G. This routing protocol is probabilistic and scalable broadcast protocol because it can significantly reduce the communication overhead compared to flooding protocol in dynamic systems [10]. This study also compares the performance of AODV+G, AODV and DSR protocols to determine which one is best and analyze the strengths and weaknesses in the design and performance of critical consideration. The performance metrics evaluated are packet delivery fraction, average end-to-end delay, routing overhead, normalized routing load, throughput, and average node energy usage. Simulations performed NS-2 (ns-version 2.32), where the network consists of 50 nodes and 150 nodes, with IEEE 802.11b protocol. The results of the study stated that the performance of DSR very well on small networks in most traffic mobility, AODV and DSR show the routing overhead are high that consumes more energy than AODV+G. Therefore, AODV+G is efficient as a promising protocol for high traffic and movement of nodes on the situation of large-scale networks with probability 0.65. However, AODV+G require improvement in throughput that can be received on wireless applications [9].

Gossip algorithm proposed also as a strategy or method of routing protocols in a decentralized network, where each node communicates with other nodes in a wireless channel, and forwards data to another node [12]. In the gossip routing protocol, network development in the form of static, where each node knows its parent and a node can only transmit data packets to only its three parents. Although a node becomes a parent, but it has to follow certain strategies for reducing burden. Gossip routing protocol is proposed as a proactive protocol with multiple treatments (Fig. 3).

There is another study by [13], proposed regional gossip routing, that show reduced overhead of routing protocol. The simulation results that the number of messages generated is less than simple global flooding (up to 94%). The authors
propose ellipse factor as foci of ellipse between source vertex and target vertex. Also, the absence of information neighbors (location) is better using a fixed probability (gossip) then followed by flooding method in the cluster network [14]. Another considerable routing protocol has been published by [15], which proposed a new routing protocol Adaptive Gossip-based Ad Hoc Routing (AGAR). The simulation results stated that AGAR delivers better performance than AODV+G, which is decreases routing load 29.2% and average end-to-end delay 54.5%. Moreover, it increases throughput 2.7%.

Fig. 3. Wireless ad hoc sensor network static deployment scenario [12].

III. SIMULATION

A. Simulation Environment and Performance Metrics

We simulated AODV and AODV+G routing protocol using NS-2.35 and compare these protocols in VMeS environment. The authors used IEEE 802.11b for physical and medium access. The simulation modeled networks of mobile nodes placed randomly within a 1000m x 1000m area. The number of nodes is 10, 15, and 20 nodes as a representation of fishing vessels at the chosen speed from 0 to 11 m/sec and no pause time. The radio propagation model used shadowing and range each node is 250 meters. The simulation conducted in 200 seconds with data rate 5.4 and 11 Mbps. For AODV+G, gossip threshold is approximately 0.65.

Consider the following three performance metrics:

- **Delay**: the time was required by a node to send data packet from source to the destination node during the simulation process. Delay is determined by calculating the time difference between sending and receiving packets divided by the total number of receiving packet [4].
- **Throughput**: the rate of information arriving at and possibly passing through, a particular point in the network system. This is an actual data rate of source node send data packet to destination node in a certain time and network condition [4].
- **Packet Delivery Fraction (PDF)**: the ratio of total data packets successfully received to total ones sent by the CBR source [16].

B. Results

The simulation results as follows:

<table>
<thead>
<tr>
<th>Simulation time (s)</th>
<th>100</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Nodes</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td><strong>AODV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay (ms)</td>
<td>5.74</td>
<td>8.07</td>
</tr>
<tr>
<td>Throughput (packet/s)</td>
<td>64</td>
<td>262</td>
</tr>
<tr>
<td>PDF (%)</td>
<td>99.78</td>
<td>99.93</td>
</tr>
<tr>
<td><strong>AODV+G</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay (ms)</td>
<td>6.85</td>
<td>6.46</td>
</tr>
<tr>
<td>Throughput (packet/s)</td>
<td>64</td>
<td>332</td>
</tr>
<tr>
<td>PDF (%)</td>
<td>99.53</td>
<td>99.45</td>
</tr>
</tbody>
</table>

Both tables plotted in graphics and this can be seen in Fig. 4 till 6. It is obvious in Fig. 4, that an increasing number of connected nodes in network, it causes a delay of data transmission will be greater. Generally, AODV has less delay than AODV+G. However, there is an interesting result, that AODV+G routing protocol performs average delay 20% better than AODV, 10 nodes simulation 200 s in both data rate. This is because the gossip protocol only sends a message to the selected node in a group of 10 nodes and it causes small propagation delay. But, more than 10 nodes, the delay become increased.
As shown in Figure 5, both routing protocols perform almost the same results, which indicate that throughput is running well. It means AODV + G could implement in VMeS in case no significant difference results compare AODV.

Figure 6 illustrates the results of PDF, in general, both routing protocols perform same results in both data rates. It displays the more number of nodes, PDF value will decrease. The average of PDF in AODV is 99%, meanwhile AODG+G is 99.28%. It means AODV+G is better than AODV. In particular, 11 Mbps data rate, AODV+G shows better approximately 0.54% than AODV. It means the ratio total data packets was received in destination node and sent by the source in AODV+G is better than AODV.

Figure 4. Delay comparison.

IV. CONCLUSION AND FUTURE WORK

The main objective of this study was to measure the performance of two ad hoc routing protocols (AODV and AODV+G) under two different data rate: 5.4 and 11 Mbps. To achieve the goals, we have simulated these protocols using ns-2.32. The simulation analysis results allowed us to find that the performance of AODV +G is almost the same as AODV. Although in particular 10 connected nodes AODV+G has the smallest delay in 5.4 and 11 Mbps simulation 200 s. AODV+G is a promising and efficient protocol for node movement situations. The results of this research support evaluation of gossip algorithm to provide dissemination information while implemented in the fishing vessel network. It concludes that AODV+G can be implemented in VMeS in 10 nodes to achieve minimum delay and maximum PDF.

Our immediate future improvement of this project would investigate other gossip routing protocol, for instance Adaptive Gossip-based Routing Algorithm (AGAR) [15], Regional Gossip [17], Concentration-driven Gossiping AODV (CG-AODV) [18] to find out which protocol is more suitable in VMeS environment.

REFERENCES


