2020 2nd Asia Pacific Information Technology Conference (APIT 2020)

17-19, January, 2020

Bali Island, Indonesia

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Welcome Message from Organizing Committee

It is our great pleasure to invite you to join our international conferences - 2020 2nd Asia Pacific Information Technology Conference (APIT 2020). This event will provide a unique opportunity for editors and authors to get together and share their latest research findings and results. We look forward to welcoming you at Bali Island.

We're confident that over the two days you'll get the theoretical grounding, practical knowledge, and personal contacts that will help you build long-term, profitable and sustainable communication among researchers and practitioners working in a wide variety of scientific areas with a common interest in information technology.

On behalf of all the conference committees, we would like to thank all the authors as well as the technical program committee members and reviewers. Their high competence, their enthusiasm, their time and expertise knowledge, enabled us to prepare the high-quality final program and helped to make the conference become a successful event.

We truly hope you'll enjoy the conference and get what you expect from the conference.

Organizing Committee
January 17, 2020

Conference Introductions

Welcome to 2020 2nd Asia Pacific Information Technology Conference (APIT 2020). This conference is organized by ACM Chapter Singapore. The objective of the conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities on Computer Science and Information Technology.

Papers will be published in the following proceeding:

International Conference Proceedings Series by ACM (ISBN 978-1-4503-7685-3), which will be archived in the ACM Digital Library, and indexed by Ei Compendex, Scopus and submitted to be reviewed by Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

Conference website and email: http://www.apit.net and apit.conference@gmail.com

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Conference Venue

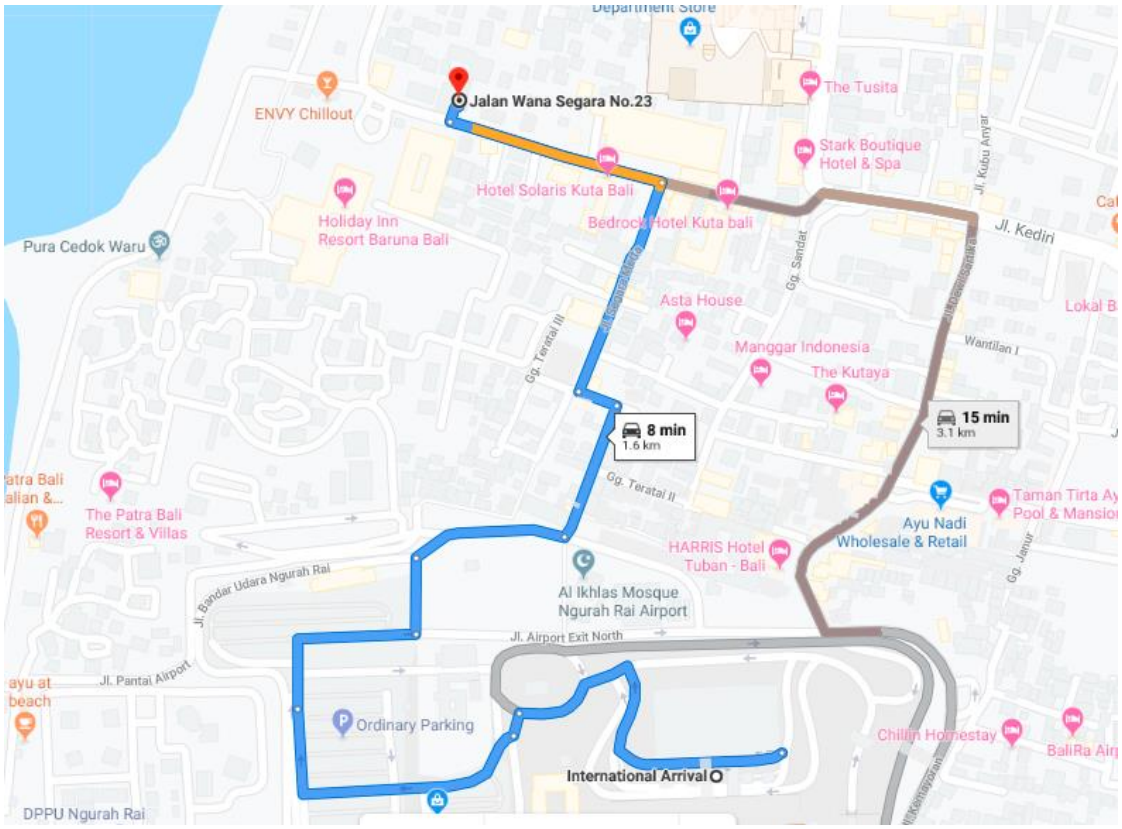
RAMA BEACH RESORT & VILLA

http://www.ramabeachhotel.com

Add: Jl. Jenggala Tuban, Kuta Bali, Indonesia 80361
T: +62 361 751557
Sales Manager: Ms. Yuni
E-mail: sm@ramabeachhotel.com

Your romantic South Kuta Resort in Bali Rama Beach Kuta Resort & Villas – South Kuta Bali is a tranquil sanctuary in the southern part of Kuta Bali with superb facilities and spacious guestrooms in 2 hectares of lush greenery and just 10 minutes' drive from Ngurah Rai International Airport and experience your authentic of Cooking Class activity. This South Kuta Resort is conveniently located within walking distance to the famous Lippo Shopping Mall, Waterbom Amusement Family Park and various restaurants and entertainment venues.

Map (Airport – Conference Venue)



Recommended Hotels:

RAMA BEACH RESORT & VILLA(conference hotel)

Holiday Inn Resort Baruna Bali(about 11 mins by foot to conference venue)

Sulis Beach Hotel & Spa(about 1 mins by foot to conference venue)

Keynote Speakers Introductions

Keynote Speaker I

Prof. Chin-Chen Chang
Feng Chia University, Taiwan

Prof. Chin-Chen Chang obtained his Ph.D. degree in computer engineering from National Chiao Tung University. He's first degree is Bachelor of Science in Applied Mathematics and master degree is Master of Science in computer and decision sciences. Both were awarded in National Tsing Hua University. Dr. Chang served in National Chung Cheng University from 1989 to 2005. His current title is Chair Professor in Department of Information Engineering and Computer Science, Feng Chia University, from Feb. 2005.

Prior to joining Feng Chia University, Professor Chang was an associate professor in Chiao Tung University, professor in National Chung Hsing University, chair professor in National Chung Cheng University. He had also been Visiting Researcher and Visiting Scientist to Tokyo University and Kyoto University, Japan. During his service in Chung Cheng, Professor Chang served as Chairman of the Institute of Computer Science and Information Engineering, Dean of College of Engineering, Provost and then Acting President of Chung Cheng University and Director of Advisory Office in Ministry of Education, Taiwan.

Professor Chang's specialties include, but not limited to, data engineering, database systems, computer cryptography and information security. A researcher of acclaimed and distinguished services and contributions to his country and advancing human knowledge in the field of information science, Professor Chang has won many research awards and honorary positions by and in prestigious organizations both nationally and internationally. He is currently a Fellow of IEEE and a Fellow of IEE, UK. On numerous occasions, he was invited to serve as Visiting Professor, Chair Professor, Honorary Professor, Honorary Director, Honorary Chairman, Distinguished Alumnus, Distinguished Researcher, Research Fellow by universities and research institutes. He also published over 1,100 papers in Information Sciences. In the meantime, he participates actively in international academic organizations and performs advisory work to government agencies and academic organizations.

Keynote Speaker II

Prof. Yong Jin Park
University Malaysia Sabah, Malaysia

Prof. Yong Jin Park received B.E., M.E., and Ph.D. degrees in Electronic Engineering from Waseda University, Tokyo. From 1978 to 2010, he was a Professor at Hanyang University, Seoul. He was also a Professor of Waseda University, Tokyo, during 2010-2016. He joined University Malaysia Sabah in 2016, where he is now a Professor of Faculty of Computing and Informatics. In addition, he was a Visiting Associate Professor from 1983 to 1984 in the Department of Computer Science, University of Illinois, Urbana-Champaign, and a Research Fellow at the Computing Laboratory, University of Kent, England, from 1990 to 1991. He joined to deploy Research & Development Network in Korea from the early stage in 1980s. Furthermore, he was one of founding members of the Open Systems Interconnection Association, which promoted standardization activities of communication networks in Korea, and the President from 1991 to 1992. He was the Chairman of the IEEE Seoul Section from 1999 to 2000 and the President of the Korea Institute of Information Scientists and Engineers (KIISE) in 2003. As international academic activities, he was the Director of the Secretariat of the Asia Pacific Advanced Network (APAN) from 1999 to 2003 and the Director of IEEE Region 10 concurrently holding a member of IEEE Board of Directors from 2009 to 2010. He served successively various IEEE committees such as Nominations and Appointment Committee, Conference Committee, Public Visibility Committee, and Ethics & Member Conduct Committee, and is now a member of Life Member Committee, Service Award Committee, Theodore W. Hissey Outstanding Young Professional Award Committee member, and Teaching Award Committee in IEEE as well as IEEE Region 10 Nominations & Advisory Committee. Currently he is a Professor Emeritus of Hanyang University and IEICE fellow. His research interest is the area of Computer Networks, especially Future Internet Architectures.

