



The International Conference on Computer Assisted System in Health, Education and Sustainable Development (CASH)



Expanding The Possibilities of Computer Integrated System in Health, Education and Sustainable Development



DSR Design for Scientific
RENAISSANCE

CASH
COMPUTER ASSISTED
SURGERY & DIAGNOSTIC



UPM
UNIVERSITI PUTRA MALAYSIA

The International Conference on Computer Assisted System in Health, Education and Sustainable Development (CASH)

CASH 2020



DSR Design for Scientific
RENAISSANCE



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Message from Vice Chancellor

Alhamdulillah, all praise to be to Allah Subhanawataála, by whose Grace and Blessings, we are able to be here today virtually, at the 4th International Conference on Computer Assisted System in Health, Education and Sustainable Development (CASH 2020).



I would also like to congratulate the organizing committee from Computer Graphics, Vision and Visualization CGV2 research group, Department of Multimedia, Faculty of Computer Science and Information Technology in organizing this CASH 2020 virtually.

I was told that CGV2 research group is one of the research groups in Faculty of Computer Science and Information Technology, which focuses and responsible in conducting research areas of Computer Graphics, Computer Vision and Visualization within computer science research area. Since the first CASH conference, the CGV2 research group collaborated organizing it with Design for Scientific Renaissance (DSR) Pte Ltd. CASH conference exists apart from the invitation from DSR. It is also an activity listed in the three-cornered MOA agreement between FCSIT, IJN and PPUKM signed on 15 February 2013 for 5 years. Due to the close collaboration between research group and DSR Pte Ltd. the CASH conference is held every 2 years from 2014 to 2020. In line with the faculty requirements to ensure the continuous collaboration with industries, CASH successfully has been organized since 2014 till today.

It is the organizer's hope that CASH 2020 can be a good platform for students and researchers to broaden their networking, Exchange research ideas and sharing inputs from other researchers. Together

with CASH first virtual innovation exhibition, we believe that CASH 2020 will open door for potential close collaboration as such beneficial ties that encourage by the University's goal to boost up research output and products which might be ready for commercialization. I also believe, conference like this can assist the country in strengthening science technology and propel its nation further. I am confident that the discussion and knowledge sharing derived from this platform will benefit all the participants. I would like to express my gratitude to all committee members of CASH 2020 for their strong dedication and commitment in ensuring that this conference runs smoothly.

Finally, I hope that the CASH 2020 will bind use together in paving path towards excellent achievements in related fields. Before I conclude, once again I would like to congratulate the organizing committee and all other sponsors who have been involved in one way or another in organizing this virtual conference. I wish you all have fun and hope all the participants will enjoy this sharing knowledge activities within the current technology era.

Thank you very much, and Wabillahi Taufiq Walhidayah Wassalammualaikum Warahmatullahi Wabarakatuh. Terima Kasih.

YBHG. PROF. DR. MOHD ROSLAN SULAIMAN

Vice Chancellor

Universiti Putra Malaysia

Message from Dean

Assalamualaikum w.b.t. and greetings to all,

Praises be to Allah, that Faculty of Computer Science and Information Technology (FCSiT) is organising the International Conference on Computer Assisted System in Health, Education and Sustainable Development 2020 (CASH2020), that will be held on the 30th and 31st of October 2020. This event will include research papers presentations and posters exhibition, both being carried out virtually - fully online.



The main objective of CASH2020 is to provide an opportunity for academicians, engineers, scientists, researchers, industrial professionals, and students from around the world to network, discuss, and exchange ideas on the latest developments in the fields of Information and Communication Technology (ICT) in health, education, and sustainable development.

The event is also part of the effort to encourage and enhance the culture of Research and Development (R&D) activities in line with the recognition given by the government to UPM as one of the Research Universities in the country. The opportunity to organise this conference is such a good privilege to promote our faculty globally. In addition, it shows how much our faculty committed in exploring the research of ICT in health, education, and sustainable development.

I would like to thank the keynote speakers who have shared their valuable knowledge and experiences with us, and the oral presenters for contributing their papers and posters in this conference. I also would like to congratulate our industry

collaborator, Design for Scientific Renaissance (DSR) Sdn. Bhd. and all the committee members of CASH2020 for the dedicated work in making this international conference a success. To all participants, it is my hope that this conference will strengthen our research collaboration and may CASH2020 act as a catalyst for the advancements in the field of health, education, and sustainable development.

Thank you.

YBHG. PROF. TS. DR. RUSLI HJ ABDULLAH

Dean

Faculty of Computer Science and Information Technology
Universiti Putra Malaysia

General Chair Foreword

Welcome to online CASH2020. CGV2 research group team members with Faculty of Computer Science and Information Technology are delighted in co-hosting CASH 2020 together with Design for Scientific and Renaissance (DSR).

Since CASH2014 to CASH2018 the high quality of the papers submitted represent the thinking and collaboration among computer and medical expert. This collaboration helped us make novel contributions to the body of scientific knowledge available today. And I believe, it's this very collaborative spirit that will motivate and innovate further study and research that will highly contribute to society, generating various computer related products and automate medical procedures, assisting in ways that truly matter to medical experts. This vision has moderately expressed itself in the enthusiasm with fine result in Computer Assisted Surgery and Medical Imaging to facilitate the tasks of clinicians to shorten the medical procedure time for each patient and ensure that close cooperation between parties can realize more sophisticated computer systems. To that extent CASH2020 moves forward to expand the collaboration with other disciplines with the hope that it will expand the spirit of the previous CASH and further motivate the researches in the related fields.



We have received 40 very good paper entries that made it easy for reviewers to filter for the conference with the aim of being sent to the journal publisher which collaborating with CASH2020. We too received 15 posters submission for our CASH Innovation Competition. To further empower the benefits of CASH, this time around, we introduced a new category called the CASH Innovation Competition, named as CASHViC. It is a poster competition for

participants to present their ideas, and research findings in a less formal way. Thanks to the experts in our department, we have managed creating a virtual environment to have the poster exhibition conducted in Virtual Reality.

Thank you very much for attending and participating CASH 2020 conference. And I would really like to express my appreciation to DSR, committees and participants who make this conference successful. I wish everyone; especially the participants and committee will successfully bring to life brilliant ideas, thoughts, sharing experiences and have a wonderful time. Welcome to our expanding community, Computer Assisted Systems in Health, Education and Sustainable Development (CASH).

I wish everyone the best of health and stay safe. Thank you.

YBHG. PROF. DR. RAHMITA WIRZA O. K. RAHMAT

General Chair
CASH2020

Background

The International Conference on Computer Assisted Systems in Health (CASH) provides a platform related to special research interest where computer technology is applied pre-, intra- and/or post-operatively to improve the outcome of any surgical procedures, assist diagnostic procedures and enhance related clinical database management systems. The main purpose of this conference is to provide an international discussion for academics, scientific researchers, clinical scientists, surgeons, engineers, and industrial partners for exchanging new ideas as well as the latest developments in this area of research. Secondary purpose is to promote research collaboration between participants from different countries and disciplines. CASH 2020 holds from October 30-31, 2020. The conference program consists of high-profile plenary/keynote lectures, invited sessions, oral and poster sessions, and exhibitions.

