Annual Report 2016

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EXECUTIVE SUMMARY

Introduction

Intelligent computing seeks to undertake research in the theory, design, implementation, and application of intelligent system. There are five research areas currently undertaken which are Data Mining & Machine Learning, Autonomous Systems & Software Agents, Optimization and Evolutionary Computing, Computational Linguistics & Semantic Web, and Bioinformatics & System Biology.

The research on Data Mining & Machine Learning concentrates on building knowledge reduction models for data classification as well as discovering strong associations among data by various algorithms for searching frequent patterns. (image, video, web, text, temporal, spatio-temporal). The research in Autonomous Systems & Software Agents address seamless interoperability between heterogeneous system and applications such as Internet of Things (IoT) for intelligent environments, prediction models for reasoning and recognition in smart home environment as well as classification of trajectory generation and control of miniature quadrotor used for aerial vehicles.

Studies on designing better algorithm for solving various combinatorial problems with special focus on improving meta-heuristic techniques for solving university timetabling and agricultural problems involving optimization in planting areas and crop systems are covered in the Optimization and Evolutionary Computing theme. The Computational Linguistics & Semantic Web theme deal with the semantic knowledge representation of texts and focus on transforming the learned rules into a model reusable by computer programs. This will enable automation and seamless interoperation between systems in which human intervention is kept at a minimum.

Meanwhile, the Bioinformatics & System Biology theme focuses on genome annotation, which is marking the genes and other biological features in a DNA sequence. We implement a software system that is able to locate the genes and other features so we can make initial assignment of function to those genes.

Members

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	Dr. Thinagaran Perumal
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	Dr. Nor Azura Husin
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Students

In 2016, in total Intelligent Computing research group members are supervising **106** numbers of postgraduate students with **14** students pursuing Master of Computer Science (research) and **92** are pursuing PhD students.

Table 1: Supervision Activity by Intelligent Computing Research Group Members

	PhD		MSc	
	Chairman	Committee	Chairman	Committee
Assoc. Prof. Dr. Nurfadhlina Mohd Sharef	5	10	0	2
Assoc. Prof. Dr Md. Nasir Bin Sulaiman	4	7	0	0
Assoc. Prof. Datin Dr. Norwati Mustapha	9	16	1	1
Assoc. Prof. Dr. Razali Yaakob	6	10	1	2
Dr. Teh Noranis Mohd. Aris	3	1	2	0
Dr. Noridayu Manshor	1	2	0	0
Dr. Hazlina Hamdan	2	2	0	0
Dr. Azree Shahrel Ahmad Nazri	2	1	0	0
Dr. Khairul Azhar Kasmiran	2	0	1	0
Dr. Mohd Yunus Sharum	0	1	0	0
Dr. Thinagaran Perumal	2	2	2	
Dr. Nor Azura Husin	0	1	0	2
Dr. Maslina Zolkepli	1	2	0	0

Table 2: Current Students in Intelligent Computing Research Group

Program	Student name	Research Title	Supervision Chairman
PhD	Ismail Ahmed Al-Qasem	Temporal Integration Based Factorization To Improve Prediction Accuracy Of Collaborative Filtering	Assoc. Prof. Dr. Nurfadhlina Mohd Sharef
	Hazrina Binti Sofian	Integration Of Self Adaptive Model With Linguistic-Based Sparql Translation Model For Semantic Question Answering System	
	Nurkhairizan Khairudin	Review-based Recommendation System	
	Ana Salwa Shafie	Multi-Aspect Sentiment Summarization	
	Muath Al-Ali	Deep learning based method for ordinal classification expressiveness to improve 5-point scale tweets sentiment analysis	
	Rozianiwati Yusof	Classification Of Imbalanced Medical Images using Novel Feature Selection Techniques	Dr. Khairul Azhar Kasmiran
	Nor Asma Mohd Zin	Novel Feature Selection on Authorship Attribution In Email	
	Mohd Norhisham Razali	Feature Representation Model to recognize Complex Appearance of food Objects.	Dr. Noridayu Manshor
	Alwatben Batoul Rashed	Adaptive Method for Feature Selection and Multi-Objective Optimization to Improve Interpretability and Accuracy	Dr. Hazlina Hamdan
	Abubakar Mansir	Scalable Instance-Based Ontology Matching for Heterogeneous Semantic Web Data	
	Bakri Badawi	Color QR Code Utilizing Neural Network and Fuzzy Logic Techniques	Dr. Teh Noranis Mohd Aris
	Salimeh Malekpourheydari	Flood Forecasting using Artificial Intelligence Techniques	
	Ong Huey Fang	Integrative Approach to Biomarker Discovery	Assoc. Prof. Datin Dr. Norwati Mustapha
	Mohsen Kakavand	Text Mining-based Payload Anomaly Intrusion Detection in	