Keynote Speaker III

Prof. Ford Lumban Gaol
Bina Nusantara University, Indonesia

Prof. Ford Lumban Gaol is Chair of Bina Nusantara University Doctorate Program in Computer Science Leader of Research Interest Group Leader "Advance System in Computational Intelligence & Knowledge Engineering Chairman of IEEE Computer Society Indonesia

Dr Ford Lumban Gaol is currently Professor Informatics Engineering and Information System, Bina Nusantara University www.binus.ac.id. He is the Chair of Bina Nusantara University Doctorate Program in Computer Science http://dcs.binus.ac.id and Research Interest Group Leader "Advance System in Computational Intelligence & Knowledge Engineering " (IntelSys)

Dr Ford is the Vice Chair of IEEE Indonesia section on the period of 2013 – 2016. He is theDirector of Region Office Ford Lumban Gaol, Ph.D., Co-Chair, IIAI Southeast Region (Indonesia Office) Dr Ford was the ACM Indonesia Chapter Chair on year 2012.

Dr Ford already involved with some project relate with Technology Alignment in some of multinational companies as well as some government projects.

For International highliht, Dr Ford is the recipient of Visiting Professor in Kazan Federal Universty, Russia 2014 and 2015, Visiting Professor in Vladimir State University, Russia 2016, Visiting Professor in Financial State University 2017 and Southern Federal University, Russia 2018. He also Visiting Researcher in Advanced Institute of Industrial Technology, Tokyo Metropolitan University Japan 2018 and 2019. He was Invited Scholar in Aligarh Muslim University, keynote speaker in ICCNT 2014 and Invited Scholar in ICTP Trieste Italy.

He has 164 papers that indexed in SCOPUS and 12 books that published by Springer-Verlag German. He was General Chairs or Co-Chairs for some International conferences and IEEE conferences including ACIIDS, Tensymp and Tencon.

Dr Ford is member of Indonesian Mathematical Society (IndoMS), The Association for Computing Machinery (ACM) Professional, The International Association of Engineers (IAENG), and the Indonesia Society for Bioinformatics.

He hold the B.Sc. in Mathematics, Master of Computer Science. and the Doctor in Computer Science from the University of Indonesia, Indonesia in 1997, 2001 and 2009, respectively.

Keynote Speaker IV

Prof. Tatsuya Yamazaki
Niigata University, Japan

Prof. Tatsuya Yamazaki received the B.E., M.E. and Ph.D. degrees in information engineering from Niigata University, Niigata, Japan, in 1987, 1989 and 2002, respectively. He joined Communications Research Laboratory (at present, National Institute of Information and Communications Technology) as a researcher in 1989. Since August 2013, he has been with the Faculty of Engineering, Niigata University, Niigata, where he is currently a Professor. Currently, he is also the director at the Big Data Activation Research Center of Niigata University. From 1992 to 1993 and 1995 to 1996 he was a visiting researcher at the National Optics Institute, Canada. From 1997 to 2001 he was a senior researcher at ATR Adaptive Communications Research Laboratories. His research interests include pattern recognition, statistical image processing, sensing data analysis, and communication service quality management. He served as general co-chair of IEEE Workshop on Knowledge Media Networking (KMN'02) and general chair of the 5th International Conference On Smart Homes and Health Telematics (ICOST 2007). He is a member of the IEEE, the Institute of Electronics, Information and Communication Engineers, the Information Processing Society of Japan, the Institute of Image Information and Television Engineers, and the Japanese Society for Artificial Intelligence.

Keynote Speaker V

Prof. Eko K. Budiardjo
Faculty of Computer Science, University of Indonesia, Indonesia

Prof. Eko K. Budiardjo has been a faculty member of the Faculty of Computer Science in University of Indonesia since 1985. Teaching, research, and practical services are aligned; give result in a full spectrum of academic achievement. Majoring in Software Engineering as professional track record, he has made some scientific contribution such as Software Requirement Specification (SRS) patterns representation method, R3 Method, ZEF Framework, FrontCRM Framework, SCRM-HE Framework, and ScrumBoosterTM. Graduated from Bandung Institute of Technology (ITB) in 1985, holds Master of Science in Computer Science from the University of New Brunswick, Canada in 1991, and awarded Philosophical Doctor in Computer Science from Universitas Indonesia in 2007. He is a member of the International Association of Engineers (IAENG), IEEE, ACM, and a senior member of the International Association of Computer Science and Information Technology (IACSIT). Currently he is the Head of Reliable Software Engineering (RSE) Lab. Faculty of Computer Science Universitas Indonesia, and Chairman of The Indonesian ICT Profession Society (IPKIN).

Registration Guide

January 17, 2020 (Friday)

Time: 10:00~17:00

Venue: RAMA BEACH RESORT & VILLA（Lobby）

Add: Jl. Jenggala Tuban, Kuta Bali, Indonesia

Registration Steps

1. Arrive at RAMA BEACH RESORT & VILLA;
2. Inform the conference staff of your paper ID;
3. Sign your name on the Participants list;
4. Sign your name on Lunch & Dinner requirement list;
5. Check your conference kits: (1 conference program, 1 lunch coupon, 1 dinner coupon, 1 receipt, 1 name card, 1 flash disk (papers collection), 1 laptop bag);
6. Finish registration.

Tips: Please arrive at the conference to upload or copy Slides (PPT) into the laptop room 10 minutes before the session begins.

Note:

(1) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(2) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on January 18, 2020.

(3) One day tour includes lunch but does not include attractions tickets, and participants need to take care of themselves.

* One regular registration can cover one participant.

*The organizers cannot accept liability for personal injuries, or for loss or damage of property belonging to meeting participants, either during, or as a result of the meeting. Please take care of all your belongings.

*Along with your registration, you will receive your name badge, which must be worn when attending all official conference sessions and activities. Participants without a badge will not be allowed to enter the venue building. Please don't lend your name badge to others.

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about 12 Minutes of Presentation and 3 Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on January 18, 2020.

Dress code

Please wear formal clothes or national representative of clothing.

Schedule for Conference

Lobby, RAMA BEACH RESORT & VILLA, January 17(10:00 - 17:00)	
Arrival and Registration	
Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA, January 18 (9:00 - 12:25)	
Opening Remark (9:00-9:10) Speaker: Prof. Eko K. Budiardjo, Faculty of Computer Science, University of Indonesia, Indonesia	
Keynote Speech I (9:10-9:45) **Title: Information Hiding Techniques Inspired by Nature** Prof. Chin-Chen Chang, Feng Chia University, Taiwan	
Keynote Speech II (9:45-10:20) **Title: Information-Centric Networking and 5G Networks** Prof. Yong Jin Park, University Malaysia Sabah, Malaysia	
Coffee Break & Group Photo (10:20-10:40)	
Keynote Speech III (10:40-11:15) **Title: to be added** Prof. Ford Lumban Gaol, Bina Nusantara University, Indonesia	
Keynote Speech IV (11:15-11:50) **Title: Visual Inspection Applications Using Machine Learning** Prof. Tatsuya Yamazaki, Niigata University, Japan	
Keynote Speech V (11:50-12:25) **Title: Software Engineering Process Quality as a Key Success Factor for Digital Transformation** Prof. Eko K. Budiardjo, Faculty of Computer Science, Universitas Indonesia, Indonesia	
Lunch (12:25-13:30)	
January 18 (13:30 – 15:45)	
Session 1 - **Jatayu Room 1st Floor** Session Chair: Prof. Ford Lumban Gaol	**Session 2** - **Jatayu Room 2nd Floor** Session Chair: Prof. Tatsuya Yamazaki
Coffee Break (15:45-16:00)	
January 18 (16:00 – 18:00)	
Session 3 - **Jatayu Room 1st Floor** Session Chair: Prof. Yong Jin Park	**Session 4** - **Jatayu Room 2nd Floor** Session Chair: Prof. Chin-Cheng Chen
Poster session (10:30-12:35) Session Chair: Prof. Chin-Chen Chang	
Dinner (18:00-19:00)	
January 19 (7:00-18:00)	
One-Day Visit & Tour	

