Handbook of the

International Conference on Orange Technologies 2018

(ICOT 2018)

October 23 -26, 2018

Bali, Indonesia

Organizer

IDEAS LAB

Co-Organizers

STIKOM BALI

UNIVERSITAS KRISTEN MARANATHA

PODOMORO UNIVERSITY

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Message from General Chair

Welcome to Bali, Indonesia.

Praise to the Almighty God for His Mercy and Grace. It is an honor to welcome all of you in Bali, known as Island of Gods. The orange technologies research continued to grow and show it is fruitful impact among the scholar around the world. This research community continues promoting a happy and healthy life in our fast-growing society. I would like to share with you the excitement of our community as we continue to gather again at our annual event.

The 2018 International Conference on Orange Technologies (ICOT) is the very first Orange Technologies conference in Indonesia and the sixth since it first launched in 2013. The 2018 ICOT hosts in Bali known as Island of Gods, where it blends spectacular mountain scenery and beautiful beaches with warm and friendly people, vibrant culture and out of this world resorts. Bali appeals through its sheer natural beauty of looming volcanoes and lush terraced rice fields that exude peace and serenity. Bali enchants with its dramatic dances and colorful ceremonies, its arts, and crafts, to its luxurious beach resorts and exciting nightlife. For this exotic island has much to offer, from inspirational spirituality to exceptional dining and meeting experiences, from world-class surfing and diving to exhilarating treks in the wild. Moreover, everywhere you will find intricately carved temples.

ICOT 2018 features keynote speech, invited speeches, special sessions and regular sessions that cover a wide range of topics in healthcare technology, happiness technology, and warming care technology. ICOT 2018 marks the 5th conference in a series, which continues the success of the recent events in Taiwan, China, Hong Kong, Australia, and Singapore. I feel privileged to be part of conference preparation as the general chair. I take this opportunity to thank all authors, reviewers, members of the technical committee and the organizing committee. I would also like to express my gratitude and appreciation to the chair of the steering committee, Professor Jhing-Fa Wang who provided the guidance to the organizing committee in the year-long preparation. A big thanks to all of you!

Finally, I do hope that you have an enjoyable and productive time in Bali, Indonesia and that you will leave with loving memories of ICOT 2018. With my best wishes for a successful and fruitful conference.

Emil R. Kaburuan & Hapnes Toba
General Chair ICOT 2018

Message from the Program Chairs

Welcome to the International Conference on Orange Technologies (ICOT) 2018. This is the sixth even following the previous ones in Taiwan, China, Hong Kong, Australia and Singapore. This year, we received submissions from Australia, China, Germany, India, Iran, Japan, New Zealand, Philippines, Belgium, Japan, Uzbekistan, Singapore, Taiwan, and Indonesia. After a careful review process, finally 52 papers are accepted to be presented at the conference. The accepted papers cover a wide range of topics including Health Care Spoken Dialogue System, Automatic segmentation of esophageal cancer pathological sections, Automatic Drug Pills Detection, Efficient Emotion Recognition, Automatic Prescription Recognition System, Melanocyte Detection and Intercellular Distribution Analysis and Knowledge and Prevention of Repetitive Strain Injury Among Computer Users. In the two days technical program, we scheduled 8 oral presentation sessions, 4 keynote speeches and 6 invited talks.

On behalf of the program committee, we would like to thank the keynotes speakers. Prof Jhing-Fa Wang from Tajen University and National Cheng Kung University, Taiwan will give a talk on Introduction to Orange Technology/Happiness computing and Creative Platform Design for Highly Interactive Spoken Dialogue system; Dr. Paulus Insap Sentosa from Gadjah Mada University, Indonesia will talk about Towards A More Comprehensive Measurement Of User Experience; Prof. Dag Svanæs from NTNU, Norway will give a talk titled Designing for the body from a 1st, 2nd and 3rd person perspective; and Prof. Henry Duh from La Trobe University, Australia

In addition, we are also very honored to have the following seven professors to talk on various topics on orange technologies: Prof Julien Epps from University of New South Wales, Prof Feng-Tyan Lin from National Cheng Kung University, Prof Shyhnan Liou from National Cheng Kung University, Prof Jiannong Cao from Hong Kong Polytechnic University, Prof Lei Xie from Northwestern Polytechnical University, and Prof Yanchun Zhang from Victoria University. We believe their talks will inspire and benefit everyone.

Last, we would like to thank the program committee members for their great effort in the paper review process. Great thanks also go to the authors and participants for their supports in making the conference a success. Finally we would like to express our gratitude and appreciation to our co-organizer: STIKOM Bali, Maranatha Christian University, Podomoro University, Forum Dosen Indonesia, and IEEE Indonesia Section for the technical support.

Welcome you to the Islands of God, Bali, and wish you enjoy the conference as well as the island.

