
# Computer Science Postgraduates Colloquium 2012

# "S$^3$MART Research"

DK–A, DK–B and DK–C,

Universiti Sains Malaysia

16 – 17 July 2012

Organized by:


UNIVERSITI SAINS MALAYSIA

School of Computer Science

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# Foreword

**Professor Dr. Rosni Abdullah**
*Dean*
*School of Computer Sciences*
*Universiti Sains Malaysia*

Firstly I would like to congratulate the organising committee for sustaining the The Computer Science Postgraduate Colloquium which is now in it's 12th year. The Computer Science Postgraduate Colloquium has been the annual meeting ground for our postgraduates to share their knowledge and findings of their research as well as network with fellow students and lecturers.

This year, the interesting theme of $S^3$MART research is employed to achieve the importance of being a quality and productive researcher. Each postgraduate student of the School is an asset with new promising and intriguing ideas. They contribute to the School's research productivity mainly via journal publications and proceedings. The main essence of the theme highlights the importance of having a well-planned research that encompasses five main factors which are Specific (S), Measurable (M), Attainable (A), Relevant (R) and Time-phased (T). These factors are very important to ensure a smooth transition to a successful career in research.

Hence, with the theme of promoting $S^3$MART research, it is hoped that this colloquium will motivate and facilitate our postgraduate students in developing themselves as a productive and quality researcher. But, be reminded that whatever research is conducted let it not infringe upon your personal life and liberties.

Thank you.

Thank you.

# Foreword

**Professor Dr. Ahamad Tajudin Khader**
*Chairman*
*Computer Science Postgraduate Colloquium 2012*

First of all, it gives me great pleasure to extend a very warm welcome to all participants to Computer Science Postgraduate Colloquium 2012 (CSPC 2012). For almost more than ten years now, this colloquium had served its purpose of being the platform where postgraduates of the School of Computer Science share their research's progress and findings. This year a total of 69 abstracts were submitted for oral, poster as well as proposal presentations.

As a recap of last year's colloquium event, CSPC 2011 focused to enlighten our postgraduates on the importance of productive researches and performances. However, this year's CSPC theme is focusing on establishing a balance to last year's theme. The current theme known as $S^3$MART research provides a formula as one of the run-way to attain such quality and productivity in research.

The most important factors of becoming a world-class researcher are our own effort in producing quality research and a strong desire in accomplishing success in competitive computer fields. For that reason, the CSPC 2012 program had been outlined in such a way as a stepping stone for you to furnish and educate yourselves on knowledge and skill sets of transforming into an excellent researcher.

I hope in your quest of becoming a quality and productive researcher would not end here (at CSPC 2012). In fact I expect CSPC 2012 will be able to derive your aspiration to embark on the journey of becoming a world-class prolific researcher.

In conclusion, I wish all of you a pleasant colloquium.

Thank you.

# About CSPC 2012

## Theme Overview:

The theme of $S^3$MART Research is employed for this year Computer Science Postgraduate Colloquium 2012 (CSPC 2012). The first character of the formula (S) assists researchers to shape their research in term of specificity of research questions need to be addressed. Measurable (M) is the ability to identify any applicable benchmark tools to measure the outcomes either atomistically or holistically. Attainable (A) emphasize on obtaining concrete conclusions in tackling a research question. Next, relevant (R) demonstrates the practicality or relevancy of the research questions and the usage of benchmark methods according to the research domain. Whilst, the last character of the formula (T), ensures that each step taken in solving a research question as well as in drawing an overall conclusion is done within an appropriate timeline.

The other two important factors that relate to the cubic expression of S are Sustainable and Social. Sustainability is important to ensure a research to meet the needs of the present and future. The endurance of research requires a researcher to efficiently use tools such as conferences, journals, forums or group discussions to exchange feedbacks and suggestions to improve their research extensively.

## Venue

This year's colloquium held at Lecture Hall A, B and C (a.k.a Dewan Kuliah A, B and C), University Sains Malaysia (USM) Penang campus. USM, better known as the University in the garden creates and sustains exploration of knowledge and intellectual growth into-the nature of existence. Surrounded by fauna and flora nature ambient as a source of inspiration, undoubtedly our own USM is the perfect place to generate ideas, discussions for our research today.

DK-A, DK-B and DK-C are three large lecture halls situated at building C08. The direction of these halls is just opposite CIMB Bank. Lecture Hall A, B and C (a.k.a. Dewan Kuliah A, B, C) can be accessed easier from two different USM entrances – Sg. Dua and Batu Uban entrance.

DK-A is able to allocate 260 participants.

DK-A is able to allocate 260 participants. While both DK-B and DK-C is able to cater up to 110 users. Comparable to seminar halls, these lecture halls are simply more versatile and excellent for focusing the attention of a large group on a single point. The acoustic properties of these lecture halls with high-end audio and visual equipments transform them as the perfect location for our international level colloquium.

## Speaker Profiles

**PROFESSOR Dr. Naomie Salim**
*Faculty of Computer Science and Information System*
*University Technology Malaysia*

**Dr. Naomie Salim** graduated with a Bachelor of Science (Computer Science) from UniversitiTeknologi Malaysia. She obtained her Masters Degree in Computer Science from Western Michigan University, USA and her PhD in Information Studies (Chemoinformatics) from University of Sheffield. She has managed to complete her PhD studies within 3 years without any correction after the viva.

Her career began with short attachments at Texas Instruments (Malaysia) and then Sapura Holdings. She started her career at UTM as an Assistant Lecturer in 1989. She was the Deputy Dean for Research and Post Graduate Studies at the Faculty of Science and Information Systems for six years since 2005.

In her academic career, Dr Naomie has taught at both undergraduate and postgraduate level, mostly for subjects related to Databases, and Information Systems. Her research interest includes Information Retrieval and Cheminformatics. She has supervised 10 PhD students to successful completion. Two of her PhD students have been awarded the UTM Chancellor's awards and one of her MSc student has been awarded the Pro-Chancellor's award. Out of 10, 5 of her PhD students graduated in less than 3 years.

Dr Naomie has been involved in 25 research projects, many in collaboration with colleagues within UTM or with external organisations, to a total value of RM 3 million. She has also authored over 150 journal articles and conference papers describing research into novel techniques for computerised information retrieval, with particular reference to textual, chemical and biological information. Among the research and innovation awards received by DrNaomie are the PECIPTA 2011 Gold Medal award, the I-inova 2010 Gold Medal award, BioInnovation 2011 Bronze Award, UTM 2010 Best Research Award and the INATEX Distinction Award (1998).

## Speaker Profiles

**Dr.SundramoorthyM.Pathmanathan**
*Associate Professor*
*School of Social Sciences*
*Universiti Sains Malaysia.*

**Dr. Sundramoorthy M. Pathmanathan** is an Associate professor of criminology and has been working as a faculty member in the School of Social Sciences at University Sains Malaysia since June 1994. Recently, he was appointed to the Board of Assessors as an expert in the area of Criminology by the Malaysian Qualifications Agency (MQA). In 2010, he (as the principle investigator) and his co-researchers successfully completed a consultation project on "The Root Causes of Crime in Malaysia" which was funded by the Ministry of Finance for the Government of Malaysia.

Since 2008, he is the principal investigator for two research projects on "Public Perception on Crime Survey" and "Public Perception on Policing Survey". In 2003, Dr. Sundramoorthy was invited as a Visiting Professor to University of Utah (USA), where he taught a course in "Comparative Criminal Justice of United States of America and Malaysia". In 2002, he was invited as a Visiting Professor to Chubu University in Nagoya, Japan. Since 1997, Dr. Sundramoorthy has been serving as executive member on the Malaysia Crime Prevention Foundation (Penang).

In October 2010, the Prime Minister of Malaysia appointed Sundramoorthy as an executive member of the Malaysia Crime Prevention Foundation (Federal). He also holds the honorary rank of Deputy Superintendent of Police since 2008.

# CSPC 2012 Program

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<tr><td>9:00am – 9:15am</td><td>Welcoming and Opening Speech</td><td>Prof. Ahamad Tajudin Khader<br>Deputy Dean<br>Postgraduate Studies & Research</td><td rowspan="2">DK A</td></tr>
<tr><td>9:15am – 10:15am</td><td>Keynote Speech : Research Management (SMART Research)</td><td>Prof. Dr. Naomie Salim<br>UTM</td></tr>
<tr><td colspan="4">TEA BREAK (10:15am – 10:30am)</td></tr>
<tr><td rowspan="2">10:30am – 1:50pm*</td><td>Oral Presentation</td><td rowspan="2">Postgraduate Students</td><td>DK A</td></tr>
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<tr><td colspan="4">LUNCH (1:00pm – 2:30pm)</td></tr>
<tr><th colspan="4">SESSION 2</th></tr>
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<tr><td rowspan="3">2:30pm – 4:45pm</td><td>Oral Presentation</td><td rowspan="3">Postgraduate Students</td><td>DK A</td></tr>
<tr><td>Proposal Review</td><td>DK B & C</td></tr>
<tr><td>Poster Session</td><td>Foyer</td></tr>
<tr><td>4.45pm – 5.00pm</td><td>Computer Science Postgraduate Society (CSPS) New Election</td><td>Mr. Bassam<br>CSPS President<br>&<br>Postgraduate Students</td><td>DK A</td></tr>
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*Early/Late Lunch for P21 proposal review team

# CSPC 2012 Program

| DAY 2: 17th JULY 2012 | | | |
|---|---|---|---|
| **SESSION 3** | | | |
| **TIME** | **PROGRAM** | **PRESENTER** | **VENUE** |
| 8:40am – 9:00am | Registration | Secretariat | Foyer<br>DK A |
| 9:00am – 10:00am | Keynote Speech:<br>Research Process | Assoc. Prof. Dr. Sundramoorthy a/l Pathmanathan | DK A |
| **TEA BREAK (10:00am – 10:30am)** | | | |
| 10:30am – 1:50pm* | Oral Presentation | Postgraduate Students | DK A |
| | Proposal Review | | DK B & C |
| **LUNCH (1:00pm- 2:15pm)** | | | |
| **SESSION 4** | | | |
| **TIME** | **PROGRAM** | **PRESENTER** | **VENUE** |
| 2:15pm – 4:00pm | 'The Tarik' Session | Postgraduate Students | DK A |
| 4:00pm - 4:30pm | Closing Session<br><br>(Certificate Presentation to CSPS 2011 Committee Member) | Prof. Rosni Abdullah<br>Dean of School of Computer Sciences | |
| **8:00pm – 11:00pm**<br>**CSPS CULTURAL NIGHT & DINNER**<br>**@ DEWAN BANKUET, USM** | | | |

*Early/Late Lunch for P10 & P19 proposal review team

## Parallel Sessions 1 (Day 1) – Oral Presentation
## Venue: DKA

### Session 1

**Reviewers: Prof. Ahamad Tajudin Khader(Chairperson), Dr. Ali Kattan**

| | | |
|---|---|---|
| 1030 – 1050 | DO5 | **Non-Native Accent Pronunciation Modeling in Automatic Speech Recognition**<br>Presenter:Basem H.A. Ahmed |
| 1050 – 1110 | D01 | **Applying Grapheme, Word, and Syllable Information for Language Identification in Code Switching Sentences**<br>Presenter:Yeong Yin Lai |
| 1110 – 1130 | D02 | **Malay News Transcription Clustering via Principal Component Analysis**<br>Presenter:Yow Foong Kuin |
| 1130 – 1150 | D03 | **MBN$^{seg}$: A Clustering System for Segmenting Spoken Broadcast News Stories**<br>Presenter:Zainab Ali Khalaf |

**Reviewers: Dr. Wong Li Pei (Chairperson), Dr. Dhanesh Ramachandram, Dr. Ali Kattan**

| | | |
|---|---|---|
| 1200 – 1220 | D06 | **3D Face Shape Reconstruction from Facial Points Using Regularization**<br>Presenter: Ashraf Y.A. Maghari |
| 1220 – 1240 | D07 | **An Initial Study on Tracking Pedestrian Trajectory from a Video**<br>Presenter: Halimatul Saadiah Md. Yatim |
| 1240 – 1300 | D04 | **A powerful modified Artificial Bee Colony Optimization algorithm for Protein structure prediction**<br>Presenter: Zakaria Noor Aldeen Mahmood |