Morning Session

Morning, January 18, 2020 (Friday)

Time: 9:00~12:25

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Opening Remarks (9:00~9:10)

Addressed by Prof. Eko K. Budiardjo, Faculty of Computer Science, University of Indonesia, Indonesia

Keynote Speech I (9:10~9:45)

Title: Information Hiding Techniques Inspired by Nature

Prof. Chin-Chen Chang

Feng Chia University, Taiwan

Abstract— Steganography is the science of secret message delivery using cover media. A digital image is a flexible medium used to carry a secret message because the slight modification of a cover image is hard to distinguish by human eyes. In this talk, I will introduce some novel steganographic methods based on different magic matrices. Among them, one method that uses a turtle shell magic matrix to guide cover pixels' modification in order to imply secret data is the newest and the most interesting one. Experimental results demonstrated that this method, in comparison with previous related works, outperforms in both visual quality of the stego image and embedding capacity. In addition, I will introduce some future research issues that derived from the steganographic method based on the magic matrix.

Keynote Speech II (9:45~10:20)

Title: Information-Centric Networking and 5G Networks

Prof. Yong Jin Park

University Malaysia Sabah, Malaysia

Abstract— Information Centric Networking (ICN) has been being inspired as a promising future Internet architecture. The recent network usage has caused the big paradigm shift from host-centric to information-centric. ICN accesses information by using its object name, instead of a location address such as IP address. This fundamental and simple concept makes ICN a promising network architecture, because it provides object-based security, in-network data storage and mobility support. On the other hand, as 5G mobile networks are expected to be deployed in earnest from this year, what relationship between ICN and 5G exists is mentioned. In summary this talk includes the background and technological features of ICN as well as its latest development. It is expressed that a variety of 5G network features facilitates adopting ICN as one of their network architectures.

Coffee Break & Group Photo Taking 10:20~10:40

Keynote Speech III (10:40~11:15)

Title: Machine Learning : The initiatives to Enhance the Quality of Our Humanity

Prof. Ford Lumban Gaol

Bina Nusantara University, Indonesia

Abstract— In this talk I explore some of the biggest threats and initiatives - for example, algorithmic oppression and triage, exacerbation of transaction and inequality, and cybersecurity and autonomous weapons - and some of the biggest opportunities of the current state of machine learning, and consider the major approaches being taken to guiding machine learning for human benefit. I then describe three initiatives we are pursuing to intervene, implement, and archive better practice.

Keynote Speech IV (11:15~11:50)

Title: Visual Inspection Applications Using Machine Learning

Prof. Tatsuya Yamazaki

Niigata University, Japan

Abstract— Since Convolutional Neural Networks (CNNs) achieved much better performance than the other approached in a visual pattern recognition contest almost a decade ago, CNNs have become a powerful tool for visual inspection applications. CNNs are usually trained by backpropagation and huge amount of training data are needed to attain human-equivalent performance.

In this speech, two practical applications of CNNs are introduced. The first one is a medical inspection application, and its purpose is to inspect lung nodules in Computed Tomography (CT) images. In this application, Deep Learning (DL) is used to extract

the features in the object images on the architecture of CNNs. In the case that a large database of CT images is not available, the accuracy of lung nodule detection can be improved by the transfer learning that trains a DL model by making use of public databases including the same kind of chest CT images.

The second application is visual inspection of pear fruit outlook quality for agricultural task support. Pear surfaces are able to be degraded by several causes and outlook degradation detection is performed by humans. We are trying to develop a human-supportive degradation detection system using DL and CNNs. First of all, we have collected outlook quality degradation data from pear surface images. Then we constructed a CNN to detect degrated parts and classify degradation causes.

Keynote Speech V (11:50~12:25)

Title: Software Engineering Process Quality as a Key Success Factor for Digital Transformation

Prof. Eko K. Budiardjo

Faculty of Computer Science, Universitas Indonesia, Indonesia

Abstract— Digital transformation in the era of the industrial revolution 4.0, software is the core of digital technology, invisible but determines how hardware / systems functioning, which places software as one of the main success factors of the digital economy. To keep risks under control, including attacks through the cyber world, capabilities are very important to be presented in developing, operating, and maintaining software so that data sovereignty, business security, and the implementation of electronic-based government systems and electronic-based business systems must be maintained. As a way to secure the existence of the system in the cyber world, in which all devices are connected. For this reason, it is necessary to ensure the quality of the software through a series of engineering processes that are in accordance with the standards, starting from the identification of requirements (requirements) to software testing, by upholding professional ethics. Quality management needs to be an integrated part of the development activities.

In software engineering, there is one language to show the quality capabilities of software products, namely the level of Capability Maturity Model Integration for Development (CMMI-Dev). Each level reflects the ability to do software engineering, thus no longer need a process to evaluate the engineering capabilities of a developer organization. The level of maturity determines the quality of the resulting software product. There are four levels out of five maturity level that concern to Software Quality Management (SQM), specifically the process area: Process and Product Quality Assurance (PPQA), Verification, Validation, Quantitative Project Management (QPM), and Causal Analysis and Resolution (CAR). This process area ensures whether the development process and the products that will be produced are in accordance with established process standards.

Lunch 12:25~13:30

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT0035 Presentation 1 (13:30-13:45)

Design Thinking Approach for Mobile Application Design of Disaster Mitigation Management

Febe Monika, Anggar Belahakki, **Almer Hafiz Yusuf**, Adinda Dwi Wulandari and Amalia Suzianti
Universitas Indonesia, Indonesia

Abstract— Effective disaster management lead to useful and reliable mitigation program. Mitigation program is an action to reduce the risk to life, property, social and economic activities, etc. from natural disasters. One of the most often disasters that occurred in Indonesia is a tsunami. Tsunami also had a lot of victims, including life victims, house, property, etc. This article focuses on using design thinking method as an approach to developing a mobile application for tsunami disaster management in Indonesia. The first step of the design thinking is empathizing with the user, which we have done by with the victims of the tsunami by interviewing one of the survivors. The second step is defining the user's needs. In the third step, ideation, we are doing brainstorming by using an affinity diagram. After that, we are developing the prototype by developing the beta version of the application to visualize the interfaces. Lastly, in the testing step in validating our mobile application prototype, we visited one of the schools in Banten which had experienced a tsunami disaster. In the end, we are discussing the results including from the pre-test and post-test results from students who had tried our application.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

SC013 Presentation 2 (13:45-14:00)

English to Bangla Machine Translation Using Recurrent Neural Network

Shaykh Siddique, Tahmid Ahmed, Md. Rifayet Azam Talukder and Md. Mohsin Uddi
East West University, Bangladesh

Abstract—The applications of recurrent neural networks in machine translation are increasing in natural language processing. Besides other languages, Bangla language contains a large amount of vocabulary. Improvement of English to Bangla machine translation would be a significant contribution to Bangla Language processing. This paper describes an architecture of English to Bangla machine translation system. The system has been implemented with the encoder-decoder recurrent neural network. The model uses a knowledge-based context vector for the mapping of English and Bangla words. Performances of the model based on activation functions are measured here. The best performance is achieved for the linear activation function in encoder layer and the tanh activation function in decoder layer. From the execution of GRU and LSTM layer, GRU performed better than LSTM. The attention layers are enacted with softmax and sigmoid activation function. The approach of the model outperforms the previous state-of-the-art systems in terms of cross-entropy loss metrics. The reader can easily find out the structure of the machine translation of English to Bangla and the efficient activation functions from the paper.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT0034 Presentation 3 (14:00-14:15)

A Survey of Attack Instances of Cryptojacking Targeting Cloud Infrastructure

Keshani Jayasinghe[1] and Guhanathan Poravi[2]

1: University of Westminster, UK; 2: Informatics Institute of Technology, Sri Lanka