An-Chao Tsa, Hapnes Toba, Muh. Salehuddin, P. Insap Santosa

Technical Program Chairs, ICOT 2018

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Keynote Speech I
Keynote Speech "Introduction to Orange Technology/Happiness computing and Creative Platform Design for Highly Interactive Spoken Dialogue system"
Date/Time October 24, 2018 (Wednesday) / 08:45 am - 09:45 am
Presenter Prof. Jhing-Fa Wang,
President, Tajen University, Pingtung, Taiwan
Chair Professor, National Cheng Kung University, Tainan, Taiwan

Biography

Prof. Jhing-Fa Wang is currently the President in Tajen University, Chair & Distinguished Professor in the Department of Electrical Engineering, National Cheng Kung University (NCKU). He got his bachelor and master degree from NCKU in Taiwan and Ph. D. from Stevens Institute of Technology USA in 1973, 1979 and 1983 respectively. He is the formal chair of IEEE Tainan Section in 2005-2009, the Coordinator of Section/Chapter, IEEE Region 10 in 2011-2012 & the Industry Liaison-Coordinater of IEEE Region 10 in 2009-2011. He was elected as IEEE Fellow in 1999 for his contribution on: "Hardware and Software Co-design on Speech Signal Processing", He was also the general Chair of ISCAS 2009. He received Outstanding Research Awards and Outstanding Researcher Award from National Science Council in 1990, 1995, 1997, and 2006 respectively. He also received Outstanding Industrial Awards from ACER and Institute of Information Industry and the Outstanding Professor Award from Chinese Engineer Association, Taiwan in 1991 and 1996 respectively. He also received the culture service award from Ministry of Education, Taiwan in 2008, Distinguished Scholar Award of KT Li from NCKU in 2009, IEEE Tainan Section Best Service Award in 2011, Innovation Education Award in 2013 Seoul International Invention Fair & special award from 2017 Kuwait International Invention Fair. Prof. Wang was also invited to give the Keynote Speeches in PACLIC 12 in Singapore, 1998, UWN 2005 in Taipei, WirlessCom 2005 in Hawaii, IIH-MSP 2006 in Pasadena, USA, ISM 2007 in Taichung, PCM 2008 in Tainan, 2011 ICAST in Dalian, China, 2011 ICSPCC in Xi'an, China, Keer 2012 in Penghu, Taiwan, HIS 2017 in Moscow Region,

Russia, ICOT 2015 & ICOT 2016 & ICOT 2017 in Hong kong & Australia & Singapore respectively. He also served as an associate editor on IEEE Transactions on Neural Network and IEEE Transactions on VLSI System and Editor in Chief on International Journal of Chinese Engineering from 1995 to 2000. Prof. Wang's research area is mainly on multimedia signal processing including speech signal processing, image processing, VLSI system design and AI robots. Concerning about the publication, he has published about one hundred & forty journal papers on IEEE, SIAM, IEICE, IEE and about three hundreds international conference papers since 1983. Prof. Wang recently has explored the research on Orange Technology. Orange Technology refers to a newly evolved interdisciplinary research area for integration and innovation of health, happiness, and care technologies. The objective of Orange Technology is to bring more health, happiness and warming care to the society.

Abstract.
The first ever World Happiness Report has been published on April 1, 2012 by the United Nations, it reflects a new worldwide demand for more attention to happiness as criteria for government policy. This also calls upon science and technology in both natural and social domains to be developed for promoting a happy and healthy lifestyle in our modern society. To meet such a world trend, the Orange Technology research has been first proposed in National Cheng Kung University in Taiwan in 2008. The Orange Technology refers to a newly evolved interdisciplinary research area for integration and innovation of health, happiness, and care technologies. The research scope includes computer science, electrical engineering, biomedical engineering, psychological/physiological science, cognitive science, and social science. The representative color of Orange Technology originates from a harmonic fusion of red (representing brightness of health and happiness) and yellow (representing warming care). Instead of emphasizing the relations between environments and humans proposed by green technology, the objective of Orange Technology will more emphasize on humanity technology and explore the more innovative technologies to bring more health, happiness, warming care, and more mental wellness to the society. The Happiness Informatics or computing Research is also newly proposed accompanying with Orange technology. It will first sense the happiness behavior of the human being to get the happiness signals such as EEG brain signals, smiling sound signals

& smiling face images etc. Then the information technology such as pattern recognition technique will be applied to detect & measure the happiness degree of the behavior based on the input signals. Finally, the system will give the suitable positive feedback to improve the happiness degree of the user. Several interesting examples will be demonstrated in this speech. Concerning about spoken dialog system or Chatbot system, we will first discuss the ten challenges in Highly-Interactive Dialog Systems, then we will survey some current top Chabot Building Platforms such as google AI-API, IBM Watson and Microsoft Bot Framework etc. Finally, we will propose a new creative platform design for highly interactive Spoken Dialogue system and compare to the existing Chatbot platform.

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Keynote Speeches II
Keynote Speech "Towards A More Comprehensive Measurement Of User Experience"
Date/Time October 24, 2018 (Wednesday) / 01:15 pm - 02:15 pm
Presenter Dr. Paulus Insap Sentosa,
Department of Electrical Engineering and Information Technology, Gadjah Mada Univerisity, Indonesia

Biography

Dr. Paulus Insap Sentosa is currently the Associate Professor in the Departement of Electrical Engineering & Information Technology, UGM. He got his Doctor of Philosophy in the Department of Information System, School of Computing, National University of Singapore, Singapore. He hold Master of Science Department of Computer Science, from University of Colorado at Boulder, Colorado, USA. And he is also Program Secretary, Master Program of Management of Higher Education. In his research interest about HCI, UI/UX, Customer Behavior, IT in Education, and Social Informatics. He is the head of Information and Support System, Quality Assurance Office, in the UGM(2014-2016). He was

also the coaching of Program on Indonesia Engineering Board (Persatuan Insinyur Indonesia, PII).