## Parallel Sessions 2 (Day 1) – Oral Presentation
## Venue: DKA

**Session 2**

**Reviewers: Dr. Vincent Khoo Kay Teong (Chairperson) , Dr.Sharifah Mashita Syed Mohamad , Dr. Muhammad Fermi Pasha**

| | | |
|---|---|---|
| 1430 – 1450 | S01 | **Usability on Mobile Prototype of an Online Cancer Portal**<br>Presenter: Edison Gunawan |
| 1450 – 1510 | S03 | **Implementing Action-based Technique to Improve Learnability and Understandability of Web Applications**<br>Presenter:Nurul Afiqah Shamsuddin |
| 1510 – 1530 | S04 | **Comparative Study on Access Control Models for Privacy Preservation**<br>Presenter: Salah Salem Saleh Bindahman |
| 1530 – 1550 | S02 | **User-Centered Technique for Managing and Tracking Modification Requests in Prototype-Based Web Applications**<br>Presenter:Siti Nor Asikin Kamalzaman |

**Reviewers: Prof. Madya Azman Samsudin (Chairperson), Mrs.Manmeet Kaur, Dr. Abdullah Jaafar**

| | | |
|---|---|---|
| 1600 – 1620 | I01 | **RFID Adoption Intention in Hajj Organizations**<br>Presenter: Abdullah Hussein Al-Hashedi |
| 1620 – 1640 | I02 | **A Secure Protocol for Ultralightweight Radio Frequency Identification (RFID) Tags**<br>Presenter: Arash Eghdamian |
| 1640 – 1700 | I03 | **Proactive Model to Analyze Cyber-Crime Intentions for Network Forensics**<br>Presenter: Mohammad Rasmi |

## Parallel Sessions 3 (DAY 2) – Oral Presentation
## Venue: DKA

Session 3

Reviewers: Dr. Abdullah Jaafar (Chairperson), Prof. Madya Wan Tat Chee ,Dr. Yap Fa Toh

| | | |
|---|---|---|
| 1030 – 1050 | I04 | **A Movement Prediction Algorithm for Network-based IP Mobility in Urban Areas**<br>Presenter: Alireza Taghizadeh |
| 1050 – 1110 | I06 | **Enhanced Mobile Lightweight Medium Access Control Protocol for Multi-Hop Wireless Sensor Network**<br>Presenter: Amina Ahmed Mohamed |
| 1110 – 1130 | I05 | **Qualified NEMO Fast Handoff and Routing Optimization in IEEE 802.16e Broadband Wireless Access Networks**<br>Presenter: Badiea Abdulkarem Mohammed |
| 1130 – 1150 | I07 | **Cluster Based Routing Protocol Enhancement using Multipath Routing**<br>Presenter: Mohammed A. Mahdi |

Reviewers: Dr. Nurul Hashimah Ahamed HassainMalim (Chairperson), Prof. Madya Nur'Aini Abdul Rashid, Dr. Abdullah Jaafar

| | | |
|---|---|---|
| 1200 – 1220 | I08 | **Use of the Hash Table for Building the Distance Matrix in a Pair-Wise Sequence Alignment**<br>Presenter:Muhannad Abu-Hashem |
| 1220 – 1240 | I09 | **Enhanced Provisioning For Elastic Inter-Cloud Platforms, A Report of Progress and Findings**<br>Presenter: Nazi Tabatabaei Yazdi |
| 1240 – 1300 | I10 | **Modern Suffix Tree Methods for Indexing large Strings : A Comparative Study**<br>Presenter:Rayan Yousif Alkhayat |

## Parallel Sessions 1 – 2 (Day 1) - Proposal Presentation : Venue: DKB

Session 1

| | | |
|---|---|---|
| 1030 – 1120 | P01 | **Enhancing Affective-Based Personalization For Recommending Adaptive Image-Based Virtual Tour**<br>Presenter: Asma Hanee Binti Ariffin<br>Panels: Dr. Ibrahim Venkat,<br>Assoc. Prof Muhammad Rafie Hj. Mohd. Arshad |
| 1120 – 1210 | P02 | **Optimization Model Based on Artificial Bee Colony Algorithm For University Examination Timetabling Problems**<br>Presenter: Asaju Bolaji La'aro<br>Panels: Dr. Ibrahim Venkat ,<br>Puan Hasimah Hj. Mohamed |
| 1210 – 1300 | P03 | **Non-Rigid Face Image Registration**<br>Presenter: Chen Junfen<br>Panels: Prof. Abdullah Zawawi Hj Talib,<br>Assoc. Prof Dhanesh Ramachandram |
| 1300 – 1350 | P21 | **A Novel Modified A Star Search Compound Weighting Method For Centralized Cooperative Spectrum Sensing In The Cognitive Radio Network**<br>Presenter: Mohammad Azmi Al-Madi<br>Panel: Dr.Wan Mohd Nazmee Wan Zainon, Dr. Yap Fa Toh |

Session 2

| | | |
|---|---|---|
| 1430 – 1520 | P05 | **A New Elliptic Curve Multiplication Based On Zot Structure**<br>Presenter: Hani Mahmoud Abdelraheem Almimi<br>Panel: Dr. Mohd.Adib Hj.Omar, Prof. Abdullah Zawawi Hj Talib |
| 1520 – 1610 | P06 | **Crowd Simulation And Rendering In An Immersive Virtual Heritage Application On Mobile Platform**<br>Presenter: Lim Chen Kim<br>Panels: Assoc. Prof. Bahari Belaton,<br>Assoc. Prof. Muhammad Rafie Hj. Mohd. Arshad |
| 1610 – 1700 | P07 | **A Methodology For Inconsistency Detection And Correction In Software Requirements Prioritization**<br>Presenter: Lim Chia Yean<br>Panels: Dr. Mohd.Adib Hj.Omar, Mr. G.C Sodhy |

Parallel Sessions 1 – 2 (Day 1) - Proposal Presentation

Venue: DKC

Session 1

| | | |
|---|---|---|
| 1030 – 1120 | P08 | **A Context-Aware Based Authorization System For Pervasive Grid Computing**<br>Presenter: Marilyn Lim Chien Hui<br>Panels: Puan Hasimah Hj. Mohamed, En.Mohd Azam Osman |
| 1120 – 1210 | P14 | **Image-Based Construction And Intelligent Interactions In Mobile Virtual Heritage Applications**<br>Presenter: Tan Kian Lam<br>Panels: Assoc Prof.Dhanesh Ramachandram, Dr. Nasriah Zakaria |
| 1210 – 1300 | P13 | **Evolutionary Algorithm-Based Optimization Models In Undertaking Multi-Objective Optimization Problems**<br>Presenter: Tan Choo Jun<br>Panels: Prof. Ahamad Tajudin Khader, Dr. Vincent Khoo Kay Teong |

Session 2

| | | |
|---|---|---|
| 1430 – 1520 | P11 | **Improving Efficiency Of Encryption And Decryption In RSA Cryptosyaytem By Zot**<br>Presenter: Shahram Jahani Ali<br>Panels: Dr. Aman Jantan , Assoc.Prof Putra Sumari |
| 1520 – 1610 | P17 | **Tracking Multiple Fishes Using Colour Changes Identification And Enhanced Object Tracking Algorihm**<br>Presenter: Wong Poh Lee<br>Panels: Assoc. Prof Cheah Yu-N, Dr. Vincent Khoo Kay Teong |
| 1620 – 1700 | P16 | **Holistic Network Selection For High-Speed Wireless Mobile Nodes In A 4g Environment**<br>Presenter: Vasuky A/P Mohanan<br>Panel: Dr. Yap Fa Toh, Dr. Mohd.Adib Hj.Omar |

## Parallel Sessions 3 (Day 2) – Proposal Presentation

## Venue: DKB

**Session 3**

| | | |
|---|---|---|
| 1030 – 1120 | P18 | **Framework Implementation Radio Frequency Identifation Library Management System (Rfid-Lms)**<br>Presenter: Zainab Binti Ajab Mohideen<br>Panel: Puan Norlia Mustaffa, Assoc.Prof Wan Tat Chee |
| 1120 – 1210 | P15 | **Compact Binary Representation Of Gf(2n) For Asymmetric Cryptography Purposes**<br>Presenter: Uma A/P S Kanniah<br>Panel: Dr. Aman Jantan, Dr. Yap Fa Toh |
| 1210 – 1300 | P04 | **Question Classification Using Clustering Rule Features**<br>Presenter: Cindy Ooi Suat Ling<br>Panels: Dr. Siti Khaotijah Mohammad, Puan Wahidah Husain |
| 1300 – 1350 | P10 | **Expert-Base Decision-Support Framework For Software Reengineering: A Requirement Engineering Perspective**<br>Presenter: Rahma A. Kamaludeen<br>Panels: Dr. Zurinahni Zainol, Puan Umi Kalsom Yusof |

## Venue: DKC

**Session 3**

| | | |
|---|---|---|
| 1030 – 1120 | P12 | **Simulation Of Pedestrian Movements And Behaviours In Crowd**<br>Presenter: Siamak Sarmady<br>Panels: Dr.Wan Mohd Nazmee Wan Zainon,<br>Assoc. Prof. Azman Samsudin |
| 1120 – 1210 | P20 | **Dynamic Approach For Secure And Cost – Aware Seamless Mobility In Coexist IPV4/IPV6 Networks Using Tunneling Mechanism**<br>Presenter: Bassam Naji Abdullah Al-Tamimi<br>Panel: Assoc. Prof. Chan Huah Yong, Assoc. Prof. Bahari Belaton, |
| 1210 – 1300 | P09 | **A Memetic Harmony Search Algorithm For Nurse Rostering Problems**<br>Presenter: Mohammed A.M. Awadallah<br>Panel: Dr. Zurinahni Zainol, Assoc Prof. Putra Sumari |
| 1300 – 1350 | P19 | **Analysis of High Resolution Mass Spectrometry For Bio Maker Discovery Based on Bio-inspired Feature Selection**<br>Presenter: Syarifah Adilah Binti Mohamed Yusoff<br>Panel: Assoc. Prof. Nur'Aini Abdul Rashid,<br>Dr. Nurul Hashimah Ahamed Hassain Malim |

## Oral Presentations:

### Infrastructure

## Oral Presentations:

### Data to Knowledge

## Oral Presentations:

### Service Computing

## RFID ADOPTION INTENTION IN HAJJ ORGANIZATIONS

*Abdullah Hussein Al-hashedi, Muhammad Rafie Mohd Arshad, Hasimah Hj Mohamed, Ahmad Suhaimi Baharudin*

***Abstract***

*Millions of Muslims go to Mecca every year to perform their Hajj (Pilgrimage). Management of Hajj activities is a very complex task for Saudi Arabian authorities and Hajj organizers due to the large number of pilgrims, the specific geographical area for the movement of pilgrims and the short period of Hajj. Radio Frequency Identification (RFID) technology can be used in various applications during Hajj season to provide good solutions for many problems and contribute in overcoming many difficulties. Despite this, RFID as an emerging technology has not been studied from the Hajj perspective. Using the Technology- Organization-Environment (TOE) framework, this study develops a theoretical model for RFID adoption intention in Hajj Organizations. Seven independent variables (relative advantage, compatibility, complexity, top management, firm size, government support, and willingness to collaborate among partners) and one moderator variable (organization readiness) are proposed to help predict RFID adoption intention. We include the willingness to collaborate among the partners as an important factor in environmental context, but has been ignored in IS literature. This study proposes to empirically test the model with adequate sample size of Hajj organizations.*

## A SECURE PROTOCOL FOR ULTRALIGHTWEIGHT RADIO REQUENCY IDENTIFICATION (RFID) TAGS

*Arash Eghdamian*

***Abstract***

*Recently, an Ultralightweight protocol for RFID Tags has been published. The advantage of this protocol was its low computation cost, but it fails in its security objectives, being vulnerable to several important attacks such as traceability, full disclosure, cloning and desynchronization. In this research, that protocol was enhanced and a new Ultralightweight RFID authentication protocol with mutual authentication was proposed, while keeping the computation cost low. The proposed protocol requires only simple bit-wise operations and can resist various attacks which the previous one could not.*