COMMITTEE

Advisory Board

Prof. Ts. Dr. Rusli bin Haji Abdullah	Dean, FCSiT	UPM
Assoc. Prof. Dr. Fatimah Khalid	Head of Multimedia Department, FCSiT	UPM

Conference Chair

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Assoc. Prof. Dr Akram M. Zeki	Department of Information System	IIUM

Co-chair

Dr Siti Khadijah Ali	Department of Multimedia, FCSiT	UPM
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Assoc. Prof. Dr. Puteri Suhaiza Sulaiman	Department of Multimedia, FCSiT	UPM
Dr. Hizmawati Madzin	Department of Multimedia, FCSiT	UPM

Technical Committee

Assoc. Prof. Dr. Masnida binti Hussin (Chief Editor)	Department of Communication Technology and Networking, FCSiT	UPM
Assoc. Prof Dr. Adel Ali Al-Jumaily	University of Technology, Sydney	UTS
Assoc. Prof. Dr. Mas Rina Mustaffa	Department of Multimedia, FCSiT	UPM
Dr. Ng Seng Beng	Department of Multimedia, FCSiT	UPM
Dr Noris Mohd Norowi,	Department of Multimedia, FCSiT	UPM
Ts. Dr Nurul Amelina Nasharuddin	Department of Multimedia, FCSiT	UPM
Dr Normalia Samian	Department of Communication Technology and Networking, FCSiT	UPM
Dr Aziah Asmawi	Department of Computer Science, FCSiT	UPM
Dr Nor Azura Husin	Department of Computer Science, FCSiT	UPM
Dr. Mustafa Ali Abuzaraida	School of Computing	UUM
Dr. Adamu Abubakar	Department of Computer Science	IIUM

IT & Promotion

Sufi Firdaus Bin Fakhurrazey	UPM
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Che Nur Shafareen Afera Bt Che Anuar	UPM
Nur Athirah Binti Hassan Basri	UPM

Abbreviations

FCSiT	Faculty of Computer Science and Information Technology
IIUM	International Islamic University Malaysia
UPM	Universiti Putra Malaysia
UUM	Universiti Utara Malaysia

Publications of CASH2020 Conference

All accepted papers will be published in one of the following Journals.

- Journal of Healthcare Engineering (JCR)
- Special issues in Scientific Programming (JCR)
- Journal of Information and Communication Technology - JICT (Scopus)
- Malaysian Journal of Medicine and Health Sciences (Scopus)
- Journal of Advanced Computer Science and Technology Research
- International Journal on Perceptive and Cognitive Computing
- Journal of Advanced Medical Research
- Journal of Advanced Science and Engineering Research
- Journal of Advanced Computer Science and Technology Research
- Journal of Advanced Biomedical & Pathbiology Research
- Journal of Advanced Social Research

Conference Schedule

30th October 2020 (Day 1)

Time	Activity	Google Meet Link	Remarks
08:30-08.45 am	Registration	meet.google.com/zpy-wtck-ezr	Host
08:45-09.00 am	Opening session by MC		
09.00-09.05 am	Sing <i>Putra Gemilang Song</i>		MC
09.05-09:10 am	Welcoming Speech		The General Chair
09:10-09:15 am	Opening Speech for Online Conference and Innovation Exhibition (CASH2020)		The Dean
09:15-9:25 am	Speech by Sponsor/Collaborator		DSR representative
09:25-09:35 am	Officiating Speech		The Vice Chancellor
09:35-09:40 am	Multimedia Presentation		Conference Video
09:40-09:45 am	Photo Session		Host
09.45-10.30 am	Keynote 1: Associate Professor Dr. Adel Ali Al-Jumaily Title: Resilient Humanized Computational Intelligence and Humanized Technology in health Technology applications.		Chair: Dr. Normalia Samian
10.30-10.45 am	Break		
10:45-1:15 pm	Parallel Session Room 1	meet.google.com/zpy-wtck-ezr	Session Chair: Dr. Ng Seng Beng
	Parallel Session Room 2	meet.google.com/qdm-ezbu-kuc	Session Chair: Assoc. Prof. Dr Puteri Suhaiza Sulaiman
1:15-1.45 pm	Break		
1:45-2.30 pm	Keynote 2: Dr. Shah Nazir Title: Big data features, applications, and analytics in cardiology- a systematic literature review	meet.google.com/zpy-wtck-ezr	Chair: Assoc. Prof. Dr. Tang Sai Hong
2:30-5.15 pm	Parallel Session Room 3		Session Chair: Assoc. Prof. Dr. Masnida Hussin

Conference Schedule

31st October 2020 (Day 2)

Time	Activity	Google Meet Link	Remarks
08:30-08.45 am	Registration	meet.google.com/vbw-yspr-oyx	Assoc. Prof. Dr. Puteri Suhaiza Sulaiman
08.45-09.00 am	Briefing session on CASHVIC2020		The General Chair
09.00-10:00 am	Virtual Innovation Competition Room 1	meet.google.com/vbw-yspr-oyx	Session Chair: Dr. Aziah Samian
	Virtual Innovation Competition Room 2	meet.google.com/vpt-ydif-ovu	Session Chair: Assoc. Prof. Dr. Fatimah Khalid
	Virtual Innovation Competition Room 3	meet.google.com/cqh-uzq-nta	Session Chair: Dr. Nor Azura Husin
10.00-11.00 am	Keynote 3: Prof. Dr. Shahrizal Sunar Title: Virtual Reality and Gamification Trend and Application in Sports		Chair: Assoc. Prof. Dr. Masrah Azrifah Azmi Murad
11.00-11.30 am	Best Paper and Poster Announcement and Closing Ceremony	meet.google.com/vbw-yspr-oyx	Advisor and General Chair

PARALLEL SESSION

PARALLEL SESSION ROOM 1 : 10.45 AM – 01.15 PM
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SESSION CHAIR : DR NG SENG BENG
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GOOGLE MEET LINK: meet.google.com/zpy-wtck-ezr
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No.	Paper ID	Time	Title
1	3	10.45 - 11.00 AM	Feature selection using Generalized Linear Model for Machine Learning-based Sepsis Prediction
2	6	11.00 - 11.15 AM	Ergonomic perspective : Mismatch Between Seat Drivers and Anthropometric Measures Of Elderly Taxi Drivers In Malaysia.
3	13	11.15 - 11.30 AM	Simplify Deep Learning-based Sepsis Prediction Model by Pruning Optimal Brain Surgeon
4	17	11.30 - 11.45 AM	Engineering Personalised Weather-based Healthcare from Systematic Review of Weather Impact on Asthma Exacerbation
5	29/57	11.45 - 12.00 AM	Mobile Games for Older Adults with Health Purpose: A Review and New Proposed Design Model
6	35	12.00 - 12.15 PM	Systematic Review of Current Techniques for Predicting Diabetic Disease from PIMA Indian Dataset
7	36	12.15 - 12.30 PM	Rating Blood Samples For Thalassemia Carrier – An Experiment
8	42	12.30 - 12.45 PM	A Review of the Best Practice Forensic Tools for Storage Recovery
9	48	12.45 - 1.00 PM	A Bibliometric Review on Virtual Reality in Medicine
10	50	1.00 - 1.15 PM	The use of Metamodel-based Approach for Designing Healthcare Applications

PARALLEL SESSION

PARALLEL SESSION ROOM 2: 10.45 AM – 01.15 PM			
SESSION CHAIR : ASSOC. PROF. DR PUTERI SUHAIZA SULAIMAN			
GOOGLE MEET LINK: meet.google.com/qdm-ezbu-kuc			
No.	Paper ID	Time	Title
1	1	10.45 - 11.00 AM	Authentic Assessment for Affective Domain through Student Participant in Community Services
2	2	11.00 - 11.15 AM	Augmented Reality in Facilitating Deep Learning: A Review
3	4	11.15 - 11.30 AM	Overview of Mobile Augmented Reality Application in Medical Education in the 2010s
4	14	11.30 - 11.45 AM	Human Embryology Medical Learning in the 21st Century- A Review of Multimedia Approach
5	22	11.45 - 12.00 AM	Ensuring Validity Of Online Assessment During COVID-19 Pandemic: Bringing Theory Into Practice
6	30	12.00 - 12.15 PM	Utilization of Cloud Computing as a Smart Electronic Advising Management System for the Students at University of Ha'il
7	37	12.15 - 12.30 PM	Challenges Augmented Reality User Interfaces Guidelines Specially Design for Medical Learning
8	46	12.30 - 12.45 PM	Feature Matching & Camera Translation Estimation for 3D Reconstruction from Multi-View Stereo Images
9	54	12.45 - 1.00 PM	HaloChem VR for Basic Chemistry Mobile Application: A Preliminary Investigation
10	55	1.00 - 1.15 PM	Exploring the perception and the acceptance of the use of 360° videos in virtual reality settings for teaching and learning