		Web Service Requests	

	Morteza Ghorbani Moghaddam	Trust-based recommendation systems	
	Harnani Mat Zin	Sentiment Analysis	
	Rahayu Saad	Clustering Multiple Data Streams	
	Musaab Riyadh Abdul Razzaq	An Efficient Incremental Clustering for Trajectory of Free Moving Objects based on Clusters Life	
	Syaifulnizam Abd Manaf	Spatio-temporal Data Mining Model for Shoreline Detection and Prediction in Peninsular Malaysia	
	Fatemeh Ahanin	Clustering of trajectories in road networks	
	Wong Pei Voon	Data Mining Approach for Crowd Analysis	
PhD	Khaleel Rababah	A novel feature extraction method based on Curvelet Transform/Gabor Wavelet for accurate detection	Dr. Azree Shahrel Ahmad Nazri
		of subtle breast abnormality from thermograms	
	Olalekan Agbolade	3D Face Reconstruction prediction by DNA	
PhD	Sayer Reasheed S Alshammari	Evaluate and Development of a Health	Dr. Maslina Zolkepli
		Management Support System for Patients with Diabetes Mellitus at Home	
		in Saudi Arabia	

EVENTS / ACTIVITIES

Activities for Intelligent Computing Research Group in 2016

In 2016, Intelligent Computing Research Group members have been actively participated several projects as shown below.

No	Member	Project	Event	Description	Date
1.	• Assoc. Prof. Dr. Nurfadhlina Mohd Sharef • Dr. Maslina Zolkepli	National Integrated Information Security Threat Factor Profiling Project with CyberSecurity	Research Review Session NIISTFP CSM-UPM	Meeting to discuss potential research opportunities and challenges for NIISTFP	22/4/2016
2.			Workshops for NIISTFP	Workshop on designing the Cyber Security Threat Profiling Model for NIISTFP	4/5/2016
3.			Research Review Session NIISTFP CSM-UPM	Meeting to discuss on literature reviews for Cyber Security Threat Profiling Model for NIISTFP	19/5/2016
4.			Research Review Session NIISTFP CSM-UPM	Meeting to discuss on methodologies for Cyber Security Threat Profiling Model for NIISTFP	9/6/2016
5.			Workshops for NIISTFP	Workshop on designing the Cyber Security Threat Profiling Model for NIISTFP	1/7/2016
6.			Research Review Session NIISTFP CSM-UPM	Meeting to discuss on the conference papers for Cyber Security Threat Profiling Model for NIISTFP	14/7/2016
7.			Research Review Session NIISTFP CSM-UPM	Meeting to discuss on the conference papers for Cyber Security Threat Profiling Model for NIISTFP	22/7/2016
8.	Dr. Nor Azura Husin	Forecasting and decision support system for brown planthopper in MADA granary	Bengkel Halatuju Kerjasama MADA and UPM	Workshop: brainstorming on planning and collaboration with MADA-UPM at Faculty Pertanian UPM	31/3/2016-1/4/2016
9.			Meeting and Fieldwork	Meeting with Pengarah Pengembangan MADA and first fieldwork at Alor Setar, Kedah	10/5/2016
10.			Meeting and Fieldwork	Meeting with KADA team members and second fieldwork at Pendang Kedah	9-11/12/2016
11.		Forecasting and decision support system for brown planthopper in	Program Pelancaran Produk dan Pemindahan Teknologi	Presenter at Majlis Pelancaran Produk dan Pemindahan Teknologi Pengeluaran Padi at Besut Terengganu	30/10/2016

12.		KETARA granary	Pengeluaran Padi LRGS, UPM	Perlantikan sebagai Pakar Padi Putra, UPM bagi Program Pemindahan Teknologi Padi Putra 2016	28/12/2016
13	Dr. Azree Shahrel Ahmad Nazri	Big Data Development in Government Agency	Business Requirement Specification Development	Perlantikan sebagai pakar Data Raya untuk membangunkan projek data raya di KPKT menggunakan platform data raya sumber terbuka fast track	22-24/5/2017
14.		Big Data Development in Government Agency	Big Data Deployment	Perlantikan sebagai pakar Data Raya untuk membangunkan projek data raya di KPKT menggunakan platform data raya sumber terbuka fast track	July

RESEARCH PROJECTS / GRANTS / CONSULTATIONS

In 2016, Intelligent Computing Research Group members obtained a number of research grants mainly coming from Universiti Putra Malaysia (UPM) and Ministry of Education Malaysia (MOHE).