Abstract

Measuring user experience quantitatively is done using certain methods or frameworks, each of which focuses on certain aspects of the user experience. With this approach, measurement of user experience is not comprehensive. Several methods for measuring quantitative user experience have been proposed. Two of them are combinations called PULSE-HEART and UEQ. PULSE HEART is a combination of two metrics, i.e. PULSE and HEART. PULSE is a measure of product quality that focuses on the business or technical aspects of certain product. The quality of this product can be used to determine the overall health of the product. PULSE consists of page view, uptime, latency, seven-day active user, and earnings. PULSE focuses more on product quality. Thus, the quality of user experience and the influence that the quality of the user has on the actions to be taken by the user cannot be measured. On the other hand, HEART focuses on the quality of user experience and action taken afterward. HEART consists of happiness, engagement, adoption, retention, and task success. UEQ stands for User Experience Questionnaires. UEQ simply measures perceived ergonomic quality, perceived hedonic quality, and perceived attractiveness of a product. Ergonomic quality focuses on the goal oriented or task oriented aspect of product design. The focus of hedonic quality is on the non-task oriented quality aspects of the software product, for example the originality of the design or the beauty of the user interface. The mental model is a model formed after the user interacts with a particular product. User will form a mental model of a particular product through their experience using the product. The user forms a mental model of a product from the results of his interpretation of the perceived action and visible structure of the product he is using. Mental models are difficult to describe. Although two people use the same application, when they are asked to describe their mental models, it is not certain that they will give the same results. Thus the parameters of the mental model need to be explored to be able to measure mental models with more certainty. In certain web activities, e.g. information search, involves two parameters, namely challenge faced by the user and user's skill. In this simple case, the challenge is about how user understand and select information of interest. Meanwhile, the skill the user must possess is his ability to navigate himself

to the desired information. When the skill is greater than the challenge, user will experience boredom. When the challenge is greater than the ability, the user may feel anxious which can lead to user frustration. When challenge and skill is proportional, user will be in a state Csikszentmihalyi calls it as flow or optimal experience. This optimal experience will be marked by symptoms such as full concentration on the activity, merging of action and awareness, and awareness of time. User characteristics vary greatly. It is a challenge to have a more comprehensive measurement of user experience quantitatively. Several aspects of known frameworks and theories need to be scrutinized and combined. The combination also need to consider the application context used by users.

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Keynote Speeches III

Keynote Speech "Designing for the body from a 1st, 2nd and 3rd person perspective"

Date/Time October 25, 2018 (Thursday) / 08:30 am – 09:30 am

Presenter Prof. Dag Svanæs,

Interaction Design in the department of Computer Science at Norwegian University of Science and Technology (NTNU) in Trondheim, Norway

Biography

Prof. Dag Svanæs is head of the User Experience Lab and Professor of Interaction Design in the department of Computer Science at Norwegian University of Science and Technology (NTNU) in Trondheim, Norway. He is also Adjunct Professor at the IT-University in Copenhagen, Denmark. He holds a PhD (2000) from NTNU in the intersection between computer science, philosophy and human-computer interaction (HCI). In his research he draws on the phenomenology of Heidegger, Merleau-Ponty, and Shusterman with a strong focus on an embodied first-person perspective in design. Much of his current research is on technology for the elderly, including exergames. He is also Norwegian representative in IFIP WG13 HCI.

Abstract

Four decades ago, computers filled large cabinets. They then became "personal computers" on our desktops, "laptop computers" on our laps, smartphones in our pockets, and are now smart watches on our wrists. Soon they can be implanted under our skin as smart biosensors and become integrated parts of our bodies. In parallel with the process of miniaturization, the computing devices are becoming more integrated through technologies such as Internet-of-Things and cloud computing. We consequently see a shift from human-computer interaction to human-computer integration. Computers are no longer solely something we chose to interact with to solve tasks, but become integrated parts of our lives in a myriad of ways.

How does the shift from interaction to integration change the user´s experience of embodiment, and what are the design challenges relate to this? To analyse these questions I will draw on the phenomenology of the French philosopher Merleau-Ponty and his concept of the lived body, Richard Shusterman´s somaesthetics, the theory of mirror neurons from neuroscience, and Martin Buber´s theories of empathy. As a theoretical framework I will contrast three perspectives on the body and technology: 1st person (I), 2nd person (you) and 3rd person (he/she/it). The first person perspective is when I experience my own body and being as me, self-aware in the present. The second person perspective is when I experience the other as a subject like me, with whom I interact respectfully. The third person perspective is when I treat my own body and others as objects in the world. While traditional life to a large degree has been lived in a 1st and 2nd person mode, modern technology often give us a third person perspective on ourselves and others: we measure our bodies with activity and heart rate sensors, we take photos of our bodies as selfies, and we relate to others offline through social media. The third person perspective externalizes us and objectifies us, and thus potentially leads to alienation both from ourselves and others, and makes us unhappy. The answer to this challenge is not to stop developing or using technology, but to design technology that respects the 1st and 2nd person perspective and avoids objectifying and alienating the user. Doing this requires educating new a generation of interaction designers that themselves have developed sensitivity for their own bodily user experiences, and skills in kinaesthetic empathy with the user. Such design skills can be trained through exercises

in mindfulness, body consciousness and empathy. To illustrate this shift in perspective from 3rd to 1st and 2nd, I will show examples from a soma-design workshop with Richard Shusterman in Trondheim, Norway.