PARALLEL SESSION

PARALLEL SESSION ROOM 3: 2.30 AM – 5.00 PM			
SESSION CHAIR : ASSOC. PROF. DR. MASNIDA HUSSIN			
GOOGLE MEET LINK: meet.google.com/zpy-wtck-ezr			
No.	Paper ID	Time	Title
1	7	2.30 - 2.45 PM	Prototyping Digital Tongue Diagnosis System on Raspberry-Pi
2	16	2.45 - 3.00 PM	Blending of Three-Dimensional Geometric Model Shapes
3	19	3.00 - 3.15 PM	Motorcycle Image Detection and Plate Recognition for Traffic Enforcement
4	20	3.15 - 3.30 PM	Enhancing the Quality of Field Image via Contrast Fusion Method
5	23	3.30 - 3.45 PM	Identifying Additional Dimensional Elements, Measuring Performance Tool and Technology Acceptance to improve Virtual Reality based Performance Cycling Training
6	25	3.45 - 4.00 PM	Identifying High Influential Parameters using Genetic Algorithm (GA) Chromosomes for Water Consumption
7	38	4.00 - 4.15 PM	Cognitive Agent Modelling and Analysis of the Dynamics of Workplace Stress
8	43	4.15 - 4.30 PM	Verifying The Correctness Of UML Statechart Outpatient Clinic Based on Common Modeling Language And SMV
9	44	4.30 - 4.45 PM	Diabetic disease prediction from Pima Indian Diabetic Dataset using random multinomial logit approach with the spiral interpretable neural network
10	56	4.45 - 5.00 PM	RELAYVIO: Mobile Application for Documenting Domestic Violence

Oral/Paper Presentation Evaluation Criteria

The International Conference on Computer Assisted System in Health, Education and Sustainable Development 2020 (CASH2020)

Author(s) :
Paper ID # :
Paper Title :
Evaluator :

Please rate the presentation utilizing the 5-point scale provided.

CATEGORY	POOR	FAIR	AVERAGE	OUTSTANDING	TRULY EXCEPTIONAL
1. Depth of Content					
<ul style="list-style-type: none"> Research deals with an important issue in the field of study, includes goals/motivating questions that provide the audience with a sense of the project's main idea. Information is accurate and includes a complete explanation of key concepts and theories drawing upon relevant literature, as well as a clear description of the results and the importance of the results. Applications of theory are included to illuminate issues. 	1	2	3	4	5
2. Organization	1	2	3	4	5
<ul style="list-style-type: none"> Presentation is clear, logical and organized. Listener can follow line of reasoning. 					
3. Presentation Style					
<ul style="list-style-type: none"> Level of presentation is appropriate for the audience. Presentation is a planned conversation, paced for audience understanding. Speaker is clearly comfortable in front of the group and can be heard by all. 	1	2	3	4	5
4. Verbal Interaction	1	2	3	4	5
<ul style="list-style-type: none"> Consistently clarifies, restates, and responds to questions. Summarizes when needed 					
5. Communication Aids					
<ul style="list-style-type: none"> Communication aids are prepared in a professional manner and enhance the presentation. Information is organized to maximize audience understanding. Details are minimized so that main points stand out. 	1	2	3	4	5

Additional section:

Do you recommend this paper as a Best Paper Award?

Yes No

* The organizer decisions on all matters relating to this evaluation shall be final, conclusive and binding. The organizer is not obligated to give any reasons on any matter in the contest.

THANK YOU FOR YOUR SUPPORT

KEYNOTE SPEAKER 1

Associate Professor Dr. Adel Ali Al-Jumaily
University of Technology, Sydney

Topic: Resilient Humanized Computational Intelligence and Humanized Technology in health Technology applications

Abstract:

The talk will introduce the problems associated with the health technology applications based on computational intelligence and will emphasize on the resilient and realism of using computational intelligence and possible realistic machine learning. It will cover bio signal processing and pattern recognition; it will highlight on the EMG based driven systems. It will include a novel working myoelectric controller for a hand rehabilitation device that can deal with such issues. The proposed systems are based on computational intelligence techniques that included developing an accurate myoelectric pattern recognition which can work well in amputee and non-amputee subjects and enable amputees wearing powered prostheses to achieve functional mobility, and a novel classifiers for acquiring practical, fast and powerful methods to classify finger movements using two EMG channels. It will also cover image pattern recognition for skin cancer and the realism approach.



Biography: Dr. Adel Al-Jumaily is Associate Professor in the University of Technology Sydney. He is holding a Ph.D. in Electrical Engineering (AI). He is leader and researcher in Computational Intelligence, Humanized Computational Intelligence based technology, Health Technology, Bio-Mechatronics Systems, Bio-signal/ Image pattern recognition, Machine Learning, Biomedical Engineering, and Vision based cancer diagnosing. Adel developed Computational Intelligence based on Electromyogram (EMG) control of prosthetic devices for rehabilitation and contributed to Electroencephalogram (EMG and EEG) techniques, and a new approach for Deep learning with small data for image processing in cancer detection, He has successfully developed many nature-based algorithms to solve the bio-signal/ Image pattern recognition computational intelligence problems. He is working in cross-disciplinary applied research area and established his international track record. He has built many systems and wearable deceives that controlled based on the development of a novel techniques in Extreme Learning Machine and realistic Computational Intelligence.

KEYNOTE SPEAKER 2

Dr. Shah Nazir

University of Swabi, Pakistan

Topic: Big data features, applications, and analytics in cardiology- a systematic literature review

Abstract:

In today's digital world, information surges with the widespread use of the internet and global communication systems. Healthcare systems are also facing digital transformations with the enhancement in the utilization of healthcare information systems, electronic records in medical, wearable, smart devices, handheld devices, and so on. A bulk of data is produced from these digital transformations. The recent increase in medical big data and the development of computational techniques in the field of cardiology enables researchers and practitioners to extract and visualize medical big data in a new spectrum. The role of medical big data in cardiology becomes a challenging task. Early decision making in cardiac healthcare systems has massive potential for dropping the cost of care, refining quality of care, and reducing waste and error. Therefore, to facilitate this process a detailed report of the existing literature will be feasible to help the doctors and practitioners in decision making for the purpose of identifying and treating cardiac diseases. This detailed study will summarize results from the existing literature on big data in the field cardiac disease. This research uses the systematic literature protocol. The data was collected from the published materials for the last 10 years as conference or journal publications, books, magazines and other online sources. 190 papers were included relying on the defined

inclusion, exclusion, and checking the quality criteria. The current study helped to identify medical big data features, the application of medical big data, and the analytics of the big data in cardiology. The results of the proposed research show that several studies exist that are associated with medical big data specifically to cardiology. This research summarizes and organizes the existing literature based on the defined keywords and research questions. The analysis will help doctors to make more authentic decisions, which ultimately will help to use the study as evidence for treating patients with heart related diseases.



Biography: Dr. Shah Nazir completed his PhD in Computer Science with specialization in Software Engineering at the University of Peshawar, Pakistan in December 2015. He has more than 60 research publications in well-reputed international journals and conference proceedings. He is an academic editor of three journals and is working as member of technical committee for more than 70 journals and conferences. He organized one international conference and remains session chair for several conferences. He completed two research projects of Higher Education Commission of Pakistan. He is currently working as assistant professor and head of department at the University of Swabi, Pakistan. Prior to this, he worked at the University of Peshawar, Pakistan since 2009 to 2016, and received several awards. His research interests include component-based software engineering, software birthmark, systematic literature review, big data and decision making.