## PROACTIVE MODEL TO ANALYZE CYBER-CRIME INTENTIONS FOR NETWORK FORENSICS

*Mohammad Rasmi, Aman Jantan*

***Abstract***

*Cyber crime analysis is a necessity after breaches of the system; without an accurate analysis, network forensics works poorly. Analyzing cyber crime evidence and linking this with previous incident responses, makes the investigation outcome more accurate and improves the quality of decision-making. This paper proposes a network forensics cyber crime analysis model that identifies the attack intentions of a new cyber crime and estimates the similarity of this new attack intention to previous ones. A similarity metric for attack intention will be generated to determine similar attack intentions. Lastly, the similarity of the attack intention will be used to determine the similarity between the incident response required for the new cyber crime and that required for previous cyber crimes, using a pre-defined incidence response database. Experiments were performed on packet capture, where network data traffic generates a backdoor attack by using a virtual cyber crime, to evaluate the proposed model. Results show that the proposed model can reduce effort and processing costs during the investigation process. In addition, the attack intention maximizes the accuracy of similar incident response.*

## A MOVEMENT PREDICTION ALGORITHM FOR NETWORK-BASED IP MOBILITY IN URBAN AREAS

*Alireza Taghizadeh, Wan Tat Chee*

***Abstract***

*Global connectivity in mobile wireless networks depends on Internet Protocol (IP) Mobility protocols, which are known for their poor performance. One approach to improve the performance of IP mobility protocols is the prediction of the mobile node future movements and accelerate the IP mobility operation by acting in proactive methods. The majority of existing movement prediction algorithms relies on the mobile node (host) intelligence and capabilities to predict its future movement. These host-based movement prediction algorithms are precise, however they are only applicable to traditional host-based IP mobility protocols. The present paper proposes a network-based movement prediction algorithm, which only uses the network side information concerning history of the mobile node movements to predict the future similar movements. The simulation results indicate that the proposed algorithm can predict IP mobility target with proper accuracy, given the street map regulated movements in the urban areas.*

## QUALIFIED NEMO FAST HANDOFF AND ROUTING OPTIMIZATION IN IEEE 802.16E BROADBAND WIRELESS ACCESS NETWORKS

*Badiea Abdulkarem Mohammed, Wan Tat Chee*

***Abstract***

*NEMO was created to extend the basic end-host mobility support in the Mobile IP (MIP) protocol to provide network mobility support. However, the handover latency in NEMO is high and the nested tunnels' problem in the nested NEMO networks is not considered. Many schemes have been proposed to solve these problems depend on the Fast Mobile IP (FMIP) by optimizing its signaling procedure. Better optimized signaling procedure is proposed in this paper and using of a proposed Routing Optimization scheme as a solution for the lack of the nested tunnels' problem is proposed too. Analytical results comparing the proposed scheme with the others are provided, showing that our scheme has the lowest handover latency and disruption time.*

## ENHANCED MOBILE LIGHTWEIGHT MEDIUM ACCESS CONTROL PROTOCOL FOR MULTI-HOP WIRELESS SENSOR NETWORK

*Amina Ahmed Mohamed, Wan Tat Chee*

***Abstract***

*EML-MAC, is a new TDMA based Medium Access Control MAC protocol, which is designed for general WSN applications to improve the energy efficiency of the nodes ,by improving the time slot synchronization algorithm of (MAC) layer hence find a more solid and complex slot assignment algorithm which improves the problem of duplicate slot assignment The main aim of this protocol is to develop a more efficient way for slot assignment, which reduces the unavoidable collisions and generalize the existing MAC protocol. The proposed method will not only reduce the duty cycle of the transceiver, it will also improve the handshaking process to limit the number of times needed to switch between transceiver states and improves the existing Time Slot Synchronization algorithm of ML-MAC protocol and use that in the SB-MAC protocol which currently does not support sleep, it also will reduce and in some cases completely prevents the possibility of packet collision.*

## CLUSTER BASED ROUTING PROTOCOL ENHANCEMENT USING MULTIPATH ROUTING

*Mohammed A. Mahdi, Wan Tat Chee*

***Abstract***

*Mobile Ad Hoc Network (MANET) is a group of wireless mobile nodes dynamically forming a network without any pre-existing infrastructure. Multipath routing allows the establishment of multiple paths between a single source and single destination node. Multipath routing is typically used to increase the reliability of data transmission, reduce end-to-end delay, provide load-balancing, and improve security. In This paper, we enhance Cluster Based Routing protocol (CBRP) which is a single path MANET protocol to use multiple paths. The traffic will distribute among multiple paths to reduce network traffic congestion and decrease delay. An analytical model is used for multipath CBRP routing protocol and single path CBRP routing protocol for MANET in order to estimate the end-to-end delay and queue length. The analytical results show that the delay and queue length in multipath CBRP are less than the delay and queue length in single path CBRP.*

## USE OF THE HASH TABLE FOR BUILDING THE DISTANCE MATRIX IN A PAIR-WISE SEQUENCE ALIGNMENT

*Muhannad Abu-Hashem, Nur'Aini Abdul Rashid, Rosni Abdullah*

***Abstract***

*In bioinformatics, distance matrices are used for many purposes, such as clustering sequences, representing protein structures without relying on coordinates, constructing phylogenetic trees, and building multiple sequence alignments. The pair-wise alignment plays a significant role in the construction of distance matrices because it rates the similarities and distances between the sequences. The N-Gram-Hirschberg (NGH) algorithm is a fast, dynamic-programming pair-wise alignment algorithm, which produces the same optimal results as the Smith-Waterman algorithm. In this paper, we present HashTable-N-Gram-Hirschberg HT-NGH method , a new and practical method for constructing a distance matrix using a pair-wise alignment. HT-NGH method is an enhancement to the NGH method, and it is fast and produces the same results as the Smith-Waterman algorithm. HT-NGH algorithm uses the hash table capabilities to enhance the transformation process of the two former methods, NGH and Hashing-N-Gram-Hirschberg (H-NGH). The proposed enhancement demonstrates an improvement in time and outperforms H-NGH, without sacrificing space complexity. Furthermore, our algorithm run-time outperforms the NGH and H-NGH methods by 60% and 30%, respectively. In addition, the complexity of the transformation phase in HT-NGH algorithm is O (min (NM)/w) compared to O (min (NM)) for NGH.*

**ENHANCED PROVISIONING FOR ELASTIC INTER-CLOUD PLATFORMS, A REPORT OF PROGRESS AND FINDINGS**

*Nazi TabatabaeiYazdi, Chan Huah Yong*

***Abstract***

*Nowadays, scientific workflow demands more and more process power. The use traditional High Performance Computing (HPC) platforms (i.e. Parallel and Distributed systems), which have a rigid contracted system, sometimes may lead to extra cost. Cloud computing on the other hand promises On-demand-provisioning and a Pay-as-you-Go model. Although there have been lots of studies in cloud platform scaling, there are still remaining challenges in this area. The proposed objective of this paper is to create an efficient elastic Infrastructure as a service (IaaS) Cloud Platform with enhanced provisioning. The contribution of this work is to implement an innovative combination of optimization algorithms for selecting the best possible schedule to use. In this paper we briefly presented some of our progress, findings and challenges in this area.*

**MODERN SUFFIX TREE METHODS FOR INDEXING LARGE STRINGS : A COMPARATIVE STUDY**

*Rayan Yousif Alkhayat, Nur'Aini Abdul Rashid, NurulHashimahAhamadHassainMalim*

***Abstract***

*In the last decade, a new data types rose in computer science, from the most important ones are the very large strings datasets. Those datasets may stands for the time series, financial data, and genomic sequences that represent the contents of the DNA, RNA and Proteins. For any researcher the process of getting knowledge about whether a subsequence exists in a specific large string is important. Either to check the substring location or to add it if it is not exists. In this paper we present a comparative study for the modern suffix tree – based algorithms used for indexing large strings, which are up to date as far as our knowledge.*

## APPLYING GRAPHEME, WORD, AND SYLLABLE INFORMATION FOR LANGUAGE IDENTIFICATION IN CODE SWITCHING SENTENCES

*Yin-Lai Yeong ,Tien-Ping Tan*

***Abstract***

*In this paper, we propose an automatic language identification approach for code switching sentences by using the morphological structures and sequence of the syllable. The approach was tested on Malay-English code switching sentences. The proposed language identification approach achieves 90.75% in term of accuracy on the vocabularies. Our approach was further improved by combining the knowledge from other level in the sentence: word and alphabet. The additional information further improves the accuracy of our language identification method to 96.36%.*

## MALAY NEWS TRANSCRIPTION CLUSTERING VIA PRINCIPAL COMPONENT ANALYSIS

*Yow Foong Kuin*

***Abstract***

*In this paper will apply Principal Component Analysis (PCA) for Malay broadcast news transcription clustering. The steps involved are sentences segmentation, indexing, dimensionality reduction and clustering. Firstly, the transcription will be segmented into sentences before the indexing stage. Indexing consists of tokenization, stop word removal, stemming and text representation. A Vector Space Model (VSM) will use to represent the sentences and terms in transcription in the form of vectors. Next, a dimensionality reduction process via principal component analysis will apply to the vectors created. The principal component score that produced will use to cluster sentences in the news stories into separated groups by using similarity measurement. Lastly, the cluster will be evaluated by using cluster validity measurement.*

## MBN$^{seg}$: A CLUSTERING SYSTEM FOR SEGMENTING SPOKEN BROADCAST NEWS STORIES

*Zainab Ali Khalaf, Tan Tien Ping*

***Abstract***

*In this study, we designed a SDR system (MBN$^{seg}$) and tested its ability to detect boundaries in Malay spoken broadcast news stories. Herein we propose the MBN$^{seg}$system, the main goal of which is to reduce the impact of ASR transcription errors on retrieval performance. An automatic speech recognition system is used to convert the Malay spoken broadcast news to text. The performance of unsupervised learning is evaluated on the Malay broadcast news using Euclidean distance algorithm. MBN$^{seg}$system achieves 29% accuracy when it is tested on the Malay broadcast news to identify news story boundaries automatically.*

## A POWERFUL MODIFIED ARTIFICIAL BEE COLONY OPTIMIZATION ALGORITHM FOR PROTEIN STRUCTURE PREDICTION

*Zakaria Noor Aldeen Mahmood, Rosni Abdullah*

***Abstract***

*Swarm intelligence systems are mainly introduced based on the behavior and the interactions of the insects locally with their communities and also with their environments. There are many swarm intelligence algorithms that have been inspired from the natural swarms. Ant Colony, Particle Swarm and Bee Colony are algorithms where practically used for different type of research problems. Artificial Bees Colony (ABC) Optimization algorithm which inspired from the honey bees food foraging method; is an optimization method where effectively used for bioinformatics problems. The Protein Structure Prediction (PSP) is one of the most interesting subjects in the field of bioinformatics. By resolving genetic code of human DNA, the amino acid sequence of proteins encoded can easily be predicted and proteins can be subsequently classified into families and subfamilies. However for a given protein, knowing the exact action whether hormonal, enzymatic, transmembranal or nuclear receptors, etc does not depend solely on amino acid sequence but on the way the amino acid thread folds as well. In this paper, a modified Artificial Bees Colony (ABC) algorithm, where a crossover operator from the Genetic Algorithm (GA) has been added to the original ABC algorithm. As this paper proposed, a crossover operator was added as a new phase after the EmolyedBees phase in the original ABC. To solve the PSP problem, a conformation with the lowest free energy is the target of the ABC to search the conformations space for. The results shows the ability of the modified ABC to reach the global minimal for PSP problem in an adequate iterations.*

## NON-NATIVE ACCENT PRONUNCIATION MODELING IN AUTOMATIC SPEECH RECOGNITION

*Basem H.A. Ahmed, Tan Tien Ping*

***Abstract***

*In this paper, we proposed an approach to model the pronunciation of non-native accented speech for automatic speech recognition system. The proposed method consists of two phases: phone adaptation and pronunciation generalization. In phones adaptation, we identify the phone used by non-native speakers compared to the standard phones, and then remove the mismatch, as a result of the influence from mother tongue. In pronunciation adaptation, we predict the pronunciations of words by non-native speakers. The results shown the proposed approach reduce the WER from 44.8% to 41.9%.*