Abstract— Cryptojacking is the act of using an individual's or an organization's computational power in order to mine cryptocurrency. In some scenarios, this can be considered as a monetization strategy, very much similar to advertisements. But to do so without the explicit consent of the computer owners is considered illegitimate. During previous years, attackers' focus was heavily laid on browser-based cryptojacking. However, it was noted that the attackers are now shifting their attention to more robust, more superior targets, such as cloud servers and cloud infrastructure. This paper analyses 11 forms of practical scenarios of cryptojacking attacks that are targeted towards cloud infrastructure. We carefully look at their similarities and properties, comparing those features with the limitations of existing literature regarding the detection systems. In this paper, we survey the attack forms, and we also survey the limitations of existing literature as an attempt to outline the research gap between the practical scenarios and existing work.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT3001 Presentation 4 (14:15-14:30)

Application of Lecturer Performance Report in Indonesia with Model View Controller (MVC) Architecture

Alexander Waworuntu[1] and Ester Lumba[2]

1: Universitas Multimedia Nusantara, Indonesia; 2: Institut Teknologi dan Bisnis Kalbis, Indonesia

Abstract— Lecturers in Indonesia have a fundamental obligation to conduct Tri Dharma activities consisting of teaching, research and community service. Most higher education institutions use Tri Dharma as a measure of lecturer's performance. In addition, lecturer activity data related to Tri Dharma is needed by the head of study program and department related to research, publication and community service to be stored which will be used as a source of data during the accreditation process. This paper discusses the application development of lecturer performance reports using the Model View Controller (MVC) architecture with Java programming language. The result is a desktop-based application that will be used by the head of the study program and the lecturers.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT0047 Presentation 5 (14:30-14:45)

The CMMI-Dev Implementation Factors for Software Quality Improvement: A case of XYZ Corporation

Yuki Alqadri, **Eko K. Budiardjo**, Alex Ferdinansyah and Mokhammad F. Rokhman
Universitas Indonesia, Indonesia

Abstract— Refer to CMMI-Institute Appraisal result there are 6 (six) companies in Indonesia that have achieved CMMI-Dev v1.3 maturity level 3, one of them is XYZ Corporation. Initially, XYZ Corporation has set a target to achieve CMMI-Dev level 2. As advised by the consultant, XYZ Corporation has the possibility to achieve level 3 by completing several parts of requirements that had not been met yet. XYZ Corporation faced a significant problem in implementation progress in particularly in standardization of documents. This is due to each division has a different document format. XYZ Corporation also needs to improve its current processes that are still in ongoing improvement process to be better standardized. This research aims to find out "The factors that affects the success of CMMI-Dev implementation based on its Current Conditions of XYZ Corporation". The approach of this research in finding the factors that influence the implementation of CMMI-Dev was Qualitative and Quantitative. A qualitative method, by means questionnaires, is used to prioritize the main factor. A quantitative method is used to get ranking of the factors that affecting successfulness of CMMI-Dev implementation in which has been validated by questionnaire's results. This research finding expects that the factors could be applied by other companies which desire to implement CMMI-Dev.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

SC016 Presentation 6 (14:45-15:00)

End-To-End Neural Network for Paraphrased Question Answering Architecture with Single Supporting Line in Bangla Language

Md. Mohsin Uddin, Nazmus Sakib Patwary, Md. Mohaiminul Hasan, Tanvir Rahman and Mir Tanveer Islam
East West University, Bangladesh

Abstract— Recent studies on QA (Question Answering) system in English language have been emerged extensively with the composition of Natural Language Processing (NLP) and Information Retrieval (IR) by amplifying miniature sub tasks to accomplish a whole AI-system having capability of answering and reasoning complicated and long questions through understating paragraph. In our proposed study, we present a general heuristic framework, an end-to-end model used for paraphrased question answering using single supporting line which is the initial appearance ever in Bangla language. Corpus dataset was scrapped from Bangla wiki and then questions were generated corresponding context have been used to learn the model. Translated bAbI dataset (1 supporting fact)[1],[2] in Bangla language has been also incorporated with to experiment the proposed model manually.

To predict appropriate answer, model is trained with question-answer pair and a supporting line. For comparing our task applying variation of basic Recurrent Neural Network (RNN): Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) different accuracy has been found. For further accomplishment, synthetic and semantic word relevance in high dimension vector space: Bangla word embedding system(word2vec) is added to the system as sentence representation along with Positioning Encoding (PE) and which outperforms both memory network GRU and LSTM precisely.

Oral Presentation Abstracts

Session 1

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT5011 Presentation 7 (15:00-15:15)

A Fast Particle Swarm Optimization Algorithm by Refining the Global Best Solution

Wang Hu[1], Yu Zhang[1], Junjie Hu[2], Yan Qi[1] and Guoming Lu[1]

1: University of Electronic Science and Technology of China, China; 2: Sichuan University, China

Abstract— A Fast Particle Swarm Optimization (FPSO) is proposed to improve the convergence response speed for some potential application scenarios such as the online or dynamical optimization environment which requires the fast convergence ability of an optimizer. Classical gradient-based optimization methods are good at finding the local optimal value of a convex region yet usually failure in searching the global optimal value of a multimodal problem. To further develop the characteristics of PSO with respect to the fast convergence and the global optimization, a pseudo-gradient method is proposed for calculating the approximate gradient at the location of the global best solution (gBest) of a swarm to refine the convergence accuracy of the gBest so as to accelerate the local convergence speed. The experimental results show that the performance of the proposed algorithm is significantly better than those of the five chosen competitive algorithms on a series of benchmark test functions with different characteristics. Furthermore, the sensitivity of the new introduced parameter in the proposed algorithm is empirically analyzed by a special experiment for recommending its best range of value.

Oral Presentation Abstracts

Session 1

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

AT3002 Presentation 8 (15:15-15:30)

Extended PrefixSpan for Efficient Sequential Pattern Mining in a Game-based Learning Environment

Raymond S. Bermudez[1], Ariel M. Sison[2] and Ruji P. Medina[2]

1: M.S. Enverga University Foundation, Philippines; 2: Technological Institute of the Philippines, Philippines

Abstract— This paper proposed an extended version of PrefixSpan as a better sequential pattern mining for a game-based learning environment (GBLE). The extended version of PrefixSpan evolved on integrating time interval constraints, clustering valued actions and extracting the closed sequences. These three concepts were derived after a previous work showed limitations of PrefixSpan in generating sequence patterns that can be used in tutoring services of a GBLE. The extended PrefixSpan underwent two phases of evaluation, performance evaluation and analyzing the quality of generated sequence patterns. The evaluation results showed that the extended versions provided a significant improvement in terms of execution time and the number of generated sequence patterns. Lastly, it shows significant improvement in the quality of sequence patterns generated as shown in better tutoring service it provided after integrating it to the GBLE.

Oral Presentation Abstracts

Session 1

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Ford Lumban Gaol

P006 Presentation 9 (15:30-15:45)

Impulse Voltage Distribution in Countershielded Disc VS Interleaved Disc Windings on 500 kV Power Transformer Design

Moh. Slamet Wahyudi and Rudy Setiabudy
University of Indonesia, Indonesia

Abstract— Interleaving and countershielding are known as two methods which are commonly used to increase the winding series capacitance. Countershielding has been proven as an effective way to substitute the interleaving as it can be faster and easier to manufature. The next challenges are to find out which is the best design configuration in terms of cost and design.
The aim of this paper is to compare the calculated impulse voltage distribution by an interleaving, single shielding, double shielding, and the combination of single and double countershielded disc configurations. A numerical and finite element method (FEM) are used for calculating the series capacitance values as well the voltage distribution along the winding. The result shows that combination of single and double countershielded disc configuration provides an improved impulse voltage distribution and lower voltage stresses compared to the other configuration.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0011 Presentation 10 (13:30-13:45)

SSS: Soil Solarization System

John Ross P. Dela Cruz, Bryan Christian M. Galon, Jae Yeon J. Han, Leania Mahimer A. Mahimer and **Eugenia R. Zhuo**

University of Santo Tomas, Philippines

Abstract— As a developing country, the Philippines has widespread use of pesticides to control soil pests and weeds; however, these chemicals can contaminate soil and have an adverse effect on soil quality. Currently, other countries are already promoting the practice of organic agriculture in weed control, and one of them is soil solarization. This paper presents an experimental embedded system developed using evolutionary prototyping to aid in performing soil solarization. It used probes as sensors for measuring soil temperature, moisture, pH, and electrical conductivity, with Arduino and Raspberry Pi as mainboards, and a 100-watt incandescent lamp was used as for soil heating. Measurements can be seen on a liquid-crystal display screen and through a web application accessed remotely using a web browser from a device connected in the system's hotspot network.