KEYNOTE SPEAKER 3

Prof Dr. Mohd Shahrizal Bin Sunar

Universiti Teknologi Malaysia, Malaysia

Topic: Virtual Reality and Gamification Trend and Application in Sports

Abstract: Among the primary technology of the 4th Industrial Revolution are Virtual Reality (VR). The technology has already reached the consumer with the mature development of software and hardware. Besides that, contents and data play important and significant role to boost the future lifestyle including sports. The growth of contents contributed by technology users will lead to how they will benefit from the technology for their lifestyle. Although Virtual Reality was seen as technologies reserved for gamers, many have realized the significant potential in a wide range of industries and applying the technologies to more serious matter such as sports. Gamification always been used as motivation method for athlete as well as ordinary user throughout the physical activity and provide a set of rules to encourage for better performance. This talk will include trends and applications of Virtual Reality and Gamification in Sports. Samples will be taken from research carried out at Institute of Human Centered Engineering (iHumEn), Universiti Teknologi Malaysia and other renowned related research centres worldwide. Specifically, the research and development work of in Virtual Reality and Gamification conducted by our team will be exposed. Furthermore, generality of impacts with VR and gamification in sports will be highlighted.



Biography: Profesor Dr Mohd Shahrizal Sunar is the Director of Institute of Human Centered Engineering (iHumEn) and Founding Director of Media and Game Innovation Centre of Excellence (MaGICX), Universiti Teknologi Malaysia. He obtained his PhD from National University of Malaysia in 2008. His major field of study is real-time and interactive computer graphics and virtual environment. He received his MSc in Computer Graphics and Virtual Environment from The University of Hull, United Kingdom and BSc degree in Computer Science majoring in Computer Graphics from Universiti Teknologi Malaysia. He received scholarships from Sultan Iskandar Johor Foundation for both his postgraduate study.

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Authentic Assessment for Affective Domain through Student Participant in Community Services

**Masnida Hussin, Mohamad Syahmi Said, Noris M Norowi,
Nor Azura Husin and Mas Rina Mustaffa**

Abstract: An authentic assessment is expected to have a positive impact on students learning and motivation. One strategy to provide practical assessment for authentic tasks is by engaging the students to the community where they are familiar and comfortable. The students' involvement in community services is able to effectively provide vibrant existence information for improving the sense of responsibility among students before they become part of the community. However, evidences from the community services' activities complicated assessment process where many documents need to be checked and verified. In our work, we designed an online authentic assessment framework of students' involvement in the community activities in terms of the affective domain. The affective domain addresses the grasp of attitudes and values that fuels teaching and learning (T&L) process. Our assessment tool aims to provide clear assessment guideline to evaluate the students' ability on analysing real issues. It also makes the assessment process easier where the evaluation materials can be assembled, previewed, edited and published instantly through online. We hope that the incorporation of student involvement in community services into course assessment shall make the learning process more inspiring.

Application of Augmented Reality in Facilitating the Process of Deep Learning Approach: A Review

Azmah Saat, Nur Izah Ab. Razak, Razif Abas and Rahmita Wirza O. K. Rahmat

Abstract: The present study reviews the augmented reality application in the education area. Justification of the use is to improve the learning motivation and outcome of students through the use of a deep learning approach. A deep learning approach is associated with better academic performances. Augmented reality provides a tool to motivate learning and understanding in the student. In the medical domain, augmented reality may serve as replacement of cadavers especially during online learning. The main aim of the current review is to reflect the use of augmented reality as a teaching and learning tool to motivate and promote the deep learning approach process which includes life-long learning and possible research areas that warrant and assess the impact of augmented reality on academic performance.

Feature Selection using Generalized Linear Model for Machine Learning-based Sepsis Prediction

Mohammed Ashikur Rahman, Adamu Abubakar Ibrhim and Afidalina Tumian

Abstract: Sepsis is a life-threatening condition of patients in an intensive care unit. Early sepsis detection can reduce mortality rate and cost of treatment among the patients of Intensive care unit (ICU). Machine Learning-based model can use to predict sepsis early using Electronic Health Record (EHR) which consists of a large number of data. Features selection plays vital role for reducing overfitting and the accuracy of ML-based prediction model. In this paper, Generalized Linear Model (GLM) was used to select the significant features related to sepsis using MIMIC-III dataset which is a rational database that contains ICU patient's data at Beth Israel Deaconess Medical center. In addition, developed a sepsis prediction model using Artificial Neural Network (ANN) and Random Forest (RF) and validate those models using confusion matrix. After that, clinical severity scores were also calculated with same dataset. At last, compared the Area Under the Receiver Operating Characteristic (AUROC) between ML-based model and clinical severity score. The accuracy of ML-based prediction model with GLM is better than clinical severity scores like SOFA, qSOFA and SIRS.

Overview of Mobile Augmented Reality Application in Medical Education in the 2010s

Shook Chin Yap, Rahmita Wirza O.K. Rahmat and Siti Khadijah Ali

Abstract: In the recent years, medical education is facing various difficulties. Students are struggling to visualize the internal organs and bones, it is insufficient cadaver for dissection demonstration, there are lack of equipment for training, and not enough opportunity for hand-sons training. Technologies have been utilized to supplement teaching in medical education to overcome the mentioned difficulties. Augmented Reality in particular mobile Augmented Reality has shown a rise in application of medical education in this decade. This paper aims to review the overall progress and development of mobile Augmented Reality in 2010s. From the researches done, we are trying to assess the feasibility, acceptability, potential, limitation and future perspectives of application of mobile Augmented Reality in medical education.

Ergonomic Perspective: Mismatch Between Seat Drivers and Anthropometric Measures of Elderly Taxi Drivers in Malaysia

Irwan Syah Yusoff and Shamsul Bahri Tamrin

Abstract: The motoring industry has neglected and does not emphasize the problems among drivers as a whole; many designers only focus on car design. The aging community may keep on serving their service even after the pension, and this was influenced by their previous work environment. One of the alternative occupations that could engage by the elderly individuals is taxi drivers. Feelings of discomfort are generated among drivers when there is a mismatch between the product/device and the user. Accordingly, an ergonomic approach should be implemented to ensure driver comfort and minimize musculoskeletal disorders. This study's principal objective is to assess the mismatch between seat drivers and anthropometric measurements among elderly taxi drivers to improve their work environment in term of safety and health. The mismatch value can be determined at any value over 95% or less than 80% of the value of the total number of respondents classified as mismatched. Any value less than 80% is a mismatch at a high level, and for a value above 99% is defined as a mismatch at a low level of respondents' total reference. The measurements between 80% to 99% are classified matched to the reference value of the respondents. The study provides a concrete foundation to identify mismatch current seat size with anthropometric elderly taxi drivers that cause injury or pain due to discomfort while driving in Malaysia. It also helps us to initiate the prevention of MSDs in terms of health and safety. The Ergonomics Intervention Approach reduces MSD-related problems that give us some practical foundation for further research on this top.

Prototyping Digital Tongue Diagnosis System on Raspberry-Pi

Muhammad Azrae Yusof, Nur Diyana Kamarudin,
Syarifah Bahiyah Rahayu, Siti Noormiza Makhtar and
Hassan Mohamed

Abstract: Tongue inspection is a complementary diagnosis method that widely used in Traditional Chinese Medicine (TCM). Since tongue manifestation is done by practitioner's observation using naked eye, many limitations can affect the diagnosis result. However, most of recent digital system are bulky and not equipped with intelligent diagnosis system that can finally predict the health status of the patient. In this research, digital tongue diagnosis system that uses intelligent diagnosis consisted of image segmentation analysis, tongue coating recognition analysis, and tongue colour classification has been embedded on Raspberry Pi. Tongue segmentation implements Hue, Saturation and Value (HSV) colour space with Brightness Conformable Multiplier (BCM) for adaptive brightness filtering to recognized tongue body accurately while eliminating perioral area. Tongue Coating Recognition uses threshold method to detect tongue coating and eliminate the unwanted features including shadow. Tongue colour classification uses hybrid method consisted of k-means clustering and Support Vector Machine (SVM) to classify between red, light red and deep red tongue and further gave diagnosis based on colour. This experiment concluded that it is feasible to embed the algorithm on Raspberry Pi to promote system portability while attaining similar accuracy for future telemedicine.