## 3D FACE SHAPE RECONSTRUCTION FROM FACIAL POINTS USING REGULARIZATION

*Ashraf Y. A. Maghari, ImanYi Liao, Bahari Belaton*

***Abstract***

*Principle Component Analysis (PCA)-based statistical 3D face modeling using example faces is a popular technique for modeling 3D faces. It has been widely used for 3D face reconstruction and face recognition. In this paper the regularized 3D face shape reconstruction algorithm has been tested to find out how the number of feature points affect the accuracy of the 3D face shape reconstruction based on the PCA-model. A case study on USF Human ID 3D database, one of the most popular database in the field, has been used to study the effect of feature points on the accuracy of 3D reconstruction. We found that, if the test face is from the training set, then any set of any number greater than or equal to the number of training faces can reconstruct exact 3D face. If the test face does not belong to the training set, it will hardly reconstruct the exact 3D face using 3D PCA-based models. However, it could reconstruct an approximate face depending on the number of feature points and the weighting factor. Furthermore, regardless of the value of the weighting factor, the accuracy of reconstruction by a large number of feature points (greater than 200 points) is relatively the same in all cases even with different locations of points on the face. However if the number of selected points is less than the number of training faces, the produced face will have less accurate shape than the one produced by the greater number of selected points. The regularized algorithm has also been used to reconstruct 3D face shape from a number of feature points selected manually from real 2D face images. Some 2D face images from CMU-PI database have been used to visualize the 3D face shapes.*

## AN INITIAL STUDY ON TRACKING PEDESTRIAN TRAJECTORY FROM A VIDEO

*Halimatul Saadiah Md. Yatim, Abdullah Zawawi Talib, Fazilah Haron*

***Abstract***

*Tracking pedestrian movements in a video can be used to gain more understanding about crowd features and behaviours. In this paper, an initial study on tracking pedestrian trajectory by using image processing methods is presented. Every frame in the video is processed to extract moving objects of interest in consecutive video frames which are assumed to be pedestrians. The data obtained is filtered to remove unwanted objects on images and then objects are labelled for identification. The centroid positions of each object in video sequences are composed to obtain the movement vector. The movement vector will be used to plot the graph and visualize the movement path of pedestrian. The results of the preliminary experiment are presented in the paper.*

## USABILITY ON MOBILE PROTOTYPE OF AN ONLINE CANCER PORTAL

*Edison Gunawan, Nasriah Zakaria*

***Abstract***

*The online cancer support have been implemented in many featured of applications in the internet, one of them is mailing lists. Mailing lists allow the subscribers or patients to attain information and opinion from the health providers. The main issue during the process of this intervention is the less amount of time spent by patients to check the mailing lists which leads to low percentages of potential patients to use the online cancer support. This research will investigate whether cancer patient can utilize the mobile cancer support prototype which was based from a web online cancer portal; therefore our aim is to investigate patients' usability with the mobile cancer support application and to apply suitable usability framework or model during the process. For the methodology part, we developed a mobile based application of the online cancer portal as the tool to conduct usability study among participants of cancer patients. This research could trigger major improvement in mobile usability study and with the integration of healthcare towards the usability model implemented during the study, will be the main contribution that could provides an implication for future study.*

## USER-CENTERED TECHNIQUE FOR MANAGING AND TRACKING MODIFICATION REQUESTS IN PROTOTYPE-BASED WEB APPLICATIONS

*Siti NorAsikin Kamalzaman, Sharifah Mashita Syed-Mohamad and Shahida Sulaiman*

***Abstract***

*The evolution of Web application leads to the excessive numbers of modification requests since users continuously requesting for changes. As a result, the maintainers need an effective technique to handle the excessive numbers of modification requests. Hence, this paper proposes a user-centered technique to assist the maintainers in managing and tracking the modification requests effectively. The proposed technique consists of four processes that are capturing, classifying, confirming, and validating the modification requests. The prototype tool is represented in order to evaluate the effectiveness of the proposed technique. We expect this technique and the prototype tool will assist the maintainers to handle and track the requests effectively and while at the same time helps the users to make a change request easily and quickly.*

## IMPLEMENTING ACTION-BASED TECHNIQUE TO IMPROVE LEARNABILITY AND UNDERSTANDABILITY OF WEB APPLICATIONS

*Nurul Afiqah Shamsuddin, Sharifah Mashita Syed-Mohamad and Shahida Sulaiman*

***Abstract***

*The emergence of the Internet era, has converted most software applications to Web-based applications that aspires developers in building high quality applications. As one of the quality factors in Web applications, usability factors in a Web application are important because it deals with various levels of users' experience. Generally a Web application contains basic functions and advanced functions, which basic functions are easy to be used by users compared to the more advanced functions which users may have never known their existence, their usage and how to use them. Thus, it is a challenge for Web developers to ensure that their Web application would continuously support users' understanding and learning processes and convince the users that their Web application will ease users' task instead of burdening them with functions that they provide in their Web applications. We propose an action-based technique to improve learnability and understandability in Web applications. This paper reports the implementation of the technique in a webmail. The study expects that the interface design of a Web application to be more usable as it does not only grant those functions that users require, but it also aids users in exploring new functions in such Web applications.*

**COMPARATIVE STUDY ON ACCESS CONTROL MODELS FOR PRIVACY PRESERVATION**

*Salah Bindahman, Nasriah Zakaria*

***Abstract***

*Privacy is considered to be a critical issue for providing high quality services to users over any information system that freely shares all data anytime, anywhere, and through any device without considering constraints. User's privacy should be protected and access to privacy information must be controlled in accordance with user's privacy preferences. Access control is the main technique used to insure the protection of the user's privacy by controlling the access to the private information only to the authorized ones. In this paper, we will discuss critically the current access control models that are for privacy protection purpose and then came out with a comparison between all of these models. We hope this paper can be useful for the researchers in this field by being a good reference in the same area.*

## Poster Presentation

### Infrastructure

## Poster Presentations:

### Data to Knowledge

## Poster Presentations:

### Service Computing

**VIEWS ON THE HISTORY AND EFFICIENCY OF EXACT STRING MATCHING**

*Atheer Akram Abdulrazzaq, Nur'Aini Abdul Rashid*

**Abstract**

*Exact String matching problem had high importance in the last two decades due to the advancement in technology. It has also become necessary to solve this problem because of its application in many fields. The main factors associated with this problem are number of attempts, number of character comparison and running time. These factors are influenced by type of algorithm, data type, data size and length of pattern used. This study is exploring the comparison in performance and limitations of algorithms.*

**STRING MATCHING ALGORITHMS FOR INTRUSION DETECTION SYSTEM: A SURVEY AND TAXANOMY**

*Awsan AbdulRahman Hasan, Nur'Aini Abdul Rashid*

**Abstract**

*Nowadays the Internet is very massive and the need for a system to protect the networks from being attacked becomes very important. The Intrusion Detection System (IDS) is an important part of any modern network to detect the intrusion activities in the network. IDS inspects the content of the packets and identify the attack signatures by utilizing string matching algorithms. As network technology goes into high speed and complex structure, the needs for efficient and accurate string matching techniques has increases and becomes important for identifying and detecting malicious packets. However, most string matching algorithms did not work well in high-speed networks without dropping the network packets during the matching process. In this work, we investigate important IDS string matching algorithms aiming to provide some suggestions for the characteristics of good string matching algorithm that will work well and can be fully adopted to work in a complex environment of IDS. We suggest implementing the hybrid string matching algorithm for IDS as alternative to using single string matching algorithms, to provide fast performance and resistance against any algorithmic performance attack.*

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**THE INTEROPERABILITY BETWEEN HETEROGENEOUS PROTOCOLS AND MULTIMEDAI APPLICATIONS: A REVIEW**

*Hadeel Saleh Haj Aliwi, Putra Sumari*

**Abstract**

*Nowadays, Multimedia Communication has been developed and improved rapidly in order to enable users to communicate between each other over the internet. In general,the multimedia communication consists of audio,video and instant messages communications. The interworking between protocols is a very critical issue due to solving the communication problems between any two protocols, as well as it enables people around the world to talk with each other at anywhere and anytime even they use different protocols.Providing interoperability between different signalling protocols and multimedia application will take advantage of more than one protocols. This paper surveys the interworking functions between different VOIP protocols (i.e. InterAsteriskeXchange Protocol (IAX),Session Initiation Protocol (SIP), and H.323 protocol),Multimedia Conferencing System (MCS) (i.e. Real Time Switiching Control Protocol (RSW) and Multipoint File Transfer System (MFTS) and multimedia applications (i.e. ISO MPEG-4 standards). As well as, we will do a comparison among these protocols in term of call setup format,media transport, codec, etc.*

**PER-PRIORITY FLOW CONTROL (PPFC) FOR ENHANCING METRO ETHERNET QUALITY OF SERVICE**

*Bahareh Pahlevanzadeh, Wan Tat Chee*

**Abstract**

*Day by day Internet communication and services are experiencing an increase in variety and quantity in their capacity and demand. Thus, making traffic management and quality of service (QoS) approaches for optimization of the Internet become a challenging area of research; meanwhile flow control and congestion control will be considered as significant fundamentals for the traffic control especially on the high speed Metro Ethernet. In 1997, IEEE had standardized a method (IEEE802.3x standard) to provide flow control, which is applicable to all version of full-duplex Ethernet. Basically the IEEE802.3x standard uses PAUSE frames as MAC control frames, in data link layer, to enable or disable frame transmission. As a result regulating data flow at the low level of OSI model assists to minimize frame loss and prevent latency due to error recovery at the higher layer protocols. With the initiation of Gigabit Ethernet as the carrier domain with long distances (high propagation delay), the above traditional ON/OFF IEEE802.3x approach may no longer be suitable. Therefore, a new architecture and mechanism that offer more flexible and efficient flow and congestion control, as well as high level QoS is now necessary. This research presents a new scheme called* ***Per-Priority Flow Control (PPFC)*** *as an extension to the* ***IEEE802.3x standard*** *based on a new* ***priority PAUSE frame management*** *using the advantages of* ***IPv6 flow label*** *field through the* ***multi-layer switches.*** *For quantitative performance evaluation of different proposed schemes (including link based IEEE802.3x and cross layer-based PPFC schemes),* ***EtherValve*** *platform-framework with its four interior modules; named Device-Based Single Shared Physical Buffer (****DSPB),*** *Port-Based Physical Buffer (****PPB),*** *Virtual Traffic-Based Prioritized Buffer (****VTPB), And*** *Hybrid Virtual Color & Class-Based Prioritized Buffer* ***(HVCPB****); has been developed based on OMNET++ simulation software.DSPB and PPB are modeled according to the link layer based scheme of original IEEE802.3x; whereas the other three proposed modules of this research are cross layer based schemes. The* ***enhanced IEEE802.3x*** *features have been achieved by means of some minor and major modifications in different components, mechanisms and algorithms of original standard (i.e. congestion detection, flow selection, congestion notification and action techniques) in order to provide more effective prioritized flow control and virtual buffer and resource management. The impact of different modules' parameters (e.g. buffer size, threshold, traffic rate and traffic class, burst duration) and some qos techniques (e.g. traffic policing, traffic shaping, buffer management, scheduling, differentiated services and marking) are evaluated for each scheme.*

## SPATIAL FUZZY C-MEANS IN GENERAL-PURPOSE COMPUTING ON GRAPHICS PROCESSING UNIT ENVIRONMENT

*Mogana Vadiveloo,Rosni Abdullah, Mandava Rajeswari*

**Abstract**

*One of the important characteristics of an image is that neighboring pixels are highly correlated. In other words, these neighboring pixels posses similar feature values and the probability of belongings to the same cluster is higher. Conventional Fuzzy C-Means (FCM) does not utilize this spatial relationship; but Spatial FCM (SFCM) does. However SFCM is expected to require higher computation time as the algorithm is combination of both spectral and spatial domain. This paper proposes the use of graphics processors (GPU) to speed up the computations involved in Spatial Fuzzy C – Means(SFCM). This implementation is expected to show speed up of 90x times higher than the SFCM for large image data set.*