The system was used for a 3-day and 2-week solarization using containerized sample soil that was previously infested with weeds and two layers of 50µm transparent polyethylene plastic as mulch. The temperature and moisture of the soil were measured every 6 hours throughout the process. Based on the soil's determined pH and EC on pre- and post-solarization, information, if the soil is in optimal condition for plant growth, was displayed on the application. Soil solarization using the system for both instances entailed a significant increase in temperature and a decrease in moisture, but soil status and salinity class were retained as they were before solarization. Moreover, weed germination was not present weeks after using the system which determined its effectiveness and potential as a preventive method for weed management.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0037 Presentation 11 (13:45-14:00)

Appraising Personal Data Protection in Startup Companies in Financial Technology: A Case Study of ABC Corp

Muhamad Fahru Rozi, Yudho Giri Sucahyo, Arfive Gandhi and Yova Ruldeviyani
Universitas Indonesia, Indonesia

Abstract— Financial Technology (fintech) has been immerged extensively in the last decade. In the realm of disruptive world, there are many areas in which startup companies are developing their business. There is always contradiction when dealing with innovation as core of digital disruption and how privacy remains as hot issues at the edge of everybody's talks. Internet plays important roles to sustain the trends. As rapidly growing country, 68% of Indonesian has access to the Internet. It drives startup companies on financial technology to innovate more and besides that they must comply to regulation in regard with personal data protection. This research aims to appraise how startup company on financial technology protect users' personal data. Personal data protection principles from international organization and Indonesian regulation regarding personal data protection are used to appraise how ABC Corp as a startup company that deliver financial technology service in Indonesian society. To ensure that its service is qualified and trustable, ABC Corp should be appraised using relevant criteria and qualitative approach. The results showed that most of regulations from sectorial supervising agency have been adhered by ABC Corp. The results bring meaningful insight to improve performance on personal data protection. They can became lessons for similar emerging startup companies in financial technology when acquiring their qualifications to protect users' personal data and keep their sustainability.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0009 Presentation 12 (14:00-14:15)

Measuring impact of academic research in computer and information science on society

Dr Kushwanth Koya[1] and Prof Gobinda Chowdhury[2]

1: Sheffield Hallam University, United Kingdom; 2: Northumbria University, United Kingdom

Abstract— Academic research in computer & information science (CIS) has contributed immensely to all aspects of society. As academic research today is substantially supported by various government sources, recent political changes have created ambivalence amongst academics about the future of research funding. With uncertainty looming, it is important to develop a framework to extract and measure the information relating to impact of CIS research on society to justify public funding, and demonstrate the actual contribution and impact of CIS research outside academia. A new method combining discourse analysis and text mining of a collection of over 1000 pages of impact case study documents written in free-text format for the Research Excellence Framework (REF) 2014 was developed in order to identify the most commonly used categories or headings for reporting impact of CIS research by UK Universities (UKU). According to the research reported in REF2014, UKU acquired 83 patents in various areas of CIS, created 64 spin-offs, generated £857.5 million in different financial forms, created substantial employment, reached over 6 billion users worldwide and has helped save over £1 billion Pounds due to improved processes etc. to various sectors internationally, between 2008 and 2013.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0013 Presentation 13 (14:15-14:30)

A Digital Solution and Challenges in the Safeguarding Practices of Intangible Cultural Heritage: A Case of 'ichngo.net' Platform

Hanhee Hahm, Jungsong Lee and **Soon Cheol Park**, Seongmi Jeong and Semina Oh
Chonbuk National University, Korea

Abstract— The purpose of this study is to analyze the construction, operation and problems of digital platform as a means for safeguarding and inheriting intangible cultural heritage. Specifically, this study will look at Ichngo.net, built by NGOs specializing in cultural heritage. A digital platform that mediates the protection and transmission of intangible cultural heritage has long been a necessity for NGOs. NGO activists were, however, generally overwhelmed by IT concepts and various technologies. As the interests of IT professionals has expanded to the cultural heritage realm, collaboration between NGOs specializing in intangible cultural heritage and IT experts has gradually increased. The advantage of Ichngo.net is that it has newly devised operational methods to support the growth of cultural diversity and increase international networking for promotion of safeguarding and sustainable practices of ICH. In order to promote greater participation, the Ichnog.net platform operates based on bottom-up and voluntary participation. The major challenge in this activity is that the digital access gap existing within and among NGOs and countries. However, the recent increase in the use of smartphones and social media is to reduce the digital divide. Therefore, the prospect of digital heritage created by the convergence of ICH and digital technology would be positive under the new direction of smartphone usage by the general populace.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0033 Presentation 14(14:30-14:45)

Identifying Social Network Delusion to Investigate Addiction Ratio using Data Mining

K S Thakre[1], Deepali Dawande[2] and Vaidehi S Thakre[3]

1: Sinhgad College of Engineering, India; 2: Zencorn Infotech Pvt Ltd, India; 3: MIT WPU Pune, India

Abstract— Mining social media is the process of defining, analyzing, and extracting applicative patterns and trends from row social media data. Social media are very popular way of expressing opinions and interacting with many individual in the online world. However growing number of social network delusion among various age categories are recently noted. Mental sickness can have a deep influence on person, families, and society as well. Hence, we propose a framework that analyzes Social Network Delusion (SND) and investigates the addiction ratio. This work first defines the framework for analyzing the social network delusion based on mining online social behavior that provides an early stage opportunity to identify SNDs (Social Network Delusion). The proposed system mainly works in three phases. Feature extraction and analysis of the various posts posted by the users on Facebook, Instagram and Twitter is performed by using mining algorithm in the first step. The SND prediction using the extracted features is done in the second phase; Third phase uses the predicted results as an input for investigating the addiction ratio. We investigate the addiction ratio among different genders and age groups for analyzing the prevention strategies against growing number of SND.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0036 Presentation 15 (14:45-15:00)

Stock Price Movement Prediction Using Technical Analysis and Sentiment Analysis

Tommy Wijaya Sagala, Mei Silviana Saputri, **Rahmad Mahendra** and Indra Budi
Universitas Indonesia, Indonesia

Abstract— This study aims to predict stock price movement using combination of technical analysis and sentiment analysis. When conducting stock transactions, the traders consider not only market activities but also the sentiments expressed within information reported in media. We build the classifier to categorize the price quotes into one of three classes: "up", "down", and "constant". We conduct the experiment with several algorithms, i.e. Support Vector Machine (SVM), K-Nearest Neighbor (KNN), and Naïve Bayes. The results of our empirical study is that the highest accuracy achieved from the method combining features from historical data and online media sentiment, on 5 days trading window using the SVM algorithm.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

SC017 Presentation 16 (15:00-15:15)

Detecting Bengali Spam SMS using Recurrent Neural Network

Md. Mohsin Uddin, Monica Yasmin, M Saddam Hossain Khan, Md Istianatur Rahman and Tabassum Islam
East West University, Bangladesh

Abstract— SMS is being spammed if the sender sends it to the targeted users to gain important personal information. If targeted users respond with personal information, it will be a great opportunity for the sender to grab their desired goal. Now, this phenomenon increases rapidly and Machine Learning (ML) is mostly used to classify this problem. In terms of Bangladesh, email spam detection is common but detecting SMS spam with the Bengali dataset is completely new as a research problem. This research is taken part to detect spam SMS using traditional Machine Learning algorithms along with Long Short-Term Memory (LSTM) and compared to find the best among them. The highest testing accuracy rate is gained by LSTM, which is 96%. To the best of our knowledge, this work is the first to apply the deep learning algorithm LSTM for detecting Bengali spam. Besides, a comparative analysis is performed with some traditional supervised ML algorithms and LSTM. Moreover, the effects of various activation functions are also experimented on LSTM algorithm. SGD optimizer gains the best accuracy over ADAGRAD, ADAMAX, and ADADELTA where Sigmoid activation function gives the best performance over Relu and Tanh.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0046 Presentation 17 (15:15-15:30)

Identifying Critical Success Factors for Information Technology Projects with an Analytic Hierarchy Process: A Case of a Telco Company in Indonesia

Luthfi Azizi Gumay, Betty Purwandari, **Teguh Raharjo**, Alfi Wahyudi and Mardiana Purwaningsih
Universitas Indonesia, Indonesia

Abstract— A survey in a software development project revealed that 71% of the project failed or ended in challenges. A similar issue also occurred in a telecommunications company in Indonesia. The company performed its strategy in terms of initiating the growth of its new broadband business. Only 44% of projects ran on time, as planned. The rest failed to meet the target. Hence, this study was conducted to investigate the critical success factors and criteria for the broadband ordering project ran by the company. The qualitative method was performed to gather critical success factors and criteria. Besides, the quantitative method was conducted to calculate the rank of factors using the Analytic Hierarchy Process (AHP). Based on the pairwise comparison conducted by administering questionnaires to key stakeholders, the most important factors are customer involvement and effective communication, followed by the capability and motivation of the team. The lowest level is top-level management support and organizational culture. The critical success factors are compiled based on success-related criteria, which are scope, time, cost, quality, and user satisfaction.