Multiprotocol Label Switching (MPLS) Model in Software-Defined Networking: Experimental Performance Evaluation

Somaia Mohammedali, Ahmedelmubarak Bashir, Abuagla Babiker,
Ahmed Abdelaziz and Suleman Khan

Abstract: Conventional IP networks are sophisticated and arduous to administrate. Software-Defined Networking (SDN) is an originating paradigm that hopeful to mutate this situation of matters, isolating the network's control logic from the underlying routers and switches, advertising focalization of network control, and defining the possibility to program the network. SDN creates and introduces novel condensation in networking, facilitation network administration and simplification of network development. This paper evaluates the performance of MPLS over SDN. Through different network simulation experiments using realistic network scenarios in Mininet and GNS3 environments, this paper provides an insight into the MPLS performance over SDN in comparison with MPLS over traditional networks the performance of these scenarios is evaluated by using Nping tool to investigate the performance of the MPLS in both SDN networks and conventional networks. The parameters that exploited are end-to-end delay; packets delay alternation, and throughput. These parameters are obtained and analyzed in various scenarios. The results clearly show that the efficiency of the software-defined network is outperforming the conventional network. For example, the average response time shows 00.448 ms in SDN while 93.761 ms in the conventional network, throughput in SDN is at least raise than 140 double comparing to conventional network and the average round trip time in the conventional network is recorded 100 double compared to SDN in both UDP and TCP traffic.

Simplify Deep Learning-based Sepsis Prediction Model by Pruning Optimal Brain Surgeon

Mohammed Ashikur Rahman and Adamu Abubakar Ibrhim

Abstract: A trained deep learning network can predict sepsis at earlier stage. At first, extract the significant features from MIMIC-III and apply Automatic Backward Elimination (ABE) algorithm to select most significant features. After that, build a sepsis prediction model using deep learning techniques to train and test with selected features. At last, prune the network with Optimal Brain Surgeon (OBS) to simplify the network architecture of the network. The pruning algorithm, OBS uses Hessian information and consider the time delay for measuring the saliency. Second-derivative information is used to compromise between the difficulty of the network and the training set error. The AUROC of model was 0.859, before and after pruning the model. OBS algorithm pruned the MLP network 83.67% with the same accuracy of the prediction model.

Human Embryology Medical Learning in the 21st Century- A Review of Multimedia Approach

**Razif Abas, Siti Fadziyah Mohamad Asri, Azmah Sa'At,
Nurul Huda Mohd Nor, Rafidah Hod, Dinna N. Mohd Nizam and
Noorkardiffa Syawalina Omar**

Abstract: The present review emphasizes the importance of the multimedia approach to the learning of medical embryology especially for medical students. Embryology which is a subset of anatomy teaching is well known to be it most difficult part. Understanding applied embryology is crucial in the practice especially, in obstetrics and gynaecology. Few methods have been introduced for the past twenty years including animations, two-dimensional illustration, three-dimensional illustration, movies, and video. These innovative methods are significantly improved the student's perception, interest, and knowledge towards the embryology syllabus hence manifest excellent performance. In this review, we elaborate on the details of multimedia learning methods used for medical human embryology teaching.

Blending of Three-Dimensional Geometric Model Shapes

Seng Beng Ng, Kok Why Ng, Rahmita Wirza O.K. Rahmat and
Yih Jian Yoong

Abstract: Three-dimensional shapes blending method can produce variation in-between model shapes from two or more inputs of model shape. Though, many of the blended shapes may be implausible due to improper parts-segmentation, inappropriate matching-parts, different inputs of model type, non-tally number of segmentation parts and etc., which need to take into account in the beginning of a research work. This paper will review a few prominent shapes blending methods and some 3D reconstruction methods using single- or multi-images techniques. It will also discuss some potential of future direction for the blending research work. A simple shape blending program has been developed and showed in Section 3 to illustrate the common yet potential problems to solve for those interested on shape blending research field.

Engineering Personalised Weather-based Healthcare from Systematic Review of Weather Impact on Asthma Exacerbation

**Radiyah Haque, Sin-Ban Ho, Ian Chai, Chin-Wei Teoh, Adina Abdullah,
Chuiie-Hong Tan and Khairi Shazwan Dollmat**

Abstract: Asthma is a common chronic disease that affects people from all age groups around the world. In recent years, researchers have been developing various IoT tools and mHealth applications for self-management. However, there is a lack of effective personalised self-management solution for asthma that can be adopted widely. Personalisation is important for identifying each patient's demographic characteristics (e.g. age and gender), measuring their asthma severity level and, most importantly, predicting the triggers of asthma attacks. It has been observed that weather attributes impact on triggering asthma attacks and adversely affect the symptoms of asthmatic patients. Hence, developing a weather-based healthcare system for self-management of asthma can help predict weather impact on asthma exacerbation for individual patients and provide real-time personalised feedback based on daily weather forecasts. This paper presents a systematic review of the impact of weather on asthma exacerbation and examines the effectiveness and limitations of several recent self-management tools and applications. Thereafter, based on the uses and gratifications theory, a personalised weather-based healthcare engineering model is proposed which incorporates major constructs including demography, weather and machine learning.

Reflection on Online Learning by First Year Health Sciences Students in Universiti Putra Malaysia

Abdah Md Akim, Zumlilah Zainalaludin, Siti Raba'Ah Hamzah, Wan Mohd Ikhtiaruddin Wan Abdul Aziz and Nazihah Md Akim

Abstract: There are six aspects in Constructivist On-Line Learning Environment Survey which measure students' perceptions of both their preferred and actual online classroom environments. The six aspects were relevance, reflective thinking, interactivity, tutor support, peer support and interpretation. The first year Health Sciences students were enrolled for Biochemistry course. At the end of the course, the students were given a Constructivist On-line Learning Environment Survey. Feedback from the 28 students was collected. Likert scale was used to grade the response. The grading was quantitatively given into 5 scales (1- almost never; 2- seldom; 3- sometimes; 4- often and 5- almost always). Mean for survey questions in each aspect was calculated to reflect the average opinion from the students. The findings showed that the students had higher expectation in all six aspects of the survey than the actual practice. The students had positive perception on e-learning. They perceived e-learning as a powerful and effective tool in education to meet the demand for work ethics that is knowledgeable, highly skilled and equipped with positive values. Overall, e-learning provides the dynamic view of current state of art learning for the Health Sciences students.

Enhancing the Quality of Field Image via Contrast Fusion Method

**Elmaliana Albahari, Hizmawati Madzin, Rahmita Wirza O.K. Rahmat,
Mas Rina Mustaffa, Mohamad Roff Mohd Noor and
Muzaiyanah Ahmad Supian**

Abstract: Contrast complexity improvement is an imperative procedure for enhancing the emotional quality and data substance of a picture. Change in the relative splendour and dimness of a picture is made to achieve the equivalent. To enhance the image and make it better for future processing in agriculture, a fusion of the existing Contrast-Limited Adaptive Histogram Equalisation or CLAHE-based method and the Fuzzy logic method has been proposed in this study. The experimental results of the leaf field image collections showed the effect of the proposed method. The obtained value was compared by using the Contrast Improvement Index as the image quality measurement technique. The proposed fusion method proved that it could produce better quality, and contrast stretching was the best technique that helped to enhance the image quality. The Contrast Improvement Index increased from 86% to 94% when the proposed fusion method was used.

Ensuring Validity of Online Assessment during COVID-19 Pandemic: Bringing Theory into Practice

Siti Khadijah Adam, Sandra Maniam, Rafidah Hod and Razif Abas

Abstract: The COVID-19 global pandemic has resulted in a dramatic change in the educational system worldwide. Many higher education institutions, particularly in Malaysia, were forced to shift into online teaching and assessment when the Movement Control Order was imposed. Faculty of Medicine and Health Sciences, Universiti Putra Malaysia embraced the challenge to conduct online examination for 19 remedial Doctor of Medicine students as a prerequisite for their end of preclinical phase Professional Examination. Proper planning and several measures were taken to ensure that the validity of the assessment was not compromised when it is conducted online. This paper provides details of how the online examination was planned and implemented. We also highlighted several challenges that we faced and the solutions to ensure that the validity and reliability of the assessment were maintained.