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Keynote Speeches IV
Keynote Speech ""
Date/Time October 25, 2018 (Thursday) / 01:00 pm - 02:00 pm
Presenter Prof. Henry Duh,

Biography

Professor Henry Duh is Head and Professor of Department of Computer Science and IT at La Trobe University, Australia; Visiting Professor in the Academy of Arts at Tsinghua University and Adjunct Professor in the Graduate Institute of Journalism at National Taiwan University. He received his degree in Psychology, Design and Engineering respectively. His research focuses on augmented/virtual reality and interaction design. He is a Fellow of BCS, the IET, UK; ACM Distinguished Speaker; Australian Representative of IFIP TC13 HCI and Co-Chair of IEEE SMC TC on Visual Analytics and Communication.

Abstract

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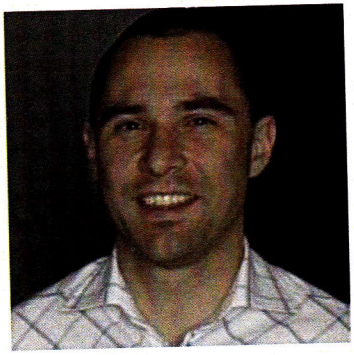
Invited Talk I
Talk " An Introduction to Speech-Based Assessment of Mental State via Mobile Device"
Date/Time October 24, 2018 (Wednesday) / 09:45 am – 10:30 am
Presenter Dr. Julien Epps,

Biography



Dr. Julien Epps completed his BE (1997) and PhD (2001) in Electrical Engineering, following which he held appointments as a Senior Research Engineer at Motorola Labs and Senior Researcher at National ICT Australia. He joined UNSW in 2007 as a Senior Lecturer in Signal Processing, and was appointed as an Associate Professor in 2013. He has authored or co-authored more than 200 publications, many involving cross-disciplinary collaboration, which have been collectively cited around 4200 times. He has delivered invited tutorials on affective computing topics to major international conferences INTERSPEECH 2014 and 2015 and IEEE SMC 2016, and invited keynotes to the CBAR 2017 Workshop (part of ACII 2017), the AVEC 2014 Workshop (part of ACM Multimedia 2014), and Eye Gaze in Intelligent HMI Workshop (part of ACM ICMI 2013). He is currently serving as an Associate Editor for IEEE Transactions on Affective Computing and for Frontiers in ICT (Human-Media Interaction section and Psychology section), and is a Guest Editor for the Computer Speech and Language Special Issue on Speech and Language Processing for Behavioral and Mental Health Research and Applications...

Abstract

Speech interfaces, and devices that can elicit and record speech, are increasingly pervading most aspects of our lives: at home, at work, in vehicles and in mobile contexts. Mental health is a problem of increasing magnitude that affects speech production, and there have been many suggestions and efforts aimed at using technology to address it, so it seems natural that automatic speech analysis will play a part. Although

significant progress has been made towards automatic assessment of mental state via speech collected by mobile devices, there are a number of challenges remaining for the research field. This paper provides a wide perspective of the problem, typical considerations for system design, and a series of areas for further research, which will be important for making progress.

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Invited Talk II
Talk "Towards Smart Internet-of-Things"
Date/Time October 24, 2018 (Wednesday) / 02:15 pm – 03.00 am
Presenter Prof. Jiannong Cao

Biography

Dr. Cao is currently a Chair Professor of Department of Computing at The Hong Kong Polytechnic University, Hong Kong. He is also the director of the Internet and Mobile Computing Lab in the department and the director of University's Research Facility in Big Data Analytics. His research interests include parallel and distributed computing, wireless sensing and networks, pervasive and mobile computing, and big data and cloud computing. He has co-authored 5 books, co-edited 9 books, and published over 500 papers in major international journals and conference proceedings. He received Best Paper Awards from conferences including DSAA'2017, IEEE SMARTCOMP 2016, ISPA 2013, IEEE WCNC 2011, etc.
He served the Chair of the Technical Committee on Distributed Computing of IEEE Computer Society 2012-2014, a member of IEEE Fellows Evaluation Committee of the Computer Society and the Reliability Society, a member of IEEE Computer Society Education Awards Selection Committee, a member of IEEE Communications Society Awards Committee, and a member of Steering Committee of IEEE Transactions on Mobile Computing. Dr. Cao has served as chairs and members of organizing and technical committees of many international conferences, and as associate

editor and member of the editorial boards of many international journals. Dr. Cao is a fellow of IEEE and ACM distinguished member. In 2017, he received the Overseas Outstanding Contribution Award from China Computer Federation.