Oral Presentation Abstracts

Session 2

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Afternoon, January 18, 2020 (Saturday)

Time: 13:30-15:45

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Yong Jin Park

AT0030 Presentation 18(15:30-15:45)

Prediction, Visualization, and Optimization of Resources using Time-Series Forecasting Models and Simplex Linear Programming

Eugenia R. Zhuo and Jake Libed
AMA University, Philippines

Abstract—Crime is one of the major problems of countries all over the world, and the Philippines is no exception. Crime prediction and prevention strategies are vital for police forces to face inevitable increases in the crime rate as a side effect of the growth of the urban population. This paper focuses on the prediction of crime rates. It also focuses on the development and testing of the effectiveness of the optimization model in reducing the crime rate score reduction considering the number of mobility using Simplex Linear Programming and regression analysis.

Various time-series forecasting models were applied in the crime dataset using the SAS tool. Datasets were extracted from fourteen (14) municipal police stations of Rizal Province, which contains historical data of crime statistics from 2013 to 2017 and mobility resources for each Police station. MAPE was used to determine the accuracy of each model.

The prediction results can be useful for the police stations to identify problematic regions to patrol and the predicted values for mobility derived from the optimization model can be a valuable information in decision making specifically in the disposition of mobility for a given locality to suppress crime so that law and order can be maintained properly and there is a sense of safety and well-being among the citizens in the province.

Coffee Break 15:45~16:00

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

SC011 Presentation 19 (16:00-16:15)

Euler's elastica Regularization for Voxel Selection of fMRI Data

Chuncheng Zhang and Zhiying Long
Chinese Academy of Sciences, China

Abstract— Multivariate analysis methods have been widely applied to functional magnetic resonance imaging (fMRI) data to reveal brain activity patterns and decode brain states. Among the various multivariate analysis methods, the multivariate regression models that take high-dimensional fMRI data as inputs while using relevant regularization were proposed for voxel selection or decoding. Although some previous studies added the sparse regularization to the multivariate regression model to select relevant voxels, the selected sparse voxels cannot be used to map brain activity of each task. Compared to the sparse regularization, the Euler's elastica (EE) regularization that considers the spatial information of data can identify the clustered voxels of fMRI data. Our previous study added EE regularization to logical regression (EELR) and demonstrated its advantages over the other regularizations in fMRI-based decoding. In this study, we further developed a multivariate regression model using EE in 3D space as constraint for voxel selection. We performed experimental tests on both simulated data and real fMRI data to investigate the feasibility and robustness of EE regression model. The performance of EE regression was compared with the generalized linear model (GLM) and total variation (TV) regression in brain activity detection, and was compared with GLM, Laplacian smoothed L0 norm (LSL0) and TV regression methods in feature selection for brain state decoding. The results indicated that EE regression possessed better sensitivity to detect brain regions specific to a task than did GLM and better spatial detection power than TV regression. Moreover, EE regression outperformed GLM, LSL0 and TV in feature selection.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

SC002-A Presentation 20 (16:15-16:30)

Optical Image Encryption and Authentication Scheme Based on Joint Transform Correlator and Phase Retrieval Technique

Y. Xiong and C. Quan

National University of Singapore, Singapore

Abstract—In this paper, an advanced optical image encryption and authentication scheme using joint transform correlator (JTC) and phase retrieval technique is proposed. In the proposed JTC-based encryption process, the plaintext with a phase-only mask is placed side by side with an amplitude mask in the input plane. A Fourier transform is then performed, and the partial information of the joint power spectrum is captured and recorded by the charge-coupled device (CCD). In the proposed phase retrieval technique-based authentication process, the partial joint power spectrum is used as the amplitude constraint to retrieve the information of the plaintext using the proposed iterative process with the help of amplitude and phase-only masks which are used as private keys. Then the nonlinear optical correlation (NOC) operation is introduced to authenticate the retrieved image. Compared to the traditional JTC-based cryptosystem, the security level of our proposed cryptosystem is improved. Since no useful information of the plaintext is directly visible from the retrieved image and a database storing the plaintexts is needed to authenticate the retrieved image, an additional security layer is provided. In addition, the quality of the retrieved images will be affected by the geometry of plaintexts due to the noise caused by the correlation of the key in the traditional JTC-based cryptosystem. In our proposed cryptosystem, the NOC peak used to authenticate the retrieved images is not sensitive to the noise. Besides, since the authentication process can be achieved successfully using the proposed iterative process with correct keys and partial information of the ciphertexts, the sizes of plaintexts will not be limited by the size of CCD. Numerical simulation is carried out to demonstrate the feasibility and effectiveness of the proposed cryptosystem.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

AT5013 Presentation 21 (16:30-16:45)

Fabricated Pictures Detection with Graph Matching

Binrui Shen, Qiang Niu and Shengxin Zhu
Xi'an Jiaotong-Liverpool University, China

Abstract— Fabricating experimental pictures in research work is a serious academic misconduct, which should better be detected in the reviewing process. However, due to large number of submissions, the detection whether a picture is fabricated or reused is laborious for reviewers, and sometimes is irrecognizable with human eyes. A tool for detecting similarity between images may help to alleviate this problem. Some methods based on local feature points matching work for most of the time, while these methods may result in mess of matchings due to ignorance of global relationship between features. We present a framework to detect similar, or perhaps fabricated, pictures with the graph matching techniques. A new iterative method is proposed, and experiments show that such a graph matching technique is better than the methods based only on local features for some cases.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

AT5016 Presentation 22 (16:45-17:00)

Optimal Camera Placement to Visualize Surrounding View from Heavy Machinery

Venkata Anirudh Puligandla and Sven Loncaric
University of Zagreb, Croatia

Abstract— Computer vision-based advanced driver assistance systems (ADAS) increase safety of operations involving heavy machinery. ADAS systems using multiple cameras can be used for surround-view visualization of complex vehicles with blind spots. Such systems are also useful for autonomous vehicles. Multiple camera systems used to capture surrounding view of heavy machinery require complex design due to the complexity in size and shape of the vehicles. In this paper, we present a novel method for determining the optimal camera pose i.e. placement and orientation in three-dimensional space, given the shape of the vehicle, in order to maximize surrounding area coverage. The first method determines camera poses using a fixed pre-determined number of cameras, while the second method determines both camera poses and the number of cameras. The problem is modelled and solved using three different deterministic optimization algorithms: 1) single objective binary integer programming approach; 2) single objective greedy algorithm; and 3) bi-objective binary integer programming approach.

The methods are validated using a set of realistic 3-D vehicle models. Experimental validation has been conducted to compare the proposed methods with respect to coverage quality and computation time metrics. The experimental results have demonstrated that the proposed methods provide accurate solutions to the camera pose and the number of camera optimization.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

AT0012 Presentation 23 (17:00-17:15)

Identification and Classification of Sashimi Food Using Multispectral Technology

Ismail Parewai[1], Mansur As[2], Tsunenori Mine[3] and Mario Koeppen[4]

Department of Creative Informatics, Japan; 2: Graduate School of Information Science and Electrical Engineering; 3: Kyushu University, Japan; 4: Faculty of Computer Science and Systems Engineering, Kyushu Institute of Technology, Japan

Abstract— Food quality inspection is an essential factor in our daily lives. Food inspection is analyzing heterogeneous food data from different sources for perception, recognition, judgment, and monitoring. This study aims to provide an accurate system in image processing techniques for the inspection and classification of sashimi food damage based on detecting external data. The external texture was identified based on the visible and invisible system that was acquired using multispectral technology. We proposed the Grey Level Co-occurrence Matrix (GLCM) model for analysis of the texture features of images and the classification process was performed using Artificial Neural Network (ANN) method. This study showed that multispectral technology is a useful system for the assessment of sashimi food and the experimental also indicates that the invisible channels have the potential in the classification model, since the hidden texture features that are not clearly visible to the human eye.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

AT0018 Presentation 24 (17:15-17:30)

Multiscale Entropy for Physical Activity Recognition

Nurul Retno Nurwulan[1] and Bernard C. Jiang[2]

1: Universitas Sampoerna, Indonesia; 2: National Taiwan University of Science and Technology, Taiwan

Abstract— This paper presents the evaluation of multiscale entropy (MSE) as a feature in physical activity recognition compared to the mostly used traditional features. Walking, jogging, and running were chosen as the physical activities for the comparison considering their similarities. Selection of similar activities can give a better evaluation of which features are useful in detecting slight differences. The acceleration data from x-, y-, and z-axes were collected using wearable accelerometers and then evaluated using Matlab and Weka. The k-Nearest neighbors (KNN), J48, and random forest (RF) were chosen as the classifiers. From the comparative evaluation, the MSE performed better compared to the traditional features. Further, the addition of the MSE significantly increased the performance of the traditional features.