No	Principle Researcher	Title	Source of Fund
1	Assoc. Professor Dr. Nurfadhlina Mohd Sharef	Self-Adaptive Model to Improve Disambiguation of Linguistics and Conceptual Mapping in Semantic Question Answering	MOHE
2	Dr. Khairul Azhar Kasmiran	Extending and Improving Autotuning through Domain-Specific Parameters and User Feedback	UPM
3	Dr. Azree Shahrel bin Ahmad Nazri	A novel extraction method based on curvelet Transform/Gabor wavelet for accurate detection of subtle breast abnormality from thermograms	MOHE
4	Dr. Azree Shahrel bin Ahmad Nazri	Enriching UPM Final Year Project with Loosely Coupled Entrepreneurial Program between Faculties to Increase Entrepreneurial Intention among Undergraduates: A Pilot Project in FSKTM and FEP	UPM
5	Assoc. Prof. Datin Dr. Norwati Mustapha	Spatio-temporal Data Mining Model for Shoreline Detection and Prediction in Peninsular Malaysia	MOSTI
6	Assoc. Prof. Datin Dr. Norwati Mustapha	A Temporal-Focused Trustworthiness to Enhance Accuracy of Trust-based Recommender Systems	UPM
7	Assoc. Prof. Datin Dr. Norwati Mustapha	A Novel Semi-supervised Support Vector Machine Model to Enhance Anomaly Detection in SOAP Web Services over HTTP	MOHE
8.	Dr. Azree Shahrel Ahmad Nazri	A novel system biology approach to propose a universal digital cancer biomarker for breast cancer and melanoma using iron nanoparticle	UPM

PUBLICATIONS

Intelligent Computing Research Group has produced 14 journals and 14 conference papers in 2016.

No	Type	Title
1.	Journal	Al-Hadi, I. A. A., Sharef, N. M., Sulaiman, M. N., Mustapha, N., (2016), "Ensemble Divide and Conquer Approach to solve the rating scores' deviation in Recommendation System", Journal of Computer Science, 12(6), pp. 265-275
2.	Journal	Sharef, N. M., Zin, H. M., Nadali, S., (2016), "Overview and Future Opportunities of Sentiment Analysis Approaches for Big Data", Journal of Computer Science, 12(3), pp. 153-168
3.	Journal	Sharef, N. M., Noura, M., (2016), "Linguistic Rule-Based Methods for the Extraction of Medical Summaries to Benefit Patients Progression Tracking", Journal of Engineering and Applied Sciences, 11(3), pp. 408-413
4.	Journal	Sofian, H., Sharef, N. M., Ibrahim, H., Murad, M. A. A., Noah, S. A. M., (2016), "Linguistic-Based SPARQL Translation Model for Semantic Question Answering System", Advanced Science Letters, in press
5.	Journal	Zin, H. M., Mustapha, N., Murad, M. A. A., Sharef, N. M., (2016), "Term Weighting Scheme Effect in Sentiment Analysis of Online Movie Reviews", Advanced Science Letters, in press
6.	Journal	Nor Azura Husin, Norwati Mustapha, Md. Nasir Sulaiman, Razali Yaacob, Hazlina Hamdan and Masnida Hussin (2016). Performance of Hybrid GANN in Comparison with Other Standalone Models on Dengue Outbreak Prediction. Journal of Computer Science. Volume 12, Issue 6, Pages 300-306
7.	Journal	Teh Noranis Mohd Aris, Hazlina Hamdan, Noraini Che Pa, Shahrin Azuan Nazeer (2016). An Agent-Based Ontology Fuzzy Logic Conceptual Model For Flood Warning Prediction. International Journal Of Advances In Electronics And Computer Science (IJAECS). Volume-3,Issue-2, Pages 83-86
8.	Journal	Suwardi Afandi Ahmad, Mohd Yunus Sharum, Yaseer Suhaimi Mohd, and Tapsir Serin. "Technology adoption decision among food manufacturers: What are the critical factors?" Economic and Technology Management Review Vol. 11. 2016.
9.	Journal	Nor Azura Husin, Norwati Mustapha, Md. Nasir Sulaiman, Razali Yaacob, Hazlina Hamdan and Masnida Hussin (2016). Performance of Hybrid GANN in Comparison with Other Standalone Models on Dengue Outbreak Prediction. Journal of Computer Science. Volume 12, Issue 6. Pages 300-306.
10.	Journal	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman, Nor Azura Husin and Mohd Radzi Abdul Hamid. (2016). Comparison of Classification Techniques on Fused Optical and SAR Image for Shoreline Extraction: A Case Study at Northeast Coast of Peninsular Malaysia. Journal of Computer Science