Abstract

As the Internet becomes increasingly ubiquitous, it is evolving into the medium for connecting objects that are embedded in the physical world. The coupling between such objects and a worldwide standard-based communication infrastructure constitutes the Internet of Things (IoT) and is characterized by machine-to-machine (M2M) communications. IoT has many applications including smart cities, logistics, industrial control and healthcare. Currently, IoT technologies still largely focus on the networking aspect of connecting and controlling the things. As the IoT continues to develop, further potential can be realized by a combination with related technology approaches such as Smart objects, Cloud computing, Big Data, and AI. In this talk, I will describe the evolution of IoT from instrumentation and interconnection to intelligence and summarize our research in the past years along this direction towards smart IoT. Smart IoT will facilitate a sustainable platform empowering advanced applications. I will focus on the current challenges and future development of smart IoT that adds intelligence to IoT leveraging big data analytics and edge computing

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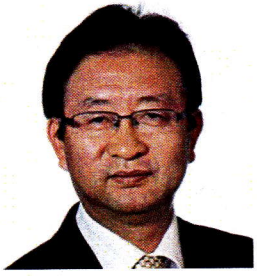
Invited Talk III
Talk "Analysis of Narcolepsy Based on Single-Channel EEG Signals"
Date/Time October 24, 2018 (Wednesday) / 4:45 pm – 5:30 am
Presenter Prof. Yanchun Zhang,

Biography



Prof. Yanchun Zhang is a full Professor and Director of Centre for Applied Informatics at Victoria University since 2004. Dr Zhang obtained a PhD degree in Computer Science from The University of Queensland in 1991. His research interests include databases, data mining, web

services and e-health. He has published over 300 research papers in international journals and conference proceedings including ACM Transactions on Computer and Human Interaction (TOCHI), IEEE Transactions on Knowledge and Data Engineering (TKDE), SIGMOD and ICDE conferences, and a dozen of books and journal special issues in the related areas. Dr. Zhang is a founding editor and editor-in-chief of World Wide Web Journal (Springer) and Health Information Science and Systems Journal (Springer), and also the founding editor of Web Information Systems Engineering Book Series and Health Information Science Book Series. He is Chairman of International Web information Systems Engineering Society (WISE). He was a member of Australian Research Council's College of Experts (2008-2010), and also serves as expert panel member at various international funding agencies such as the Royal Society of New Zealand Marsden Fund and National Natural Science Fund of China (NSFC).

Abstract

A normal person spends about a third of his life in sleep. Healthy sleep is vital to people's normal lives. Sleep analysis can be used to diagnose certain physiological and neurological diseases such as apnea, insomnia and narcolepsy. This paper will introduce the sleep stage and the corresponding electroencephalogram (EEG) characteristics at each stage. We used the deep convolutional neural network (CNN) to classify original EEG data with narcolepsy. We use perturbations based on frequency to generate adversarial examples to analyze the characteristics of narcolepsy in different sleep stages. We find that perturbations at specific frequencies affect the classification results of deep learning.

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Invited Talk IV
Talk "A theory of inspiration: the model of enhancing transdisciplinary collaboration between technology and humanity"
Date/Time October 25, 2018 (Thursday) / 9:30 am - 10:15 am
Presenter Prof. Shyhnan Liou,

Biography

Prof. Shyhnan Liou is currently a professor and Chair of the Institute of Creative Industries Design at National Cheng Kung University (NCKU). He also is the director of CUHK-NCKU joint center of Positive Social Science (CPOSS). He was the CEO of the Research Center of Creativity, Innovation, and Entrepreneurship at NCKU. He has served as consultant for many R&D institutes include: Biomedical Technology Research & Development Institute in ITRI, Metal Industries Research & Development Center of Biotechnology. He received NCKU excellent research award in 2018, 2017. His research areas are mainly on team creativity processing, organizational innovation in both R&D institutes and creative industries, and transdisciplinary collaboration in integrative research. He has published five books on creativity and decision making, and fifty more journal papers and international conference papers. Prof. Liou recently has promoted Positive Social Innovation to seek to seed and grow an innovative and rigorous integrative positive social science that promotes community building; empowerment and rejuvenation; humanized technology; civic virtues; and personal and collective wellbeing.

Abstract

In this talk, I would propose an advanced creativity theory centered in inspiration. We argue that a creative experience should not only the consumption of others' creativity outcome which manifest useful and novel. Instead, creative experience can evocate individuals to be more active in transcend thoughts and then help people go beyond the habituated constraints, give a sense of pursuing a better possibility.

Creativity inspires and guide individual's behavior to motivate individual's creative thoughts or aspirations into action, thus creates social innovation diffusion.

We suggest that the inspiration model would contribute to advance technology for humanity which is the vision of IEEE and the Orange Technology community. We argue that the technology R&D would be inspired by the social issues and well target the social need and contribute to develop better tools and environment for supporting and enabling people to pursuit better wellbeing, that's the technology for humanity.

For the future development to apply the inspiration creativity to Orange Technology development, we suggest that program of design thinking and social innovation for cultivating the R&D ability of humanity empathy and framing social issues as technology development proposals. In addition, for facilitation of the interdisciplinary and transdisciplinary collaboration, we can adopt inspiration mechanism to evocate individuals to have more active transcend thoughts and creative actions with empowered with sensitivity to experiences of other experts and potential users. Creativity inspired what and how the technology to advance for the humanity.