## A NEW INFROMATION HIDING METHOD FOR COLOR IMAGE

*Samer Atawneh, Putra Sumari*

**Abstract**

*With thousands of digital files are downloaded and uploaded daily, information hiding techniques increasingly become widespread, and secure communications become a greater concern. Steganography plays an increasing role in the security of transmitting confidential information. This paper presents a new hiding technique that exploits the spatial domain to hide secret information. The cover image is virtually divided into disjoint parts with each part's size equal the size of the secret message.Each pixel from the secret message is to be hidden in the best pixel among the corresponding pixels' bytes in the parts of the cover image.The Experimental results show that the proposed algorithm reserves the image quality.*

**PHYLOGENETIC TREE CONSTRUCTION SOFTWARE: A REVIEW**

*Najihah Ibrahim, Nur'Aini Abdul Rashid*

**Abstract**

*Bioinformatics is the application of computer algorithm for organizing,managing and analyzing biological data. One of the most important bioinformatics applications is the algorithm to construct phylogenetic tree to classify the communities, populations and species using gene sequence data.In this study, we investigate and compare existing application to find the suitable method for phylogenetic tree analysis and construction. The application that being compare in here are MRBAYES, TREE-PUZZLE, GAML AND BEAST. This survey shows that MCMC algorithm is more reliable method to construct phylogenetics tree compare to the other methods.*

**OPTIMIZED ENERGY CONSTRAINT FOR REAL-TIME WIRELESS SENSOR NETWORKS BY PARTITIONING MULTIPLE-PATH USING INTERGER PROGRAMMING**

*Mohammed Zaki Hasan, Wan Tatt Chee*

**Abstract**

*Typical sensor network consists of a large number of multi-functional, low-cost, low-power nodes deployed densely and randomly in the environment for monitored sensed to control the environment, performing local processing, and communicating their results with a base station, which do most of the complex processing. The introduction of multimedia sensor networks along with the increasing interest in real time applications had made strict constraints on both delay and throughput in order to report the time-critical data to the processing center or sink within certain time limits and bandwidth requirements without any loss. For instance, transmission of video streaming in a disaster management setup requires careful handling in order to ensure that the end-to-end delay is within acceptable range, and the video is received properly without any distortion. The failure to detect the event arises from many reasons, limitation functionality of sensors, the power consumption and reliability. We proposed a mathematic model for a new generation QoS routing determination method that enables to allocate the optimal path that satisfying the required QoS in order to support a wide range of communication-intensive real-time multimedia for wireless sensor applications. The mathematical modeling based on using Mixed Integer Programming (MIP) which is both based on the Lagrange Relaxation (LR) that defined as critical parameter to adaptive the switching hop-by-hop QoS routing protocols in wireless sensor networks. Thus occur through embedded the multi-criteria for each objective function related to decision constraint that decides which path from the source to sink will be selected.*

**A REVIEW VIDEO ON DEMAND SYSTEMS OVER CLOUD COMPUTING ENVIRONMENT.**

*Vaithegy Doraisamy,Putra Sumari*

**Abstract**

*In this paper proposed a caching scheme to reduce the time delay in Video on Demand (VOD) System over MANET. VOD System over MANET is an interactive multimedia system that provides video services to mobile clients. Mobile clients who use the system will encounter high service delay to watch their favorite movie and this is the main problem in this system. The proposed caching scheme is called Neighborhood-Initial Playback Based Caching Scheme (NIPBCS) to overcome the service delay in the system. In NIPBC, when a new client enters the MANET network, the Local Forwarder (LF) will detect the new client upon arrival and will send the 1st segment of a movie to the new client's First buffer. The new client can request for the 1st segment of its favorite movie by tuning in to a channel from the Staggered Broadcasting Protocol that will broadcast the 1st segment of the movie or the new client can request from the neighbors. If the new clients' favorite movie is the same as the 1st segment of a movie sent by the LF, the client can just switch to the First Buffer and start watching the movie. By this way the aim of this caching scheme is achieved that is to reduce the time delay in VOD system over MANET. The performance of the system is evaluated through a simulation study and the extensive simulation was conducted to get the performance result of the NIPBCS. The result obtained from the simulation shows that NIPBCS reduces 10% of the time delay of the system compared to the existing caching scheme.*

**A VIDEO ON DEMAND SYSTEM ARCHITECTURE FOR HETEREGENOUS WIRELESS MOBILE NETWORK**

*Saleh Ali.K.Alomari, Putra Sumari*

**Abstract**

*This paper proposed new system architecture for heterogeneous mobile devices over heterogeneous network to provide optimal Video on Demand (VoD) services to difference types of devices with optimal bandwidth utilization. At the same time, it will provide separate VoD services to different type of devices. and proposed a new conceptual model whereby a mobile node is possible to move through heterogeneous networks and infrastructures, there are also several nodes connected and receiving VOD services in different communication and infrastructural approach also we proposed for our system architecture Global Media Forwarder (GMF) to provides wide area services through deployed infrastructures such as 3G and WIMAX as well as a new protocol call (DNDS) will be used for accumulating the required information from the mobile devices and Media Forwarders for configuring and providing optimal services to the mobile users, implemented and executed between Media Forwarders, CVSP and the mobile devices.*

## SPIKING NEURON MODELS: A REVIEW

*Ahmed Abusnaina, Rosni Abdullah*

**Abstract**

*This paper illustrates various spiking neuron models, which could be used in simulation or implementation of different spiking neural network application; such as brain simulation and engineering problems. Biologically plausible and computational efficiency are the most characteristics that could be taken in consideration to choose which of the available model is best fit to the application.*

## ADAPTING SOCIAL FACTORS IN ONTOLOGY REPRESENTATION FRO A KNOWLEDGE BASED COALITION FORMATION SYSTEM

*Azleena Mohd Kassim, Cheah Yu-N*

**Abstract**

*A coalition formation system focuses to achieve an optimal group arrangement between agents; which can be a collection of computer systems, processes or even virtual presentation of human. Most coalition formation approach focus more on the structure and representation, often overlooking the knowledge embedded in the coalition formation systems. Coalition formation systems can be further enhanced by adapting knowledge management and knowledge engineering strategies into the systems. Human and social factors which are one important knowledge source and trigger are also not widely applied to coalition formation systems. In our research, our coalition formation system represent human as individual agent in a social network with social factors as the instance, represented in ontology format. In this paper, we present the framework of the social factors which is the basic structure of the knowledge source in the coalition formation system. The presentation of these social factors in ontology format will be discussed in the paper, focusing on the suitability and the benefits to the coalition formation system.*

## SEGMENTATION OF MULTISPECTRAL MR OSTEOSARCOMA IMAGES

*Lim Khai Yin, Mandava Rajeswari*

**Abstract**

*Diminutive attention is given on Osteosarcoma segmentation even though it is the third common cancer occurs in adolescence. In this paper, several techniques are studied and suggested to segment necrosis regions in multispectral Osteosarcoma images. The methods are Fuzzy C-means (FCM), Fuzzy Generalized c-Means (FGcM), Possibilistic Generalized c-Means (PGcM) and fuzzy connectedness. To evaluate the performance of the algorithm, multispectral Osteosarcoma images from STIR, T1 post-contrast and T2-weighted MRI sequences and similarity index are tested and employed respectively.*

## TRANSFECTANT GENETIC ALGORITHM (TgGA)

*Lim Ting Yee*

**Abstract**

*Advancement in molecular biology has changed theview of natural evolution. Transfection has been seen as an important procedure in genetic engineering. Transfectant Genetic Algorithm (TgGA) that combines both the elements of crossover and transfection is presented here.*

## APPROCHING BIOMETRICS WITH BIO-INSPIRED MACHINE LERANING TECHNIQUES: A REVIEW

*Mallikka Rajalingam, Ibrahim Venkat, Putra Sumari*

**Abstract**

*In recent years, biometric authentication of face recognition system deals with highly challenging and complex problems. When compared with other methods of identification such as iris, speech recognition, gait recognition, fingerprint, palm print, face recognition can detect a person more accurately. Face recognition problems successfully attain high accuracy rate in age detection, gender recognition, smile detection, and voice detection. But biometric face recognition does not have efficient fast recognition algorithm while computational speed and recognition time plays vital role in face recognition system. By using genetic algorithm need to improve existing algorithm to achieve high performance based on best matching in face identification. Experiments based on single sample per image used for training and testing which helps to claim better recognition rate. Research problem focused towards on facial expressions and occlusions in uncontrolled environment of face recognition. These are challenging issues to find solution to these problems by using single sample per class. Expected results shows accuracy rate 99% of perfect match of face image based on bio-inspired techniques claims accurate performance than principled approaches.*

## A MODEL FOR USAGE MINING OVER THE SEMANTIC WEB

*Mohammad Hani Nayel Al-Majali*

**Abstract**

*Web usage mining is being highly concentrated-on in the web mining area particularly and in Artificial Intelligence(AI) in general. Most researches in this field focus on the mining processes in the pattern discovery and pattern analysis phases, and only a few focus on the data preprocessing phase, which is considered an easy straight-forward process on the traditional web. However, from the point of view of the semantic web; focusing on this phase is quite important to utilize the added value of the semantics incorporated with documents. In this paper, we propose a new data preprocessing scheme which includes a structure-preprocessing model toobtain the website-map via PetriNets and produce an Incedence Matrix that facilitates the pageview identification and reveals the reachability between web pages, an annotation model for semantically unannotated documents to extract semantic annotations, a content-preprocessing model for assigning ontology concepts to documents and a usage preprocessing model with a new sessionization algorithm to produce semantically enhanced datasets. The initial tests have revealed promising results and currently a full scale test is being implemented.*

## PRELIMINARY STUDY ON NOISE REMOVAL IN WEATHER DEGRADED IMAGES

*Mohd Helmy AbdWahab, Nasriah Zakaria, Rosalina Abdul Salam*

**Abstract**

*Bad weather conditions lead the robustness of most surveillance and driver assistant system. Therefore this paper attempts to describe the type of bad weather in a perspective of computer vision and image processing and performing some brief review of a recent effort which has been successfully design and developed to enhance the image degrade by the bad weather.*

## A STUDY ON ONTOLOGY-BASED CASE-BASED PLANNING FOR DIET RECOMMENDATION SYSTEM

*Ngo Hea Choon, Yu-N-Cheah, Nasriah Zakaria*

**Abstract**

*Planning entails the art of automatically generating a course of actions to best achieve certain goals under a set of rules and constraints. This paper presents an ontology-based case-based planning for diet recommendation system. This proposed diet recommendation system is to provide (i) initiate independent actions and goals; (ii) a plan representation based on ontology; (iii) a case-based planning engine by using genetic algorithms.*

## COMPUTER AIDED 3D SKULL – 2D PHOTO SUPERIMPOSITION IN FORENSIC ANTHROPOLOGY

*Tan Joi San, Iman Yi Liao , P.T. Jayaprakash, Bahari Belaton*

**Abstract**

*In this paper, we are discussed about procedures and also techniques for skull-photo superimposition in forensic anthropology. The purpose of this research is to assist the related authorities such as forensic anthropologists in crime investigation. With the implemented system, experts will be able to save an amount of time and effort in identifying for an unknown skull from a huge database of missing persons. In current situation, it involves a lot of miscellaneous procedures which consumed time before identify the identity of the victims. Hence, by facilitating the system, efficiency will increase in solving those cases. Scanning skulls, pre-processing for images, landmarks placing, 3D skull-2D photograph superimposition and decision making are the crucial steps that involved. Techniques such as active shape model, shading and facial detection are used in this research. For this system, we are emphasizing on accuracy instead of computing spee.*

## PRELIMINARY STUDY TO DESIGN AN EFFICIENT mHEALTH GUI FOR DERMATOLOGY CHRONIC DISEASE SELF-MANAGEMENT

*Amin Kianpisheh, Nasriah Zakaria, Norlia Mustaffa*

**Abstract**

*Providing health-care information throughout cell-phones is quite new and most mHealth applications are related to specific chronic disease such as diabetes and heart cessation. There is not sufficient impact data about how mobile technologies are influencing health outcomes, creating challenges to identify and replicate best practices [1]. Correspondingly there is less attention to dermatology while people would like to get more information and there are not much efficient applications that work on dermatology disease. In dermatology area there is lack mobile applications which focus specifically on GUI. Cell-phones potential to show graphical objects is increasing rapidly Also increasing cell-phones built in camera resolution, is highlighted the needs for more user-friendly mHealth application with better graphical user interface. There are some challenges on purposing appropriated GUI for mHealth application on dermatology chronic disease self-management as it includes both communication technology, graphical and also psychological. This study intends to define the factors which will lead to design efficient GUI for dermatology chronic disease mobile application.*