11.	Journal	Masnida Hussin, Raja Azlina Raja Mahmood, Nor Azura Husin, Noris Mohd. Norowi (2016). A Performance Optimization Model of Task Scheduling towards Green Cloud Computing. International Journal of New Computer Architectures and their Applications (IJNCAA) 6(1): pp. 1-8.
12.	Proceeding	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman and Nor Azura Husin. (2016). Monitoring Shoreline Change in West Coast of Peninsular Malaysia using Statistical Analysis Techniques. 37th Asian Conference on Remote Sensing (ACRS 2016). 18-20 Oct 2016, Colombo, Sri Lanka.
13.	Proceeding	Maslina Zolkepli and Teh Noranis Mohd Aris, "Fuzzy MCDM Approach in Information Retrieval for Bibliographic Big Data", The 4th Symposium on Applied Engineering and Sciences 2016 (SAES2016), Kitakyushu, Japan (Dec. 2016).
14.	Proceeding	Sharef, N.M., Rosli, R. R., (2016), "Empirical Investigation of Feature Sets Effectiveness in Product Review Sentiment Classification", 3rd International Multi-Conference on Artificial Intelligence Technology (M-CAIT 2016), in press
15.	Proceeding	Razali, M. N and Manshor, N. (2016), "Object Detection Framework for Multiclass Object Localization and Classification", The 3rd International Conference on Computational Science and Technology 2016 (ICCST2016).
16.	Proceeding	Norwati Mustapha, Aida Mustapha, Hazlina Hamdan, Rozita Rosli (2016). Association Rule Mining, Associative Classification, Microarray, Gene expression In the 2016 Advanced Research in Engineering and Information Technology International Conference, Bandung, Indonesia.
17.	Proceeding	Suhaili Beeran Kutty, Rahmita Wirza O.K Rahmat, Sazzli Shahlan Kassim, Hizmawati Madzin, Hazlina Hamdan (2016). Lumen area and border detection of coronary artery using parametric deformable model. In Proceedings of the 6th International Conference On Science And Technology (ICSTIE 2016) Park Royal Resort, Penang.
18.	Proceeding	Suhaili Beeran Kutty, Rahmita Wirza O.K Rahmat, Sazzli Shahlan Kassim, Hizmawati Madzin, Hazlina Hamdan (2016). Catheter Detection Using Threshold Value Normalization and Labeling for Automatic Initialization in Intravascular Ultrasound Segmentation. In Proceedings of the International Conference on Computer Assisted System in Health (CASH2016) Kuala Lumpur, Malaysia.
19.	Proceeding	Wan Mastura Shaik Mossadeq Gayathri Thevi Selvarajah, Idawaty Ahmad, Hazlina Hamdan, Siti Suri Arshad (2016). MyVetPBL: A problem based learning (PBL) tool for veterinary education in Universiti Putra Malaysia. In International University Carnival on e-Learning (IUCEL 2016), UTM Sekudai.
20.	Proceeding	Mohd Norhisham Razali and Noridayu Manshor. 2016. Object Detection Framework for Multiclass Object Localization and Classification, The 3rd International Conference on Computational Science and Technology 2016 (ICCST2016).
21	Journal	Mohsen Kakavand, Norwati Mustapha, Aida Mustapha, Mohd Taufik Abdullah, (2016), Effective Dimensionality Reduction of Payload-Based Anomaly Detection in TMAD Model for HTTP Payload, *KSII Transactions on Internet and Information Systems*, Vol 10, No 8, pp 3884 – 3910, IF=0.365 (JCR). eISSN: 1976-7277.