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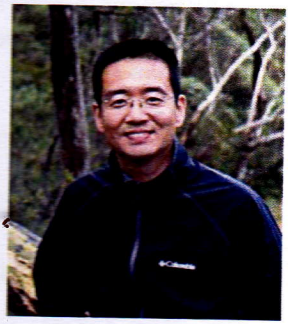
Invited Talk V

Talk "Deep Adversarial Learning and its Applications in Speech Processing"

Date/Time October 25, 2018 (Thursday) / 2:00 pm – 2:45 pm

Presenter Prof. Xie Lei,

Biography



Prof. Xie Lei is currently a Professor in the School of Computer Science in NPU. From 2001 to 2002, he was with the Department of Electronics and Information Processing, Vrije Universiteit Brussel (VUB), Brussels, Belgium, as a Visiting Scientist. From 2004 to 2006, he worked in the Center for Media Technology (RCMT), School of Creative Media, City University of Hong Kong. From 2006 to 2007, he worked in the Human-Computer Communications Laboratory (HCCL), The Chinese University of Hong Kong. His current

research interests include speech and language processing, multimedia and human-computer interaction. He is currently an associate editor of IEEE/ACM Trans. on Audio, Speech and Language Processing. He has published more than 140 papers in major journals and proceedings, such as IEEE TRANSACTIONS ON AUDIO, SPEECH, AND LANGUAGE PROCESSING, IEEE TRANSACTIONS ON MULTIMEDIA, SIGNAL PROCESSING, PATTERN RECOGNITION, ACM Multimedia, ACL, INTERSPEECH and ICASSP.

Abstract

Deep Adversarial Learning and related topics have drawn much attention recently, which naturally introduces the concept of adversarial training to learn better deep natural networks (DNNs). The deep learning pioneer, Facebook's AI research director, Yann LeCun has called *deep adversarial learning* "the most interesting idea in the last 10 years in ML"

A vivid example of adversarial learning is *the boxing game*. A good boxing coach will never let new boxers ask questions. It was often the case that new boxers asked the wrong questions, got answers they didn't need, and then focused on the wrong things. Instead, new boxers learn the good skills and improve themselves from practical adversarial fighting with others.

Hence the most beautiful merit of introducing adversarial learning to neural network training is that the networks learn entirely from data – the questions, the corresponding answers, and the evaluation of these answers can be intrinsically learned. As opposed to the classical deep learning, where questions that are expected to be relevant to the specific task are manually identified, and hand-crafted objective functions guide the optimization of our networks towards learning the corresponding answers.

Recently, deep adversarial learning, especially generative adversarial networks (GANs), have shown amazing results in image generation, and a large number of new ideas and applications have been developed accordingly. Although it is quite successful in image processing, the use of deep adversarial learning in audio and speech tasks is still in its infancy. It is probability because of the complicated sequential nature of audio signal as well as the ambiguity and variability of human speech. A summary of some typical preliminary applications of deep adversarial learning in speech processing can be found.

In this invited talk, after introducing some backgrounds, I will describe some of our recent achievements in applying deep adversarial learning in

the broad area of speech processing, namely speech and speaker recognition, speech enhancement and speech synthesis.

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Invited Talk VI
Talk "Cases of Smart Healthy City in Taiwan"
Date/Time October 25, 2018 (Thursday) / 4:45 pm – 5:15 pm
Presenter Prof. Feng-Tyan Lin,

Biography

Prof. Feng-Tyan Lin obtained his bachelor degree in engineering (urban planning) at National Cheng Kung University, Tainan, Taiwan, in 1977. He obtained his master and Ph.D. degrees in computer science at Northwestern University, USA, in 1986 and 1989, respectively. Prof. Lin's research has focused on information cities and computer theories which can be applied to urban planning and architectural design. He is currently a distinguished researcher of NCKU Research and Development Foundation, Tainan, Taiwan; an adjunct research professor of The Department of Urban Planning, National Cheng Kung University, Tainan, Taiwan; and President of Taiwan Institute of Urban Planning. During 1989-2009, he had been an associate professor, full professor, and director in the Graduate Institute of Building and Planning, National Taiwan University. During 2009-2015, he had served as the Dean of the College of Planning and Design, National Cheng Kung University. During 2015-2016, he had served as Vice President of Asia University. In recent years, he was PIs of the following research projects: Spatial Knowledge Management System of High Risk Watershed Area, Emergency Evacuation Guidance System for Public Buildings, Analysis Method and Dynamic Simulation System for Public Bike System, International Orchid Show, Smart Land Use Planning of Zhanghwa County, Land Development Planning of Dacun Township, and Strategic Planning of Tainan Smart City.

Abstract

Smart healthy city is a combination of two concepts: smart city and healthy city. From the viewpoint of spatial planning, this paper will firstly introduce a framework, consisting of six components, namely, infrastructure, data, services, urban development, social and culture, and complements, including issues of organization, laws, regulations, etc. Then, five principles of constructing smart city, including openness, appropriate technology, policy planning, problem solving, and connectivity, are proposed. Finally, two cases in Taiwan, Dengue fever outbreak and a compound nexus which long-term health care involves, are illustrated to show how the proposed framework and principles of smart city can be applied to the issues of healthy city.