## A REVIEW ON INITIAL TRUST ANTECEDENSTIN E-COMMERCE

*Aszifa Aris, Nurul Syafika Nadiah MohdZabarudin*

**Abstract**

*Trust is the key factor in ensuring e-commerce success, as a result, trust studies had emerged rapidly in e-commerce research. One of the key area in trust studies is the antecedents of trust, a research between trust and IT artifacts. However, trust antecedent's study found in the literature still addressed various antecedents from different views that create complexity in understanding antecedents of trust, especially for novice researchers. Besides, there are no yet firm theory exist on trust antecedents study. This bring the significant to continue the antecedents of initial trust research, but with careful analyzing of the trust concepts to avoid less complexity and more focused discussion in the literature. In this review, a literature study that closed to systematic review was designed to track the main antecedents of initial trust that can affect trust building mechanism. The study selected journals and proceedings that has empirical evidence from the starting year of empirical study on initial trust to current years. This study identified three main antecedents in initial trust. The antecedents are 1) website quality;2)assurance;3)reputation. Only website quality and assurance antecedents are discussed further in this study. Based on the evidence from the literature, the researchers categorized the sub-antecedents to cognitive-based trust constructs and emotional-based trust constructs. The sub-antecedents that had been categorized to cognitive-based trust construct are, website information quality (information content, functionality, usefulness) and assurance (privacy, security and reliability or transaction integrity). Next, the sub-antecedents that had been categorized to emotional-based trust construct are website interactivity (website appeal, website attractiveness, good interface design, perceived enjoyment, perceived ease-of-use, navigability, perceived control, perceived responsiveness and perceived customization or personalization). Researchers that interested to further the initial trust research can pay awareness to the main antecedents and sub-antecedents addressed in this study. Besides that, the sub-antecedents that had been categorized to cognitive-based trust constructs and emotional-based trust constructs can simplify the complexity of initial trust building mechanism study as it can easily match the consumer that is human which is dominant in cognitive ability and emotional reaction while making decision to pursue initial exploration and purchasing with e-commerce website*

## INTEROPERABLE SOA-BASED ARCHITECTURE FOR E-GOVERNMENT

*Khairul Anwar Sedek, Shahida Sulaiman*

**Abstract**

*An effective e-government platform provides greater access to government services among citizens, businesses, and tourists. However, most e-government portals are not integrated as each government agency has its own portal. This may cause confusion and becomes a cumbersome task among users. This paper proposes a one-stop e-government architecture that integrates one-stop portal, e-government service application, and e-government service provider. The architecture provides seamless interoperability of e-government services among different government agencies. This work exploits various Web technologies and service oriented architecture approaches such as Web portal, portlet, service component architecture, Web services, and BPEL. Finally, this work presents the proof-of-concept of the proposed architecture and a case study in an e-government service environment.*

## E-MENTORING SYSTEM DEVELOPMENT USING ARCS MOTIVATIONAL STRATEGIES

*Faten Damanhoori, NursakirahAb.Rahman Muton,Nasriah Zakaria,Norlia Mustaffa*

**Abstract**

*An e-mentoring system is an online tool that enables interactive mentoring between a mentor and a mentee, regardless of place and time differences. This paper discusses the system design of an e-mentoring system for Malaysia orphans, called MyMentorMentee.com. The design of MyMentromentee.com is an adaptation of Keller's ARCS Motivational model and uses its motivational elements to provide an effective mentoring experience for each session. A (attention), R (relevance), C (confidence) and S (satisfaction) are the four components of the ARCS motivational problems faced by a learner during the learning process. The purpose of MymentorMentee.com is to study how an e-mentoring system can overcome the motivational challenges faced by orphans which were identified during preliminary study. Among these are personal issues and learning issues. The system was developed to help mentor and mentee to carry out the mentoring session using alternative ( web-based) way at anytime and anywhere. The system that we have designed has 4 modules: personal profile, text messaging, mentoring schedule, and personal video chat. All modules were evaluated using quantitative and qualitative techniques.*

## A SUITABLECOGNITIVE MODEL IN HUMAN-COMPUTER INTERACTION TO ENHANCE ACCESSIBILITY OF M-HEALTH IN DEVELOPING COUNTRY

*Pakapan Limtrairut, Nasriah Zakaria*

**Abstract**

*Millions of people in developing countries do not have the appropriate healthcare application such as m-health however they have the same needs for m-health as people in developed countries. From the evidence of World Health Organization, there are some concerns in health care for this region. This paper reviews on three issues that relates to the current situation towards m-health in developing country. The first issue is the lack of suitable cognitive model that enhance the accessibility for health user in developing country. The second issue is the lack of health care service in developing country, and the last issue is the difficulties of bringing the successful m-health. The evidence from this paper review be background information for m-health developer.*

## A PROPOSAL TO MEASURE SUCCESS FACTORS FOR LOCATION-BASED MOBILE CARDIAC TELEMEDICINE SYSTEM (LMCTS)

*Pantea Keikhosrokiani, Nasriah Zakaria, Norlia Mustafa, Min Kianpisheh, Pakapan Limtrairut, Muhmmad Imran Sarwar.*

**Abstract**

*Cardiac telemedicine systems facilitate treatment of patients by sending blood pressure and cardiac performance information to the hospitals and medical emergency care units. Location-based services can be used in mobile cardiac telemedicine systems to improve efficiency, robustness and accuracy. This paper proposes a combination of mobile telemedicine systems and location-based services that will enable hospitals and emergency departments to do continuous monitoring of a patient's heart activity; such a system would decrease the probability of critical condition patients in emergency cases and increase the chance of saving lives. In order to evaluate whether this kind of health care system might work, we explore the success factors for such a system by adapting the DeLone& McLean IS success model to the context of location-based mobile system in cardiac health care. After reviewing previous works, we identify fourteen factors which can affect the success of a location-based mobile cardiac telemedicine system: Realization of user expectations, Portability, Accessibility, Extend of data processing, Time response, Urgency, Currency, Sufficiency, Understandibility, reliability, Extend of Mobility ( spatial,temporal, contextual), System support, Responsiveness, and Assurance. We apply these factors to propose a success model for our location-based mobile cardiac telemedicine system.*

**PRIVACY ISSUES IN A PSYCHIATRIC CONTEXT: APPLYING THE ISD PRIVACY FRAMEWORK TO A PSHCHIATRIC BEHAVIOURAL MONITORING SYSTEM**

*Rusyaizila Ramli, Nasriah Zakaria, Norlia Mustaffa, Putra Sumari*

**Abstract**

*Privacy issues are frequently discussed among researchers, practitioners and patients in healthcare. However, psychiatric patients' privacy issues get less attention in Information System Development (ISD), which surely needs more attention. This paper applies Carew & Stapleton's Privacy Framework to Psychiatric Monitoring Systems to identify the issues that are related to monitoring psychiatric patients' behavior. Finding the issues will help system developers produce a privacy-sensitive system that can contribute to the system engineering for international stability. We elaborate on each factor in the framework (physical, social, psychological and informational) and then explain the relationship to the psychiatric context.*

**DEVELOPMENT OF VoD BROADCASTING FOR 3D VIDEO**

*Salehah Hamzah, Putra Sumari*

**Abstract**

*Delivery of 3D video through streaming technology is expected to be the next big thing in entertainment field. Broadcast is a very efficient form of streaming for popular video content, to all receivers at the same time. Many video broadcasting protocols have been proposed to support video on demand with a large community of users. In this protocol, it needs a periodic broadcast server which divides a video object into multiple segments over a set of multicast addresses. This paper is a preliminary study on getting the idea for proposing a broadcast protocol based VoD application for streaming methods over 3D stereoscopic video data which has not been investigated yet. In this study we explored several work on streaming method over 3D stereoscopic video which mainly focused high quality of images display for acceptance of larger user mass market and periodic broadcast scheme from an algorithmic perspective which mainly focused on server bandwidth sharing and service latency. Then we conclude with our objective and discuss our scope of work to investigate whether the broadcasting based VoD could bring two separate streams for stereoscopic 3D video arrive concurrently broadcast periodically and will not disrupt the normal playback.*

## Proposal Presentation

## Proposal Presentation

## ENHANCING AFFECTIVE-BASED PERSONALIZATION FOR RECOMMENDING ADAPTIVE IMAGE-BASED VIRTUAL TOUR

*Asma Hanee Binti Ariffin ,Cheah Yu-N, Abdullah Zawawi*

**Abstract**

*Different background of users may lead to different ways of using, viewing and analyzing any technologies preferred. Personalization plays an important role where it can assist the system to provide the most intimate output tailored to specific user. As to assist user on visualizing, photographs still remain the most important instrument for communication emotion on any application ranging from tourism to real states and marketing sectors. However, most image-based virtual environments have been focused on fixed environment that assumed all users have similar interest. In addition, viewing similar images or words may bring different perception from different users, without they realize it. Some images may "switch on' part of the unconscious mind that somehow may affect the way user formulate their decision or perform any tasks. This study aims to fulfill the call, which emphasized on creating user profiles embedded with subliminal cue for emotion recognition elements, matches with item profile that is based on contextual information. These profiles will effectively recommend user to an adaptive virtual tour path that will try to be suited with user feedback. The objectives are 1) to form a model of context-aware content-based recommender system representing the overall plan, 2) to construct architecture of the recommender system based on suitable bio-inspired algorithm studied, 3) to generate a prototype of an adaptive image-based virtual tour based on user feedback. The core idea behind this study is to present an adaptive model that can provide motivation to user based on signal that they are not aware of. With this combination of user profiles and item profile for recommending an adaptive virtual tour, the study can contribute an affect-awareness system based on suitable recommender system algorithm. It is hoped that the recommended virtual tour will give positive predictions as well as benefit to users by making to him suggestions on tours that he is assumed going to like.*

## OPTIMIZATION MODEL BASED ON ARTIFICIAL BEE COLONY ALGORITHM FOR UNIVERSITY EXAMINATION TIMETABLING PROBLEMS

*Asaju BolajiLa'aro, Ahamad Tajudin Khader*

**Abstract**

*In this proposal, Memetic Artificial Bee Colony Algorithm (memetic-ABC) is proposed to tackle university timetabling problem using a dataset introduced by Carter and Laporte (1996). ABC is a nature-inspired based which mimics intelligent behaviour of honey in their colony. The major driving force of this algorithm lies in its capability to fewer control parameters and also to combine the major components of population-based techniques and local search-based techniques in the same optimization model. Its has been successfully used to tackle a wide range of optimization problems. The performance of ABC on timetabling problem is not quite impressive where its results did not match other state-of-the-art techniques. Therefore, this proposal present a further investigation of its performance on university examination timetabling problem by: i) re-adapting ABC ii) modifying ABC and iii) hybridizing ABC with hill climbing optimizer in order to improve its exploitation ability. Note that, the best results of the ABC shall be compared with previous ABC technique on the problem and other state-of-the-art techniques.*

**NON-RIGID FACE IMAGE REGISTRATION**

*Chen Junfen, Bahari Belaton, Munir Zaman*

**Abstract**

*Face registration is to construct a mathematical transformation that finds out point-to-point dense correspondences between a reference face and a probe face. Face registration is an important and inevitable step in face recognition, face reconstruction, face detection, etc.. This research will focus on point set registration techniques, the coordination values combined the intensity information of a point of face image will be used fully for registration. In addition, neural network is introduced to recognize human face and obtain quite high accuracy and convolution neural network has been employed to register face image directly. So, this research topic is the non-rigid face registration using neural network technique. Consideration different expressions can result in different degree deformation in different parts of human face. Furthermore, the nose is a quite rigid region than other regions no matter what kind of facial expressions. Component-based non-rigid face registration strategy is another research topic of this research. At the same time, the combination idea is introduced into face registration area. The main research objective is to find dense correspondences between a source face and a reference face based on neural network including 2D-to-2D, 3D-to-3D and 2D-to-3D three kinds of face registrations. Once the correspondences between two face images are found, the registration is done successfully with respect to the transformation relation obtained from these dense correspondences.*