Oral Presentation Abstracts

Session 3

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

SC201 Presentation 25 (17:30-17:45)

Informative Images for Information and Communication using Brightness, Contrast and Picture Effect

Lianly Rompis

Universitas Katolik De La Salle, Indonesia

Abstract— Sometimes information needs to be interactive and informative for people to be able to understand and catch the meaning or comprehension of it which is written in booklets, course materials or topics discussed through social media or classroom. Portion of multimedia elements that make information so valuable and accepted by students or a society is the one we called image, an important element that mainly acts as a communication line for transferring information. For better conveying, users or students usually change and modify an original image into a good quality image through image processing. Even in Electrical Engineering field image takes an important role because it used to represent a device, network, tool, component or system in brief description. A good and informative image facilitates the development of knowledge, clear information and supple communication. The idea is about informative image that merely focuses on parts of an image that need to be emphasized and showed to the audiences. This paper is conducted a research to create an informative image using three features: brightness, contrast, and picture effect. The research methodology is literature study, practice experience, and image processing method. The output gives a positive outcome and could help people to improve their skills in designing or editing a new excellent apparent of image for the purpose of information and communication.

Oral Presentation Abstracts

Session 3

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Tatsuya Yamazaki

AT0002 Presentation 26 (17:45-18:00)

Newton-Raphson algorithm for determination of SIFs and crack-tip from photoelastic images

Zhenkun Lei, Jianchao Zou and **Ruixiang Bai**

Dalian University of Technology, China

Abstract— The combination of multi-parameter stress field equations and photoelastic images, a nonlinear least-squares method was deduced and applied to determine the parameters in the stress field equations of crack tip by fitting the isochromatic phase field obtained by the ten-step phase-shifting in digital photoelasticity. Not only the parameters in the stress field equations but also the coordinates of crack tip were determined simultaneously and automatically by using the proposed method. A set of over-determined nonlinear equations were established to estimate the unknown parameters by an iterative procedure based on Newton-Raphson method. Simulation and experimental results validated the correctness of the proposed method.

Oral Presentation Abstracts

Session 4

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

SC003 Presentation 27 (16:00-16:15)

Evaluation of OFDM-MIMO systems using convolution with CPM

Guowei Lei and Sunqing Su
Jimei university, China

Abstract— Orthogonal frequency division multiplexing (OFDM) is regarded as a popular technique. Moreover, OFDM combined with multiple-input multiple-output systems (MIMO) has drawn many interests. However, OFDM-MIMO systems with continuous phase modulation have not been investigated extensively to date. In this paper, we propose an OFDM-MIMO system using convolution codes with continuous phase modulation (CPM). In the system, an interleaver is added between encoder and modulator. Moreover, iterative decoding and demodulation are combined together at receiver. To evaluate the performances, the comparisons between CPM and linear modulations in terms of bit error rate (BER), peak-to-average power ratio (PAPR) and power spectrum density (PSD) are given in the end.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

SC010 Presentation 28 (16:15-16:30)

Ultra-wideband Microstrip Array Antenna for 5G Millimeter-wave Applications

Efri Sandi, Rusmono, Aodah Diamah and Karisma Vinda

Universitas Negeri Jakarta, Indonesia

Abstract— In this paper, a design of ultra-wideband microstrip array antenna using a stepped line cut and U-slot combination for 5G millimeter-wave applications is proposed. The feeding technique used in the proposed design is a proximity coupling technique to improve bandwidth performance. The proposed antenna bandwidth performance is compared with the conventional antenna array design to determine the bandwidth increase. Numerical and simulation results show a significant increase in bandwidth performance compared to conventional design. The proposed antenna design can operate at frequency band 28 GHz with a bandwidth 4.47 GHz and gain 8.71dB. These results prove that the proposed antenna design can be used for 5G technology applications in the millimeter-wave band.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

AT0038 Presentation 29 (16:30-16:45)

Transforming smart vehicles and smart homes into private diagnostic spaces

Thomas M. Deserno

PLRI, TU Braunschweig University, Germany

Abstract— The aging societies require disruptive technologies and the digitization of health is one of these. For instance, health-enabling technologies are designed to elongate autonomous living of elderly people. Similar to the controller area network (CAN) bus that is used in (smart) cars we have developed a bus-based system for smart homes. In addition, we consider both, vehicles as well as homes as private spaces. In contrast to smart wearables or smart clothes, cars and apartments provide sufficient power supply and allow installing computer and storage hardware. Today's homes and cars are already equipped with a variety of sensors. In the car, such sensors control assistance systems, active driving, or well-being. In smart homes, sensors drive energy optimization and security. However, such sensors deliver data that is also relevant with respect to health. The daily delay between opening of bedroom and bathroom doors, or the time between opening the car's door and starting its engine indicates mobility. More specific, changes in monitored times indicate changes in mobility. This is just one example of the manifold options of sensing environments. We obtain even more empowering of eHealth if the private spaces such as cars and homes are additionally equipped with medical sensors. Unobtrusive continuous monitoring of vital signs and biosignals is not yet explored clinically. We propose steering wheel integrated electrocardiography (ECG) recording in smart vehicles and capacitive ECG recording in the chair and bed of the smart home for stroke prevention. The sensors are integrated into the bus systems in both environments and will allow to robustly predict stokes before they occur due to detection of latent atrial fibrillation. Such an extension of sensing devices in private spaces, the transformation of processing and communication units, and the combination with a medical application turns smart environments into private diagnostic spaces.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

P004 Presentation 30 (16:45-17:00)

Modeling of Upwelling Early Warning System Using Water Quality Sensor and Automatic Weather System Integrated with Hybrid Tsukamoto FIS GA

Muhammad Rofiq, Yogie Susdyastama Putra, Wayan Firdaus Mahmudy, Herman Tolle and Ida Wahyuni
STMIK Asia, Indonesia

Abstract— It is a common fact that one of the adverse effects of upwelling in lakes is the death of fish in floating net cages or (aquaculture/floating net cages) in large numbers. One solution to reduce the unsavory effects of upwelling is to create an Upwelling Early Warning System that can predict the probability of upwelling in a certain period of time. This research proposed a system that can measure the parameter for upwelling prediction and use those parameters to make predict the next upwelling event. The proposed system uses some sensor they are water quality sensor and automatic weather system (AWS) integrated with hybrid Tsukamoto FIS GA. The sensor used in this system has been successfully tested in laboratories. From the test results, the water quality sensor has been successfully measured the water parameter data consisting of water pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), electrical conductivity (EC), and resistance temperature detectors (RTD) or water temperature with accuracy achieve 80%. While the Automatic Weather System has also succeeded in measuring weather data they are wind speed, and wind direction, rainfall, and air temperature with accuracy achieve 100%. The measurement data will use as input data for the Hybrid Tsukamoto FIS GA method to predict the next upwelling event.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

P005 Presentation 31 (17:00-17:15)

Security Monitoring and Network Management for the Power Control Network

Sugwon Hong, Jae-Myeong Lee, **Mustafa Altaha and Muhammad Aslam**
Myongji University, Republic of Korea