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CONFERENCE PROGRAM

Time	Tue, 23 Oct	Wed, 24 Oct	Thur, 25 Oct	Fri, 26 Oct
08.30-08.45	REGISTRATION	Opening	Keynote III (Dag Svanæs)	CULTURAL TOUR
08.45-09.00		Keynote I (Jhing-Fa WANG)		
09.00-09.15				
09.15-09.30				
09.30-09.45			Invited Talk IV (Shyhnan Liou)	
09.45-10.00		Invited Talk I (Julien Epps)		
10.00-10.15				
10.15-10.30			BREAK	
10.30-10.45		BREAK	Parallel Session III	
10.45-11.00		Parallel Session I		
11.00-11.15				
11.15-11.30				
11.30-11.45				
11.45-12.00				
12.00-12.15			Lunch Break	
12.15-12.30		Lunch Break		
12.30-12.45				
12.45-13.00				
13.00-13.15			Keynote IV (Henry Duh)	
13.15-13.30		Keynote II (P. Insap Santosa)		
13.30-13.45				
13.45-14.00				
14.00-14.15			Invited talk V (Xie Lei)	
14.15-14.30		Invited Talk II (Jiannong CAO)		
14.30-14.45				
14.45-15.00			BREAK	
15.00-15.15		BREAK	Parallel Session III	
15.15-15.30		Parallel Session II		
15.30-15.45				
15.45-16.00				
16.00-16.15				
16.15-16.30				
16.30-16.45			Invited Talk VI (Feng-Tyan Lin)	
16.45-17.00		Invited Talk III		

17.00-17.15		(Yanchun Zhang)		
17.15-17.30			Closing Ceromony	
17.30-20.00		Gala Dinner	Banquet	

PARALEL SESSION

Paralel Session I (10.45-12.30), 24 Oct 2018
Healthy Technology I
Room A
Chair :

Time	ID	Title	Author(s)
10.45-11.00	2	Health Care Spoken Dialogue System for Diagnostic Reasoning and Medical Product Recommendation	Bo-Hao Su, Shih-Pang Tseng, Yu-Shan Lin, Jhing-Fa Wang
11.00-11.15	11	Automatic segmentation of esophageal cancer pathological sections based on semantic segmentation	Sizhe Li, Jiawei Zhang, Yuzhen Jin, Liping Zheng, Jilan Xu, Guanzhen Yu, Yanchun Zhang
11.15-11.30	12	Blood Flow Patterns in The Left Ventricle by Echodynamography Method	Sri Oktamuliani, Kaoru Hasegawa, Yoshifumi Saijo
11.30-11.45	16	Types of Technostress on Employees of IT Consulting Company	Alita Ferziani, Robert O Rajagukguk, Priska Analya
11.45-12.00	31	Design and Implementation of Cloud Service and APP for Drug-Drug Interaction	Li-Chai Chen, Jui-Le Chen, Shih-Pang Tseng
12.00-12.15	35	Motion Gesture Game for Measure Kinesthetic Level	Ezra Peranginangin, Christian, Emil R. Kaburuan, Boike Janus Anshory, Abba Suganda Girsang
12.15-12.30	25	Run for Fun: Shape Body and Knowledge through Playing	Tsai-Yun Mou, Zong-Xian Yin, Chia-Pin Kao, Horng-Horng Lin

Paralel Session I (10.45-12.15), 24 Oct 2018
Digital Business I
Room B
Chair : Dr. Ezra Perangin-Angin

Time	ID	Title	Author(s)

10.45-11.00	10	Identifying Factors Affecting Smart City Adoption Using The Unified Theory of Acceptance and Use of Technology (UTAUT) Method	Hendro Gunawan
11.00-11.15	18	Evaluation of IS Risk Management Using Octave Allegro In Education Division	Jarot S Suroso, Sri Mumpuni Ngesti Rahaju, Kusnadi
11.15-11.30	21	E-commerce Business Planning using SMS Banking and SMS Gateway as Payment Gateway	Mohammad K Najib, Harisno
11.30-11.45	41	Evaluation of Knowledge Management System Application with Technology Acceptance Model Method In Education Division	Jarot S Suroso, Sasmoko, Rizki Fadhillah
11.45-12.00	55	Implementation SCRUM Method in Warehouse Receipt System Development	Suwarni, Bayu Nugroho Indriyanto, Emil R. Kaburuan, Parwito, Eko Darwiyanto, Joni W. Simatupang
12.00-12.15	39	Systems Thinking: a paradigm for advancing technology to enhance humanity	Hernandez Sibo-Ingrid, Gomez Celis-David A., Shyhnan Liou

Paralel Session II (15.15-16.45), 24 Oct 2018
IOT and Application
Room A
Chair : Dr. Tsai-Yun Mou

Time	ID	Title	Author(s)
15.15-15.30	33	Gamified SCRUM Design in Software Development Projects	Sherly Hermanto, Emil R. Kaburuan, Nilo Legowo
15.30-15.45	1	Study of Wireless Sensor Network Application for Dosimeter Personal Real Time	Ramacos Fardela, Kusminarto, Ahmad Ashari
15.45-16.00	23	Mobile Payment Services Adoption: The Role of Perceived Technology Risk	Trianggoro Wiradinata
16.00-16.15	37	Call for Green Vocabulary in IT: Need for more robust development of green vocabulary for ecological responsibility midst the changing landscape of green IT	Peter H-J Kim
16.15-16.30	7	A Study of Tourist Sequential Activity Pattern through Location Based Social Network (LBSN)	Anmoila Talpur, Yanchun Zhang