**QUESTION CLASSIFICATION USING CLUSTERING RULE FEATURES**

*Cindy OoiSuat Ling, Cheah Yu-N*

**Abstract**

*The current Question Answering systems are still far from the ideal intelligent Question Answering system that every Artificial Intelligence linguists are aiming for. Many researches has shown that one major problem that contributes to the errors in returning the correct answers in Question Answering system is the ability of the system to correctly identify the correct question type and expected answer. Thus, Question Classification has been regarded as one of the vital component in Question Answering systems that will improve the accuracy of the answers returned. This research hope to introduce a general cluster rule as a classification feature to study the impact of sentence structures in question classification. The methodology consists of four phases. The first is pre-processing of UIUC training dataset which will be POS-tagged and parsed. Next, the processed POS-tagged questions will be clustered using Predictive Clustering Rules to generate a set of rules which will be introduced as a classification feature in the next phase. In the question classification phase, other features such as Wh-Word, head word and WordNethypernyms are extracted. Then, a simple Association Rule will be used to classify the questions together with the general cluster rule. Finally, the results will be compared using Li and Roth's 6 coarse class and 50 fine class categories.*

## A NEW ELLIPTIC CURVE MULTIPLICATION BASED ON ZOT STRUCTURE

*Hani Mahmoud AbdelraheemAlmimi, Azman Samsudin*

**Abstract**

*Many public-key cryptosystems are used in our daily lives to attain privacy, authenticity, integrity and non-repudiation. However, most of the existing public-key algorithms are based on complex mathematical computations. Until recently, building a highly secured public-key cryptosystem without utilizing complex computations has been a serious challenge, making it necessary for investigations to develop new cryptography methods. Elliptic curve cryptography (ECC), independently introduced by Koblitz and Miller in the 80's, has attracted increasing attention in recent years due to its shorter key length requirement in comparison with other public-key cryptosystems such as RSA. Shorter key length means reduced power consumption and computing effort, and less storage requirement, are attractive points for portable devices such as PDAs, cellphones, smartcards, etc. To that end, a lot of research has been carried out to speed-up and improve ECC implementations, mainly focusing on the most important and time-consuming ECC operation: scalar multiplication. The computation of $kP$ over elliptic curves is the dominant operation. It depends on the representation of the scalar $k$. The binary method is the standard unsigned method that is used to compute the elliptic curve point $Q = kP$. Researchers found that it is not the most efficient way for implementing elliptic curve computations. Other recoding methods such as CR, NAF, and MOF were presented in order to enhance the efficiency of EC computations. A new ZOTEC method that is based on ZOT recoding method was proposed to accelerate the EC computations. ZOTEC can be computed in both directions, right-to-left or left-to-right. The recoding process is also faster than NAF and as fast as CR and MOF if the binary conversion included or excluded. ZOTEC method is more efficient than BIN, CR, MOF, and NAF methods in terms of field complexity and time complexity whenever a field inversion is more expensive than 6 multiplications for BIN, CR, and MOF, and 8.3 for NAF.*

## CROWD SIMULATION AND RENDERING IN AN IMMERSIVE VIRTUAL HERITAGE APPLICATION ON MOBILE PLATFORM

*Lim Chen Kim, Abdullah Zawawi Talib*

**Abstract**

*In the last 500 years or so, George Town has been well known for their multi-cultural trading activities. On the other hand, virtual environments have commonly been used for the dissemination, education and public awareness of cultural heritage. However, interactive virtual environments have yet to be fully utilised as a tool for crowd simulation and rendering using mobile device. This research introduces a practical implementation for crowd simulation and rendering on mobile platform that allows the user to experience panoramic view of various heritage sites of George Town. First, the crowd is modelled and simulated in virtual heritage environment. The 360$^o$ panoramic view consists of immersion in an artificial heritage sites and crowds where the visitors feel just as immersed as they usually feel in the consensus reality. Second, the crowd is animated and rendered on mobile platform and third, the acoustical heritage is built and incorporated into the system. On top of this, an emotive background ambience with clearly defined sound can provide a certain degrees of information about the present heritage sites are tailored for mobile device sound properties. This will permit the user to navigate the extra values in virtual heritage and explore multiple hypothetical acoustical heritage of an ancient site on mobile device. Finally, a demonstration of system is developed and integrated with the models, techniques and algorithms of this research. When attempting to understand a particular cultural heritage site through virtual tourism application, this research is also able to connect to the past and appreciate the presence by connecting people to heritage with historical information provided, thus resulting in potential development of social business in Malaysia's tourism sector.*

## A METHODOLOGY FOR INCONSISTENCY DETECTION AND CORRECTION IN SOFTWARE REQUIREMENTS PRIORITIZATION

*Lim Chia Yean, Vincent Khoo Kay Teong*

**Abstract**

*In decision science, online criteria prioritization questionnaires have been widely used in organizations to determine the importance level of criteria or alternatives in accordance with a principle of choice or goal. From the literature review, it is found that no corrective actions could be taken at each detected inconsistent response because of the lack suitable corrective approaches which is directly caused by the inherent inaccuracy in the Likert scale. In this research, we propose a methodology which is not only able to detect inconsistency from a suite of methods, but also allow an easy correction of the inconsistency at response level. In addition, we have the provision to cater for articulation of the reasons behind the agreement to accept and correct every detected inconsistent response. This research proposes a methodology to detect and correct inconsistency in the prioritization of software requirements, through a strict enforcement of removing all detected inconsistency. The methodology comprises a series of interdependent methods incorporated with the appropriate visual consistency checks and techniques for visualization, verification, and validation. Whenever a correction is made on an inconsistent response, the appropriate reasons are required to be stored in an ontology structure. Along with the strict enforcement of zero inconsistency, the respondents would be able to express the reasoning for agreeing to individually correct each detected inconsistency. The significance of this research would be the detection of online inconsistency through a suite of methods in different contents and the elicitation of the reasoning behind the agreement to revert each and every detected inconsistency in the process of prioritizing software requirements in a globally distributed software installations. The future work includes possible parallel execution of those methods for each pair of requirements, and at a later stage, a more advanced methodology with an integrated execution of more sophisticated methods, so that requirements can be prioritized in different perspectives from different stakeholders at different geographical locations, and at different time periods. Decision makers with different agenda could eventually proceed to decide individually, allowing the artificially and cognitively more intelligent machines to resolve the conflicting requirements and systematically integrate segregated organizational needs for better-informed group decision support.*

## A CONTEXT-AWARE BASED AUTHORIZATION SYSTEM FOR PERVASIVE GRID COMPUTING

*Marilyn Lim ChienHui, Chan Huah Yong*

**Abstract**

*The advance in wireless technologies had accelerated the evolution from grid technologies to pervasive grid. Ubiquitous computing need to deal with the surrounding environment dynamic attributes that changing from time to time. Context-Awareness was introduced into the authorization technologies to increase the security of heterogeneous networks. This thesis describes the authorization system architecture for Pervasive Grid environment. It discusses the characteristics of classical authorization system and requirements of the authorization system in pervasive grid environment as well. Based on the analysis of current systems and considering the main requirements of the pervasive environment, this thesis proposed a new authorization system framework. This framework not only supports user attributes but also context attributes which act as a key concept for context-awareness thought. The architecture allows authorization of users dynamically when there are changes in the pervasive grid environment. We will investigate the proposed framework using a simulation testing environment that includes heterogeneous pervasive grid infrastructures mapped over multiple virtual organizations.*

## A MEMETIC HARMONY SEARCH ALGORITHM FOR NURSE ROSTERING PROBLEMS

*Mohammed A.M. Awadallah, Ahamad Tajudin Khader*

**Abstract**

*This proposal presents a Memetic Harmony Search Algorithm (MeHSA) to tackle Nurse Rostering Problem (NRP) using a dataset introduced in the first International Nurse Rostering Competition (INRC2010). The Harmony Search Algorithm (HSA) is a population-based metaheuristic method which mimics the improvisation process; it has been successfully applied to a wide range of optimization problems. The HSA iteratively improvises the new harmony using three operators: memory consideration, random consideration, and pitch adjustment. In this proposal, the HSA shall be modified for NRP in two operators: firstly, three alternatives of pitch adjustment operator is defined to enhance the exploitation ability. Note that the best alternative that obtained the results among them will be use in the next phase. Secondly, the memory consideration operator is modified by investigating a set of selection methods rather than the random selection method to enhance the speed of convergence. The modified HSA will be hybridized with hill climbing optimizer to enhance the exploitation ability which is called MeHSA. The MeHSA shall be study using different parameter settings and the best results obtained by MeHSA shall be compare with other methods in the literature that solve the same problem.*

## EXPERT-BASE DECISION-SUPPORT FRAMEWORK FOR SOFTWARE REENGINEERING: A REQUIREMENT ENGINEERING PERSPECTIVE

*Rahma A. Kamaludeen, Cheah Yu-N*

**Abstract**

*Software is common in many applications today. As these software ages, they have to be maintained to suit the demands of the users. There are many challenges involved in maintaining this software, which decision makers in the software reengineering community have to address. These decision makers need an expert's assistance in reengineering the software. Many studies attempt to support decision makers. However, there is limited study in adopting artificial intelligence approaches to support the decision-support process. Hence, we introduce an expert-based decision support framework called REXDES that can analyze different rules extracted from the software expert to facilitate decision-support in software reengineering. The framework also gives guidelines on validating the requirement prior to submitting the requirement into the REXDES framework, as to ensure the reengineering advice achieved via the REXDES framework is from a validated requirement. The REXDES gives RASIC as output serving as reengineering recommendation or advice.*

## IMPROVING EFFIENCY OF ENCRYPTION AND DECRYPTION IN RSA CRYPTOSYAYTEM BY ZOT

*Shahram Jahani Ali, Azman Samsudin*

**Abstract**

*High-speed cryptography is being more important day to day. For different reasons, some people would like to gain access to the internet to capture, destroy or modify the web pages, mail messages or many types of sensitive digital information. Cryptography is a set of methods, protocols and algorithms to overcome of these issues. Scrambling messages to protect data against of the hackers by a cryptography method, is a time consuming procedure and for busy network servers, this problem is more serious. With improving the speed of current cryptography algorithms or alternating them with more efficient and secure algorithms, the cost of internet services will decrease. Modular multiplication and exponentiation are very important operations for many public-key cryptosystems such as RSA. The performance of such cryptosystems with the performance of these operations has a direct correlation and improving the efficiency of these operations could boost the performance of RSA cryptography algorithm. This research focuses on big number multiplication and exponentiation algorithms based on the symbols extracted from the binary numeral system. We named the new numeral structure as "ZOT". The new algorithm for big numbers multiplication is constructed from the combination of ZOT structure and two most applicable multiplication algorithms in RSA cryptography; classical and Karatsuba. We also introduce new exponentiation algorithms by applying the ZOT structure on the L-R and R-L binary method exponentiation algorithms. To evaluate the algorithms, we simulate an environment capable of handling big numbers to compare the performance of the propose algorithms against the well-known algorithms.*

## SIMULATION OF PEDESTRIAN MOVEMENTS AND BEHAVIOURS IN CROWD

*Siamak Sarmady, Fazilah Haron, Abdullah Zawawi Talib*

**Abstract**

*Cellular automata models have been used for simulating pedestrian movements for a while. One of the weaknesses of this type of models is the size of the cells which is considered to be of the size of a pedestrian (i.e. 40cm wide cells). Each pedestrian occupies a single cell and during simulation time steps, transits to neighboring cells. The size of the cells dictates discrete speed steps for pedestrians and chess like movements. A pedestrian could move one or more cells in each simulation time step or do not move at all. In order to have more smooth movement and different speeds for pedestrians (i.e. from different ages, physical and health status) we propose a finer grid cellular automata. In addition to the smoother movements, groups of pedestrians in crowd have rarely been noticed in models. Groups of pedestrians like family members and friends normally move slower than others and therefore act as a virtual barrier and slow down the crowd. In this research we present our variation of least effort cellular automata algorithm which includes the effect of pedestrian groups on crowd movement. We use the proposed models to build a least effort cellular automata movement algorithm and test them on a simple walkway scenario. Results of the simulations and evaluation of the results have been discussed in this research.*