Identifying Additional Dimensional Elements, Measuring Performance Tool and Technology Acceptance to improve Virtual Reality based Performance Cycling Training

Imran Mahalil, Azmi Mohd Yusof and Nazrita Ibrahim

Abstract: Indoor stationary bicycle training integrated with virtual reality (VR) is widely practiced. This practice of using a VR-based system for performance training has recently been incorporated with 6-Dimensional elements, such as wind, uphill climb, altitude, temperature, and many more to create a higher fidelity of realism which leads to a more realistic experience. However, the usage of multiple dimensional elements as a combination that can improve training has not yet been determined. In addition to the additional dimensional elements, this paper also discusses measuring performance tool and technology acceptance that contributes to VR-based training towards improving cyclist performance. This discussion is based on the findings from a survey and literature.

Identifying High Influential Parameters using Genetic Algorithm (GA) Chromosomes for Water Consumption

Siti Arpah Ahmad, Noor Elaiza Abd Khalid, Rosanita Adnan,
Nurul Nadia Hani, Ahmad Firdaus Fadzil,
Khairul Anwar Rasmani and Wan Isni Sofiah Wan Din

Abstract: Severe uncertainties climate changes course flood and droughts disaster have made clean water precious for domestic consumption. Thus, securing clean water is important. Wastage of water comes from water consumption such as from household usage. However, monitoring water consumption from household usage is tedious and time consuming. This work utilized Genetic Algorithm (GA) to optimize the coefficient of micro-components of water consumption (CMWC) values to determine high influential household routine parameters. Nine household parameters have been investigated namely, bath/shower, personal hygiene, flush toilet, wash cloth by hand, wash cloth by washing machine, food preparation, water plant, washing car and miscellaneous. These parameters are encoded as a chromosome data in GA to incorporate the CMWC values. The aim is to minimize the residential water consumption estimation error rates and subsequently enabling increased accuracy towards estimating and classifying the amount of residential water consumption. Data average monthly water consumption were collected from 80 households in Seremban. Water consumption has been categorized into three groups of low (L-PDWC), medium (M-PDWC) and high (H-PDWC). Comparison was made between PCC and DWC-GA error rate's values. PCC method's error rates of 9.49. DWC-GA error rate is 1.05.

Augmented Reality Mobile Application for Malay Heritage Museum

Siti Khadijah Ali, Haninah Masduki and Siti Noor Aisyah Nazarrudin

Abstract: Lack of staffs and language barriers are two factors that limit the Malay Heritage Museum UPM staffs to handle visitors especially during peak seasons. Hence, to resolve these issues, an augmented reality mobile application is proposed to assist the visitors for tour and also to entertain them. The proposed solution is focusing on the Malay traditional cloth and textiles (MTRACR). To attract visitors, the information is shared by using an interactive technology, an augmented reality with interactive features such as hand gestures and interactive games. Unity, Blender and Vuforia were used in this work. The Unity was used to develop the Android application while the Blender was used to create the 2D and 3D artefacts of the museum. The Vuforia was used to store the marker and to ensure that it is working for the augmented reality. Based on survey, all users were satisfied with the proposed mobile application and agree that it can be promoted to others.

Mobile Games for Older Adults with Health Purpose: A Review and New Proposed Design Model

Naincie Pindeh, Azrina Kamaruddin, Noris Mohd Norowi and Rahmita Wirza O. K. Rahmat

Abstract: As the average age of the world's population rises, applications that are suitable for older adults, taking into account age-related limitations will increasingly be required. Computer-based applications have seen substantial changes over the last decade. One of these tools is digital mobile games that can bring benefits to older adults, particularly in the prevention and treatment of cognitive disabilities or increased physical activity. Around the same time, smartphone applications have become popular and have innovative and interesting ways of communicating and interacting. This paper provides a study of the literature on mobile games for older adults. This paper also provides answers to research questions that have been formulated. The review of the relative literature review was conducted in SCOPUS, the Science Web, and Google Scholar for the period 2008-2019. The results of this review illustrated a set of studies, which focused mainly on older adults. The findings of this study discussed the main factors that motivate older adults to play mobile games. The mobile game component that makes older adults interested in playing mobile games has also been discussed and finally, the design model was proposed.

Utilization of Cloud Computing as a Smart Electronic Advising Management System for the Students at University of Ha'il

Hamad Alreshidi

Abstract: The study aims to extrapolate the effect of using cloud computing in academic advising system among the students and academic advisors at the University of Hail, KSA, as well as the importance of modern technology in improving academic guidance in the university and the challenges that both students and academic advisors of the university facing in “Cloud Computing System (CCS)”. In order to get sufficient information on this topic, the research adopts descriptive and analytical methodology by designing a questionnaire for the purpose of data collection, analysing it, and draw the conclusion. The study found that the academic advisors at the university are highly competent to use the “CCS” and its applications, as they also highly satisfied with the university’s provisions for it, while moderately satisfied with the current academic advising system. As for the university’s students, the study found that they are highly satisfied with the current academic advising system too, and moderately satisfied with the university’s provisions for “CCS”. While their satisfaction with the way the academic advisors relate with them and their competency in using “CCS” is low. The study recommends the following: it is important for the university to organise (from time to time) intensive training courses on using “CCS”. It also suggests conducting an extra field studies to be acquainted with the technical obstacles facing the advisors in using “CCS” for academic advising. The study concluded by developing a technical concept for the strategy of applying “CCS” to the academic advising system in the University of Hail.

Systematic Review of Current Techniques for Predicting Diabetic Disease from PIMA Indian Dataset

Divager Balasubramaniyan, Nor Azura Husin, Norwati Mustapha,
Nurfadhlina Mohd Sharef and Teh Noranis Mohd Aris

Abstract: Diabetic is one of the widespread diseases globally, from the report of WHO, around 438 million peoples will be suffered by diabetic in 2030. Therefore, the diabetic disease needs to be recognized in the earlier stage for reducing the mortality rate. Different machine learning (ML) and artificial intelligence (A.I.) techniques are widely utilized to identify people with diabetes. The significant analysis, robust examination, automatic learning process, and the highest accuracy of deep learning techniques are mostly used to predict the diabetic disease. This method predicts diabetic disease accuracy, and computation complexity is one of the severe issues while analyzing the high-dimensionality of data. So, in this paper, explore the different researcher works, techniques, reports for getting the current methods for resolving the above-discussed computation problems. This article analyzes the past six years of papers because they are dealing with the present techniques in the diabetic prediction process. At last, the efficiency of the discussed methods is tabulated for understanding the performance of their work. This article focuses on emerging machine-learning advances that have had significant implications on diabetes detection and diagnosis.

Rating Blood Samples for Thalassemia Carrier – An Experiment

Hang Hou Chong, Kok Why Ng and Seng Beng Ng

Abstract: Thalassemia is a genetic illness and it has the potential to affect child's birth if both parents are thalassemia carrier. Therefore, thalassemia has become a considerable disease to be tested before a couple plan to commit themselves into a closer relationship. Conventional method of thalassemia diagnosis has several disadvantages that lead to human refusal to check for their body condition. Although numerous programmes have been developed, they still consist of limitation such as lack of microscopic images data from the internet sources and the accuracy of the current results are not as high as the conventional method. For the purpose of the research, we have developed a simple and reliable computer programme for thalassemia diagnosis. Multiple methods used appropriately in various layers of image processing to achieve as high accuracy of results as possible. These methods in image pre-processing layers includes de-noising the image, increasing the contrast, sharpening the image, grey-scaling the image, applying Gaussian filter and OTSU binarization. Besides, canny edge detector, finding the contours and drawing contours by normal distribution have been conducted in image segmentation layer. Lastly, Support Vector Machine is used to train the image classification layer. From the trained model, we achieved 92.7% accuracy and all the images were evaluated and most of the input provide correct output. In a nutshell, the development of this programme considered successful with well operation in all functional requirement to generate accurate results. It is hoped that this study and idea can contribute better healthcare and increase the quality of living in the world.