21	Journal	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman, Nor Azura Husin, Md Radzi bin Abdul Hamid, (2016), Comparison of Classification Techniques on Fused Optical and SAR Images for Shoreline Extraction: A Case Study at Northeast Coast of Peninsular Malaysia. *Journal of Computer Science*. DOI: 10.3844/jcssp.2016.399.411.
22	Journal	Madjid Khalilian, Norwati Mustapha, Md Nasir Sulaiman (2016), Data Stream Clustering by Divide and Conquer Approach based on Vector Model, *Journal of Big Data*, 3:1, SpringerOpen Journal, ISSN: 2196-1115, DOI 10.1186/s40537-015-0036-x.
22	Proceeding	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman, Nor Azura Husin, Raihani Mohamed, Helmi Zulhaidi Mohd Shafri, (2016), *Shoreline Extraction from Medium Resolution Satellite Images using Ensemble Classifier,* International Conference on Computing Convergence and Applications (ICCCA 2016), 20 – 22 Dec 2016, Busan, Korea.
23	Proceeding	Eissa M. Alshari, Azreen Azman, Norwati Mustapha, Shyamala a/p C. Doraisamy & Mostafa Alksher *Prediction of Rating from Comment based on Information Retrieval and Sentiment Analysis,* 3rd International Conference on Information Retrieval and Knowledge Management (CAMP2016), 23 – 24 August 2016, Malacca, Malaysia
24	Proceeding	Huey Fang Ong, Norwati Mustapha, Hazlina Hamdan, Aida Mustapha and Rozita Rosli, *Associative Classification Framework for Cancer Microarray Data*, 2016 Advanced Research in Engineering and Information Technology International Conference (AREITIC'2016), 31 May - 02 Jun 2016, Bandung, Indonesia.
25	Proceeding	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman, Nor Azura Husin, Md Radzi bin Abdul Hamid, (2016), *Monitoring Shoreline Changes in West Coast of Peninsular Malaysia using Statistical Analysis Techniques*, the 37th Asian Conference on Remote Sensing (ACRS2016), 18 – 20 Oct 2016, Colombo, Sri Lanka.
26	Proceeding	Syaifulnizam Abd Manaf, Norwati Mustapha, Md Nasir Sulaiman, Nor Azura Husin, Md Radzi bin Abdul Hamid, (2016), *Artificial Neural Networks on Satellite Image Classification for Shoreline Extraction from Land and Water Classes at North West Coast of Peninsular Malaysia*, 2016 International Conference on Computational Science and Technology (ICCST2016), 28-30 November 2016, Kota Kinabalu, Sabah.
27	Proceeding	Harnani Mat Zin, Norwati Mustapha, Masrah Azrifah Azmi Murad, Nurfadhlina Mohd Sharef, (2016), *Term Weighting Scheme Effect in Sentiment Analysis of Online Movie Reviews*, 2016 International Conference on Computational Science and Technology (ICCST2016), 28-30 November 2016, Kota Kinabalu, Sabah.
28	Proceeding	Wong Pei Voon, Norwati Mustapha, Lilly Suriani Affendey, Fatimah Khalid, (2016), *A New Clustering Approach for Group Detection in Scene-Independent Dense Crowds*, 2016 3rd International Conference on Computer and Information Sciences (ICCOINS2016), 15 – 17 August 2016, KLCC.

INNOVATIONS

Intelligent Computing Research Group members have obtained 1 innovation award in 2016.

No	Researcher	Innovation Title	Avenue
1	Hazlina Hamdan	"MyVetPBLTM : A problem-based learning (PBL) tool for veterinary education in Universiti Putra Malaysia (UPM)	International University Carnival on eLearning (IUCEL 2016)

ACHIEVEMENTS / AWARDS

Intelligent Computing Research Group members has obtained 1 award in 2016.

No	Researcher	Title of Contribution	Award
1	Hazlina Hamdan	"MyVetPBLTM : A problem-based learning (PBL) tool for veterinary education in Universiti Putra Malaysia (UPM)"	Bronze Medal

GENERAL CONTRIBUTIONS

In 2016, the Intelligent Computing Research Group members have co-organized several activities as professional services for community development.

No	Event	Date	Venue
1	Artificial Intelligence Day	April 2016	FSKTM UPM
2	Robotics Day	April 2016	FSKTM UPM
3	Majlis Jamuan Hari Raya	Ogos 2016	FSKTM UPM