## EVOLUTIONARY ALGORITHM-BASED OPTIMIZATION MODELS IN UNDERTAKING MULTI-OBJECTIVE OPTIMIZATION PROBLEMS

*Tan Choo Jun, Cheah Yu-N, Lim Chee Peng*

**Abstract**

*In this research, three optimization models are proposed. They are designed based on Micro Genetic Algorithm (mGA) to undertake the Multi-objective Optimization Problems (MOPs). The main contribution of this work is to devise models that able to form pareto optimal solutions with improved Multi-Objective Evolutionary Algorithm indicator measurement based on extension of mGA and Trust, Negotiation, and Communication (TNC) model. The models are formulated using elitism strategy, pareto dominance sorting, Apportionment of Credit, Reinforcement Learning scheme, and TNC model. The performances of three proposed optimization models are evaluated with published results in MOPs.*

## IMAGE-BASED CONSTRUCTION AND INTELLIGENT INTERACTIONS IN MOBILE VIRTUAL HERITAGE APPLICATIONS

*Tan Kian Lam, Abdullah Zawawi Talib*

**Abstract**

*A visitor usually would like to discover more about the attractions of a place before his or her physical visit. With the fast growing technology advancements in mobile devices such as smart-phone or tables, there are various applications available for the exploration of heritage sites on mobile platform. Besides, the number of mobile phone subscriptions worldwide is over 5 billion and the number is still increasing. Nonetheless, mobile devices have several limitations compare to other devices such as the limited number of processors and memory. However, there is a need for applications that are more highly accessible with adventure and adaptive learning in a more entertaining manner and the Graphic Processing Unit (GPU) in the mobile device that can handle large image. This research aims to model the heritage sites and buildings by using sophisticated graphics methods or techniques on mobile platform by using the tile-based method in order to ensure the rapid rendering of a large image and design a mobile game for virtual heritage. Moreover, intelligent interactions and virtual agents are to be incorporated to increase the mobile user interactions and learning experience in virtual heritage application. The expected result for the application is to allow the user to view the various heritages in the panoramic view and the intelligent interaction agent is able to educate the user in the mobile virtual heritage application. A set of experiments and questionnaire will be carried out to determine the result.*

## COMPACT BINARY REPRESENTATION OF GF(2n) FOR ASYMMETRIC CRYPTOGRAPHY PURPOSES

*Uma A/P S Kanniah, Azman Samsudin*

**Abstract**

*Public key cryptography (PKC) and related techniques lies beneath security features of many application products related to communication. In PKC, each user that takes part in the communication will be given a pair of keys known as the public key and private key. The keys are bundled together with a set of operations associated with the keys to perform cryptographic operations. Only the user knows his/her the private key whereas the public key is distributed to all users taking part in the communication. The main PKC's cryptographic primitives are categorized into four major components. This includes key exchange, encryption, digital signature and zero knowledge. One of the drawbacks in most of this algorithm is the inherently expensive exponential calculation that provides the needed one-way trapdoor mechanism. Hence, we are adapting an alternative approach whereby these algorithms will no longer depend on the prime field instead the newly proposed algorithms will now depend on the binary field as it is known that binary field operations are inexpensive and provides notably faster computations. In general, the results obtain shall serves as an example in which the binary field can benefit the mainstream cryptography.*

## HOLISTIC NETWORK SELECTION FOR HIGH-SPEED WIRELESS MOBILE NODES IN A 4G ENVIRONMENT

*Vasuky A/P Mohanan, Wan Tat Chee, Rahmat Budiarto*

**Abstract**

*Solving network selection problem (NSP) for next generation networks is very challenging. This is further compounded by the availability of myriad of choices for the user to choose from in terms of which network to connect to. Furthermore, in 4G environment, mobility scenarios are highly dynamic and current approaches tends to ignore this. Additionally, these solutions tend to focus on solving one aspect of the NSP. This paper proposes a holistic and dynamic network selection solution based on gray relational analysis (GRA) and Analytical Hierarchical Process (AHP). In order to correctly assess the context on which the network selection occurs, our method uses attributes collected from the three main stakeholders of a NSP mainly: user, mobile node and the candidate networks. The proposed method uses a combined method of mean value of past sessions as well as most recent value as means to collect the attribute value. This is so that past as well as current scenario is taken into consideration. Weights are assigned to these attributes indicating their relative importance. These weights are not fixed unlike previous approaches and are adjusted to reflect the mobile node's current context. Previous approaches mostly uses quality of service requirements (QOS) of the executing application as a guide for indicating the weight. The proposed scheme not only uses QOS requirements but also combines user preference and mobile node's mobility scenario into consideration in determining the weights. Finally, ranking of the candidate networks is done using GRA. The ranking process takes into account quality of experience (QOE). Also, due to GRA's non monotonic utility of criteria values makes GRA a suitable candidate in resolving conflicting objectives.*

## TRACKING MULTIPLE FISHES USING COLOUR CHANGES IDENTIFICATION AND ENHANCED OBJECT TRACKING ALGORIHM

*Wong Poh Lee, Azman Samsudin*

**Abstract**

*Tracking multiple fishes using computational methods have become a research endeavour among researcher. Different concept has been taken such as installing water sensors and video cameras to identify movement speed, colours, shapes and swimming patterns displayed by fishes. In this research, an enhanced algorithm consisting of motion detection algorithm and condensation algorithm is proposed. This algorithm is further integrated with colour changes identification technique which considers the changes in colour on fishes when movement is detected. This is to identify overlapping fishes and to detect the distance between the camera and the fishes in the water. IN our case study, a cultured fish tank is installed with water sensors to monitor water pH, dissolved oxygen and temperature is set up together with two network cameras. Koi fishes are chosen due to their active swimming behaviour, variety of colours and easy-to-adapt habitat in the water. A real-time prototype system which models the fish swimming pattern consisting of the enhanced algorithm and colour changes identification is developed.*

**FRAMEWORK IMPLEMENTATION RADIO FREQUENCY IDENTIFATION LIBRARY MANAGEMENT SYSTEM (RFID-LMS)**

*Zainab Binti Ajab Mohideen, Muhammad Rafie Hj. Mohd.Arshad*

**Abstract**

*The Framework Implementation of Radio Frequency Identification Library Management System (RFID-LMS) will endorse a revolutionary used Radio Frequency Identification (RFID) for Library Management System (LMS) in academic sector and focusing on the library market. Efficient framework is the key to a successful implementation of Radio Frequency Identification Library Management System (RFID-LMS) in the library. The RFID-LMS framework is the base for libraries that transit from barcode technology to RFID tags. A three-phase framework that consists of hardware, middleware and application for the RFID-LMS implementation is presented in details. The Framework provides the entire workflow and the proceeding process for the implementation of RFID-LMS. Deciding to deploy the RFID-LMS demands library planning, as it needs significant converting of the way the service operates. The proposed framework is a useful roadmap for the successful implementation RFID-LMS.*

**ANALYSIS OF HIGH RESOLUTION MASS SPECTROMETRY FOR BIO MAKER DISCOVERY BASED ON BIO-INSPIRED FEATURE SELECTION**

*Syarifah Adilah Binti Mohamed Yusoff, Rosni Abdullah, Ibrahim Venkat*

**Abstract**

*Mass spectrometry technique is gradually gaining momentum among the recent techniques deployed by several analytical research labs which intends to study biological or chemical properties of complex structures such as protein sequences. This advancement also embarks the discovery of biomarkers through accessible body fluid such as serum, saliva and urine. Anyhow, due to physical and chemical phenomena, a given molecule species can give rise to a series of interrelated peaks in a mass spectrum. Therefore, a sample data can result in a very complex spectrum with many interrelated and overlapping peaks. Furthermore the spectrums also suffer with high dimensionality data relative to small samples size. Literature reveals that reasoning voluminous mass spectrometry data via sophisticated computational techniques inspired by observing natural processes adapted by biological life has been yielding fruitful results towards the advancement of fields including bioinformatics and proteomics. Such advanced approaches provide efficient ways to mine mass spectrometry data in order to extract discriminating features that aid in discovering vital information, specifically discovering disease-related protein patterns in complex protein sequences. Thus it has motivated to further study the potential of bio-inspired optimization method as a robust feature selection for biomarker discovery to discriminate disease.*

**DYNAMIC APPROACH FOR SECURE AND COST - AWARE SEAMLESS MOBILITY IN COEXIST IPV4/IPV6 NETWORKS USING TUNNELING MECHANISM**

*Bassam Naji Abdullah Al-Tamimi, Mohd. Adib Hj. Omar, Wan Tat Chee*

**Abstract**

*The rapid growth of the Internet in the last few years has been exposing the limitation of the address space in the current Internet protocol version 4 (IPv4). The increasing of demand and consumption of IP addresses have led to anticipated exhaustion of the IPv4 addresses. To address this concern, the new Internet protocol version 6 (IPv6) has developed by the Internet Engineering Task Force (IETF) to provide sufficient address space. Although many networks have been upgrading to support IPv6, there are many networks are still supporting IPv4. Since IPv6 has not yet been widely deployed and for cost constraints, various transition mechanisms that is, (Dual stack, Translation, and Tunneling) have been defined to support the interoperability between IPv4 and IPv6. In the mobility environment, the interoperability between IPv4 and IPv6 networks is required due to the incompatibility that occurred in the headers of both IPv4 and IPv6 protocols. It is probable that a Mobile Node (MN) moves out of its Home Agent's domain towards a different IP domain IPv4/IPv6. This research proposes a dynamic approach for seamless mobility in coexist IPv4/IPv6 networks utilizing of tunnel mechanism. The solution maintains mobile node connectivity with its Home Agent while moving within a mixed IPv4/IPv6 network. Finally, another contribution of this research was the evaluation of the signaling cost and implementing security algorithm that protects the clients of the Home Network.*

## A NOVEL MODIFIED A STAR SEARCH COMPOUND WEIGHTING METHOD FOR CENTRALIZED COOPERATIVE SPECTRUM SENSING IN THE COGNITIVE RADIO NETWORK

*Mohammad Azmi Al-Madi, Rosni Abdullah*

**Abstract**

*One essential and effective application that has taken place in the future wireless communication networks and the mobile computing is the Cognitive Radio Network (CRN). This network as been considered to be an intelligent network technology of where its environment is being sensed and its communication parameters are being adapted in an automatic manner. On the matter of fact, such cognitive features as flexible development and high adaptive radios are enabled by this emerging technology based the Software Defined Radio (SDR) that represents the core technology of the CRN. In the wireless cognitive networks, spectrum scarcity has widely affected the CRN as many spectrums have been underutilized in a proper and a reliable way. Therefore, spectrum sensing has emerged in the CRN to outperform this scarcity by allowing secondary users to exploit the unused spectrums opportunistically while ensuring to avoid causing harmful interferences to the primary users. Secondary users are those who are not authorized to use the unused spectrums whereas the primary users are those who are authorized for so. However, most spectrums are unexploited by these authorized users. Accordingly, the CRN has allowed its unauthorized users to perform opportunistic accesses into these unused spectrums. Therefore, spectrum sensing has arisen where secondary users will be able to sense or detect the unexploited primary spectrum channels in order to make use of them in reliable and efficient manners. There are two types of spectrum sensing. The first type is the individual spectrum sensing in which each secondary user independently perform local sensing for the spectrum and a decision on whether the channel is occupied by a primary user or not is considered by each secondary user. The second type is the cooperative spectrum sensing that has been taken into consideration at most for its higher performance in which each secondary user independently perform local sensing as well, but, a final decision is made by their Fusion Center (FC) that has received their sensing reports. In particular, this type of cooperative spectrum sensing is called the centralized cooperative spectrum sensing that has at most attracted many researchers compared to other cooperative spectrum sensing types due to its greater flexibility and high performance in the cooperative spectrum sensing. However, there are many issues to been encountered in the centralized spectrum sensing and have been tackled by several researchers currently. The most common issues that have been introduced and elaborated in this research comprise: Shadowing/fading, the delay reporting time and the heavy load over the limited bandwidth control channel issues. Therefore, this research has proposed a novel modified A*Star search compound centralized cooperative spectrum sensing method to outperform these indicated issues in the centralized cooperative spectrum sensing.*

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