Challenges Augmented Reality User Interfaces Guidelines Specially Design for Medical Learning

Che Nur Shafareen Afera Binti Che Anuar,
Rahmita Wirza O.K. Rahmat, Azrina Kamaruddin and Rafidah Hod

Abstract: Augmented Reality (AR) Mobile applications have been widely used in many fields, including education, computer games, advertising, tourism and more. AR is also widely used in medical education, as it helps medical students to see and understand the structure of human/animal anatomy more closely and this helps them visualize the model because their textbooks show only 2D images. Some existing AR applications are not widely used and are less user-friendly. The main purpose of this paper is to compile elements that can encourage medical students to fully utilize AR applications to assist in their self-study after taking the relevant classes. The main contribution of this research is to identify the challenges in interacting with AR applications in medical education. To identify the proposed guidelines, a Mobile AR Application named as Brain Anatomy Revision Application (BARA) was developed. BARA is developed in stages and each level tested by users as respondents for feedback before advancing to the next level. Subsequently, several preliminary experiments were conducted according to the BARA phase and version, as well as User Evaluation by medical students from Faculty of Medical and Health Science, Universiti Putra Malaysia. The final Acceptance Test was performed by UiTM Sg Buloh medical students on three different versions of BARA namely printed markers, digital markers, and object target markers. All three versions of BARA have been applied using ten new guidelines, and medical students will choose which version they prefer to use including issues of contents, ease of use of apps, and the experience using AR BARA as they can look and interact at the entire AR 3D model.

Cognitive Agent Modelling and Analysis of the Dynamics of Workplace Stress

Azizi Ab Aziz and Billel Arbaoui

Abstract: The high demanding workplace will create unavoidable pressure for some people. In general, the pressure is viewed as acceptable by certain standards, as it is a core component to keep people alert, motivated and learn something new (or commonly known as eustress). However, when it taxes the personal resource to cope, it will lead to the undesirable condition called as distress. This paper discusses the implementation of agent-based modelling (ABM) approach for stress at workplaces as a basis to understand the behaviour of that condition. Agent-based modelling focuses on the individual active components of a system. First, the confounding factors that are responsible for the formation of stress at the workplace were identified and formalized. Later, this formal model has been evaluated using equilibria analysis and temporal trace language methods. Based on the simulation results, the proposed computational cognitive agent-based model has demonstrated rational behaviours patterns that follow the existing psychological and cognitive literature related to stress at the workplace.

Task-based Accessibility Evaluation of Arabic Version of Websites by Low-vision and Dyslexia User

Muhammad Akram, Rosnafisah Sulaiman and
Shah Murtaza Rashid Al Masud

Abstract: Websites are considered as a significant source of information. Services provided by the websites must be equally accessible by all users, including people with disabilities. Web content accessibility guidelines exists since the last two decades but still disable users are not able to benefit from the services provided by the website adequately. However, our knowledge is quite low about the problems faced by disabled users of Arabic websites. In this study, five Saudi Ministry websites selected as a case study for accessibility evaluation based on their frequency of usage. Twenty-five low-vision and fourteen dyslexia participant performed the given a set of tasks on each chosen website. After completing the task, each participant rated the level of compliance of the website using five-level scales with the web content accessibility guidelines 2.0. The study concluded that selected Arabic websites are not fully designed by applying the existing WCAG 2.0. The conclusion enforces the involvement of disable user is significant in design and evaluation to improve the accessibility. Moreover, the research team believes that empirical evidence generated by this research study is an addition to the current body of accessibility evidence. In future perspective, problems encountered by the low vision and dyslexia users can be used to investigate the percentage of coverage of user problems with existing guidelines. Moreover, results will be helpful to refine the guidelines according to local context and can be used to design the Arabic websites to be fully benefited by low vision and dyslexia users.

A Review of the Best Practice Forensic Tools for Storage Recovery

Wan Nur Eliana Wan Mohd Ludin and Chng Chern Wei

Abstract: Analysis and examination of data is performed in digital forensics. Nowadays computer is the major source of communication which can also be used by the investigators to gain forensically relevant information. In this research, there focus on 10 different recovery tools with different characteristics of recovery and type of operating system that support that recovery tools. Most of tools suitable for the all operating system but not all tools support both of type analysis which is static and live. It is because, the recovery tools have different purpose and function. An investigator must know what type evidence and what the data or information will do recovery. The recovery tools support analysis which is static and live, it based on condition an evidence during the crime. The forensic recovery tools also have difference supported operating system and file format. Basically, an investigator will use recovery tools depends on type of evidence either Windows, Linux or Mac.

Verifying the Correctness of UML Statechart Outpatient Clinic Based on Common Modeling Language and SMV

**Pathiah Abdul Samat, Muhammad Amsyar Azwarrudin,
Norhayati Mohd Ali and Novia Indriaty Admodisastro**

Abstract: Unified-modelling language (UML) is a standard general purpose modelling language, which is widely, used in system design of banking, biological, plantation and healthcare. Recently, there are many systems of healthcare are modeled using behavioral diagram such as UML statechart for design purposes. However, the behavior of healthcare statechart is rarely verified to ensure it is behaving as we needed. In software engineering, a software should be verified before it is transform to the further phases. In this paper, a statechart of outpatient clinic is verified to ensuring the correctness of its design. Therefore, to achieve our objective, we have applied Common Modeling Language (CML) and SMV model checker for verification formal system modeling and specification of property of statechart outpatient clinic. The result shows that the statechart of outpatient clinic is behave as required and the statechart is allowable to transform to the next phase.

Diabetic Disease Prediction from Pima Indian Diabetic Dataset using Random Multinomial Logit Approach with the Spiral Interpretable Neural Network

Divager Balasubramaniyan, Nor Azura Husin, Norwati Mustapha,
Nurfadhlina Mohd Sharef and Teh Noranis Mohd Aris

Abstract: According to the report of the World Health Organization (WHO), a diabetic is one of the most common and dangerous diseases. The diabetic disease affects almost 275 million people in 2010 and it has to be increased up to 438 million in the year 2030. This disease is one of the metabolic disorders which affects almost several people. So, it has to be detected in the earlier stage. Traditional diabetic disease prediction systems have been used to manage the false acceptance rate and false rejection rate while predicting diabetic disease which affects diabetic prediction accuracy. To overcome the above issues, in this manuscript effective and intelligent machine learning algorithm called a random multinomial logit approach with the spiral interpretable neural network approach. The introduced algorithms successfully analyze the Pima Indian diabetic dataset and select the best diabetic features. The selected features are successfully classified by applying the introduced classifiers. Then the efficiency of the system is evaluated using MATLAB based experimental results and discussions.

Feature Matching & Camera Translation Estimation for 3D Reconstruction from Multi-View Stereo Images

Intan Syaherra Ramli, Rahmita Wirza O.K. Rahmat,
Seng Beng Ng, Hizmawati Madzin and Puteri Suhaiza Sulaiman

Abstract: 3D reconstruction based on multi-view image captured by a single moving camera has increased in demand as it low in cost for setup, faster and easier for novice which requires less technical skill. The general process involves image acquisition, feature extraction and matching, camera motion estimation and 3D point reconstruction. However, there are still challenges to develop an accurate 3D model with less complex process. This is due to several factors such as human error and number of images required for image acquisition process and camera motion estimation which could affect the reconstruction of 3D model. Therefore, this paper proposed a new method for camera translation estimation based on gradient analysis and rectification of optical flow feature point matched. Result shows that the method able to auto-calibrate the camera position due to human error by rectifying the median of each feature point matched. The average accuracy is 0.005649 which refers to accurate different between the benchmark and tested data. This result shows that the average gradient for the tested data in condition two after implementing the method is close to the benchmark data in condition one. Moreover, the proposed method only requires four views of image in image acquisition step which able to reduce the time complexity.