Abstract— Security monitoring is a viable solution to enhance the security capability in the current power control SCADA network, since the intrusion detection system as a main tool for monitoring can be easily deployed without any change of SCADA configuration. We explain how to design the domain-specific network security monitoring system, reflecting semantics of the target SCADA network. However, considering the recent attacks to the SCADA/ICS systems, the attack vectors are the vulnerabilities of the software underlying the host systems. In this respect, we need security monitoring running on host systems which can provide process and memory protection. Furthermore, Network and system management which incorporates the IT network management into the power control system can not only help to manage and maintain the IT/OT system in a unified way, but also enhance the security capability of the SCADA system with collaboration with network and host security monitoring.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

AT5012 Presentation 32 (17:15-17:30)

Guiding the Illumination Estimation Using the Attention Mechanism

Karlo Koščević, Marko Subašić and Sven Lončarić
University of Zagreb, Croatia

Abstract— Deep learning methods have achieved a large step forward in many computer vision applications. With mechanisms such as attention, deep models can now guide themselves to focus on parts of an image that are more significant for a given task. In computational color constancy, the most important step is to estimate the illumination vector as accurately as possible. Since illumination estimation algorithms can be sensitive to noise, such as ambiguous regions in the image, the ability to have a mechanism to look for specific regions in an image could be helpful. In this paper, a convolutional neural network with an attention mechanism is proposed. The attention mechanism helps the network to focus on regions that contain more content and to avoid regions where ambiguous estimations may occur. In the experimental results, it is shown that the attention mechanism does help the network to obtain more accurate estimations and puts the focus of the network on the regions in an image where gradients are high. The network with the attention mechanism achieves up to 10% increase in accuracy compared to the same network architecture without the attention mechanism.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

AT0028 Presentation 33 (17:30-17:45)

A Spatio-temporal Network for Demand Prediction of Electric Vehicle Sharing Systems

Qin Zhou, Hongming Zhu and Yi Luo
Tongji University, China

Abstract— With the improvement of environmental awareness, one-way electric vehicle sharing systems with stations are gradually known. Vehicle rebalance and station expansion are the two things that system operators care most about. In this paper, we study the problem of forecasting travel demand, which can be used to infer the place to deploy new station and provide suggestions for vehicles scheduling. As an attempt to make use of both spatial and temporal features, we propose a spatio-temporal network based on Convolutional Long Short-Term Memory (ConvLSTM) to predict traveling demand in an area without historical travel records. Convolution networks make sure that when demand in an area is predicted, geographical features of its neighborhoods will also be considered. With LSTM, demand will be treated as time series. Therefore, temporal associations are also considered. Our network improves the prediction accuracy which has been corroborated through experiments on real-life data conducted with other regression methods. In addition, it can be observed from prediction curves, that trend of curve predicted by our method is closer to the real curve. Our work provides a travel demand predicting solution with commercial potential that helps to make business decisions.

Oral Presentation Abstracts

Session 4

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Afternoon, January 18, 2020 (Saturday)

Time: 16:00-18:00

Venue: Jatayu Room 2nd Floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Cheng Chen

AT0019 Presentation 34 (17：45 -18:00)

Wearable Device Equipped with Door Alert and Mobile App for Security and Supervision

Justin Daniel G. Baugbog, Mhir John Paul Manalo, Jose Mari M. Salonga Elizabeth P. Naval and **Eugenia R. Zhuo**

University of Santo Tomas, Philippines

Abstract— Nowadays the percentage of old aged people that have Alzheimer's disease has increased over the years. Alzheimer's disease is one of the most crucial diseases that our loved ones might acquire.

In this study, a device for patients with Alzheimer's disease and a mobile application for the guardian/s to lessen their stress and worries when taking care of the patient were developed. It is called Patient Security & Supervision Equipment(PS & SE), which has a 3-layer security, mainly: [1] The door alert that is equipped with modules like UHF RFID reader which is used as an identifier for the patient, and an activator for the PIR sensor, a motion detector and, a Wi-Fi module for the connection of the door alert to send notifications to the mobile application; [2] The wearable device that is equipped with modules, such as a GPS tracker to know the location of the patient, a GSM module used by the GPS module in sending coordinates to the Firebase database, and a UHF RFID tag. [3] Lastly, the mobile application, named as PSSE, is used by the guardian/s to check the location of the patient. Passcode security is required before accessing the application.

Based on a series of testing, the device's accuracy and efficiency for locating the patient depend on the signal/speed of the internet on a certain location. Hence, the system is said to be viable and feasible in the medial industry for its application of Alzheimer's patients and the other mentally challenged patients after the evaluation and validation of a specialist doctor.

Dinner 18:00-19:00

Poster session

Afternoon, January 18, 2020 (Saturday)

Time: 10:30-12:35

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Chen Chang

AT0010-A Poster 1

A Novel Guidance System for Indoor Parking Lots

Sheng-Shih Wang and Wei-Ting Wang

Lunghwa University of Science and Technology, Taiwan

Abstract— The paper proposes a guidance system to provide drivers the efficient parking guidance information and departure guidance information in indoor parking lots. The proposed system consists of four subsystems, including a parking space monitoring subsystem, a vehicle positioning assistance subsystem, a route driving guidance subsystem, and a central management and control subsystem. The main functions of the proposed system include locating parking spaces and vehicles, monitoring the state of parking spaces, and determining the optimal parking space and exit. The system mainly consider a virtual coordinate system to assist in determining the virtual location of each parking space and facility, and also achieve vehicle positioning. In addition, the proposed system can derive the shortest guidance route with the minimum number of changing directions (i.e., turning left or right) at intersections. We implemented the route driving guidance subsystem using an Android APP. We also used Arduino as the platform and adopt diverse sensing and wireless communication modules to develop other subsystems. The field test and simulation results validated that the proposed system can work well and generate correct guidance information for drivers.

Poster session

Afternoon, January 18, 2020 (Saturday)

Time: 10:30-12:35

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Chen Chang

AT0023 Poster 2

BPTrends Redesign Methodology (BPRM) For The Development Disaster Management Prevention Information System

Anita Ratnasari, **Devi Fitrianah** and Wachyu Hari Haji

Universitas Mercu Buana, Indonesia

Abstract— Indonesia's forest fire disaster is still much happening and has become a national problem; if it is not handled thoughtfully, it can be a threat to worry about, and can disrupt the Indonesian economy. According to BMKG, Pekanbaru meteorological station declared a forest fire had struck 11 regencies in Riau Province on July 2019. Indications of the fire were detected from the existence of 38 hot spots in the area. Previous research has been conducted to develop the SI/TI framework for the mitigation of forest fire disaster using TOGAF, which result is a reference in business development to technology design for disaster management. This paper proposes a recommendation for business process development and the design of disaster management technology. BPTrends Redesign method outlines activity and improvement in business process consisting of activity, role, result, technique, and meta-model in the development of disaster management prevention information system, thus obtained a more comprehensive recommendation in its application development. The results of the discussion obtained technology architecture from the Organization Database to Emergency Management information System and overview of the business model in the form of Disaster integration and Safety Information system which explains about internal and external access.

Poster session

Afternoon, January 18, 2020 (Saturday)

Time: 10:30-12:35

Venue: Jatayu Room 1st floor, RAMA BEACH RESORT & VILLA

Session Chair: Prof. Chin-Chen Chang

AT0022 Poster 3

D-Loc Apps: A Location Detection Application Based on Social Media Platform in the Event of a Flood Disaster

Devi Fitrianah, Ida Nurhaida and Dwiki Jatikusumo
Universitas Mercu Buana Jakarta, Indonesia

Abstract— The purpose of this research is to develop a disaster location detector application, specifically about flood that happens in the area of Jakarta, Indonesia. According to social media data updated by the users of twitter, search inquiry is done by its users with the keyword 'seputaran banjir' (in Bahasa Indonesia) which is combined with the Location Based Service function of the determined word search. The method in creating this application is Extreme Programming that uses repetitive and incremental development process approach. By using twitter status data about Jakarta's area, this application has been successfully developed and the result can be shown in the form of twitter status updates from its users that contain words about flood. The search results of flood location validation are coordinates, which are done by checking the availability of the geospatial information from each update of the data. The average accuracy of the search result is 83.7% out of all the location search results.

One Day Visit

January 19, 2020(Sunday) 7:00-18:00

- 7: 00 Pick you up at hotel lobby
- 8: 30 Take the speedboat to the wharf
- 9: 30 Snorkeling, then water activities - banana boats and doughnuts
- 11: 30 Enjoy lunch
- 12: 40 Visit Keling King beach, Angle's Bliiabong and Broken Beach
- 16:30-17:00 Back to Bali Island
- 18:00 Take you back to the hotel

Note

Note