A Bibliometric Review on Virtual Reality in Medicine

Rafidah Hod, Siti Khadijah Adam, Faridah Idris and Aidi Ahmi

Abstract: This paper conducts a bibliometric review of global research on virtual reality in medicine. Virtual reality plays a significant role in various fields. Our review documents most influential institutions, journals, article titles and authors in this area. Using a bibliometric analysis, a sample of 3774 studies was examined from the Scopus database to identify research activity on virtual reality in medicine between 1990 and early January 2020. The analysis resulted in the most influential articles and authors based on their citations and publications. The network of co-occurrence of authors keywords was also visualized. This review is hoped to 1) provide insight into the history and development of augmented reality in medicine and 2) as an overview of virtual reality research landscape in medicine.

Augmented Reality in Facilitating Deep Learning: A Review

Azmah Saat, Nur Izah Ab. Razak, Razif Abas and
Rahmita Wirza O. K. Rahmat

Abstract: The present study reviews the augmented reality application in the education area. Justification of the use is to improve the learning motivation and outcome of students through the use of a deep learning approach. A deep learning approach is associated with better academic performances. Augmented reality provides a tool to motivate learning and understanding in the student. The main aim of the current review is to reflect the use of augmented reality as a teaching and learning tool to motivate and promote the deep learning approach process which includes life-long learning and possible research areas that warrant and assess the impact of augmented reality on academic performance.

The Use of Metamodel-based Approach for Designing Healthcare Applications

Norhayati Mohd Ali, Novia Admodisastro,
Rahmita Wirza O.K. Rahmat and Mohd Zamrin Dimon

Abstract: Recently, the use of Model-Driven Engineering (MDE) via metamodeling approach is gaining more attention for software applications development. The community from the healthcare domain also attempts to employ the metamodel approach for producing quality healthcare applications. Healthcare applications have become an imperative in every attempt to improve healthcare management. Numerous studies reported that the healthcare domain is seen as a complex and unique domain, which involves dynamic characteristics. In addition, it is widely recognized that the increase of information exchange in the healthcare domain is caused by the diversity of healthcare data. This has led to the increase use of information technologies in the healthcare industry so as to enhance the healthcare delivery process via healthcare applications. However, the complexity of healthcare information leads to ineffective models and design of healthcare applications. Modeling the healthcare processes and developing healthcare applications are challenging tasks. Hence, the advances of MDE have influenced the use of the metamodeling technique in the development of healthcare applications. Various metamodels are developed as a solution to provide a clear healthcare process model and a correct healthcare application. The aim of this paper is to analyse the use of the metamodel-based approach in designing healthcare applications. We believe that the metamodel-based approach would improve the development of healthcare applications.

Multiprotocol Label Switching (MPLS) Model in Software-Defined Networking: Experimental Performance Evaluation

Somaia Mohammedali, Ahmedelmubarak Bashir, Abuagla Babiker,
Ahmed Abdelaziz and Suleman Khan

Abstract: Conventional IP networks are sophisticated and arduous to administrate. Software-Defined Networking (SDN) is an originating paradigm that hopeful to mutate this situation of matters, isolating the network's control logic from the underlying routers and switches, advertising focalization of network control, and defining the possibility to program the network. SDN creates and introduces novel condensation in networking, facilitation network administration and simplification of network development. This paper evaluates the performance of MPLS over SDN. Through different network simulation experiments using realistic network scenarios in Mininet and GNS3 environments, this paper provides an insight into the MPLS performance over SDN in comparison with MPLS over traditional networks the performance of these scenarios is evaluated by using Nping tool to investigate the performance of the MPLS in both SDN networks and conventional networks. The parameters that exploited are end-to-end delay; packets delay alternation, and throughput. These parameters are obtained and analyzed in various scenarios. The results clearly show that the efficiency of the software-defined network is outperforming the conventional network. For example, the average response time shows 00.448 ms in SDN while 93.761 ms in the conventional network, throughput in SDN is at least raise than 140 double comparing to conventional network and the average round trip time in the conventional network is recorded 100 double compared to SDN in both UDP and TCP traffic.

HaloChem VR for Basic Chemistry Mobile Application: A Preliminary Investigation

Nurul Amelina Nasharuddin, Nurul Amirah Umar,
Mas Rina Mustaffa and Nor Azura Husin

Abstract: Numerous teaching and learning tools leverage existing technologies to ensure that relevant knowledge is acquired by learners, hence increasing their learning performance. Augmented reality, virtual reality, and mixed reality are three of the digital technologies implemented in mobile-based education system. One of the challenges encountered by the learners in the field of Chemistry is the challenge of visualising the mechanism of atoms and chemical bonding. An immersive mobile prototype application with virtual reality technology was designed and built in this study to help learners visualise the process of chemical bonding, thereby enhancing the learners' comprehension and interest. The mobile application known as HaloChem VR also includes mini game as an assessment to test the retention of knowledge by learners. The phase of development was carried out using the Agile method focused on the interpretation of specifications by experts and learners. The HaloChem VR was developed using Unity. The preliminary testing with 5 learners assessed their reactions and satisfaction in using the application. Overall results indicated that the proposed prototype application had a positive feedback and serves as a good base to a more comprehensive mobile learning application in future. This study showed that the proposed application had a promising impact on learners' knowledge growth.

Exploring the Perception and the Acceptance of the use of 360° Videos in Virtual Reality Settings for Teaching and Learning

Evi Indriasari Mansor, Marzni Mohamed Mokhtar and Nurfadhlina Mohd Sharef

Abstract: Virtual Reality (VR) is a technology that has been widely adopted in supporting learning and educational purposes over the recent years. It has shown enormous potential to pioneer education in the future, mainly through its immersive learning environments provided in 360° settings. This paper reports the perception of trainee teachers towards the acceptance of the use of 360° videos in VR settings for teaching and learning. Forty trainee teachers were grouped to create learning content by using available 360° videos and rendering and processing them into a VR format. They viewed and experienced the content they developed using the ClassVR headset. The findings showed positive feedback on the use of 360° videos in facilitating immersive learning experiences.

RELAYVIO: Mobile Application for Documenting Domestic Violence

Noris Mohd Norowi, Siti Norhanida Hairudin and
Lili Nurliyana Abdullah

Abstract: RelayVio is designed and developed as android-based mobile applications for all users, particularly users of domestic violence victims and their families in Malaysia. The main function of this app is to encourage domestic violence victims to document evidence of violence by way of writing notes, capturing images and recording dates and times of the occurrence. The app also allows victims to sending messages to a domestic violence hotline (Talian Nur), or can directly connect to 999 in the event of an emergency. The app also aims to educate the general public on the signs, dangers and help they can get relating to domestic violence abuse, through the use of animation (3D stop motion). getting information about the act of domestic violence. The method used in the development of mobile applications is ADDIE, which consists of analysis, design, system development, implementation and evaluation. An interview with a sociologist was conducted as an expert review, as well as a usability study of the app. Results show that the majority of the participants agreed that RelayVio app will be able to facilitate victims of domestic violence to gather information and keep documentation of the abuse as a form of evidence against their abusers.

Mobile Games for Older Adults with Health Purpose: A Review and New Proposed Design Model

Naincie Pindeh, Azrina Kamaruddin, Noris M Norowi and Rahmita Wirza O.K. Rahmat

Abstract: As the world's older age population increases, appropriate technologies for older adults are more and more needed, taking into account age-related limitations. Computer-based applications have undergone significant improvements over the last decade. One such tool is digital mobile games that can benefit older adults, especially in preventing and treating cognitive impairment or increased physical activity. Smartphone apps have become popular at the same time and have creative and fascinating ways to connect and interact with them. This article includes a literature review of mobile games for older adults. This paper also contains answers to the research question. The literature review was assessed in SCOPUS, Web of Science, and Google Scholar for the 2008-2019 period. The results of this review have demonstrated several studies focused primarily on older adults. The findings of this study explored the vital motivational components of mobile games for older adults. There was also a discussion of the mobile game aspect that makes older adults interested in mobile games, and finally, the design model of mobile games for older adults was proposed.

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