16.30-16.45	57	Monitoring of Electrical Output Power-Based Internet of Things for Micro-Hydro Power Plant	Setiawan Ginting, Joni Welman Simatupang, Iksan Bukhori, Emil R. Kaburuan
16.45-17.00	58	New Authentication Scheme for Cloud Computing	Islomov Sh.Z., Zokirov O.Y., Mavlonov O.N., Muhamadiev A.N., Emil R. Kaburuan

Paralel Session II (15.15-16.45), 24 Oct 2018
Data Mining and Intelligence Systems I
Room B
Chair : Dr. Hapnes Toba

Time	ID	Title	Author(s)
15.15-15.30	4	Design and Implementation of Sentence Similarity Matching and Multimedia Feedback for Intelligent Pharmacy on Zenbo Robot	Chen Che-Wen, Bo-Rui Chen, Shih-Pang Tseng, Jhing-Fa Wang
15.30-15.45	5	DNN Regression Model and Microphone Array for Noise Reduction System on Real Field	Sheng-Chieh Lee Che-Wen Chen, Bo-Hao Su, Yi-Shiun Chen, Shih-Pang Tseng, Jhing-Fa Wang
15.45-16.00	50	The separation of drug dispensing from medical practice in Taiwan	Han-Chun Huang, Chin-Shun Huang
16.00-16.15	19	Future prospects of artificial intelligent and how it drive to smart society	Yi-Chun Lin
16.15-16.30	30	Empathy: Its Proximate and Ultimate Bases in Advancing Technology	Hsueh-Fang Wang, Shyhnan Liou
16.30-16.45	44	Brightness vs. Lightness Enhancement for Image Segmentation	Luh Putu Ayu Prapitasari
16.45-17.00	20	Solis: A Smart Interactive System for Houseplants Caring	Arno Penders, Johanna Renny Octavia, Michiel Caron, Fay de Haan, Thomas Devoogdt, Samnang Nop, Anthony McAtear, Olivier Pieters, Francis Wyffels, Steven Verstockt, Jelle Saldien

Paralel Session III (10.30-12.00), 25 Oct 2018
Healthy Techonlogy II
Room A
Chair : Dr. Jarot S. Suroso

Time	ID	Title	Author(s)
10.30-10.45	3	Automatic Drug Pills Detection based on Convolution Neural Network	Yang Yen Ou, An-Chao Tsai, Jhing-Fa Wang, Jiun Lin
10.45-11.00	8	Efficient and Effective Multi-person and Multi-angle Face Recognition based on Deep CNN Architecture	An-Chao Tsai, Yang-Yen Ou, Liu-Yi-Cheng Hsu, Jhing-Fa Wang
11.00-11.15	26	Efficient Emotion Recognition based on Hybrid Emotion Recognition Neural Network	Yang-Yen Ou, Bo-Hao Su, Shih-Pang Tseng, Liu-Yi-Cheng Hsu, Jhing-Fa Wang, Ta-Wen Kuan
11.15-11.30	27	Automatic Prescription Recognition System	Yang-Yen Ou, Shih-Pang Tseng, Jiun Lin, Xuan-Ping Zhou, Jhing-Fa Wang, Ta-Wen Kuan
11.30-11.45	38	Melanocyte Detection and Intercellular Distribution Analysis of Melasma in Harmonically Generated Microscopy Images	Gwo-Giun Lee, Hsien-Pin Chu, Chi-Kuang Sun, Yi-Hua Liao
11.45-12.00	15	A Comparison Study Between Deep Learning and Conventional Machine Learning on White Blood Cells Classification	Made Satria Wibawa
12.00-12.15	14	Knowledge and Prevention of Repetitive Strain Injury Among Computer Users	Rianto

Paralel Session III (10.30-12.00), 25 Oct 2018
Data Mining and Intelligence Systems II
Room B
Chair :

Time	ID	Title	Author(s)
10.30-10.45	29	Parametric model for image blur kernel estimation	Ao Zhang, Yu Zhu, Jinqiu Sun
	6	Gated End-to-End Memory	Bin Zhou, Xin Dang

10.45-11.00		Network Based on Attention Mechanism	
11.00-11.15	9	A stock forecasting method based on combination of SDAE and BP	Zheng Li, Xin Dang
11.15-11.30	13	Design of Chinese Depression Spoken Speech Corpus Based on Psychological Self-related Processing	Xiaoyong Lu, Haizhen An, Yanqin Li, Renjun Li Chaochao Pan
11.30-11.45	17	Hyperspectral Image Classification Based on Convolutional Neural Networks With Adaptive Network Structure	Chen Ding, Wei Li, Lei Zhang, Chunna Tian, Wei Wei, Yanning Zhang
11.45-12.00	43	NUS-HLT Spoken Lyrics and Singing (SLS) Corpus	Xiaoxue Gao, Berrak Sisman, Rohan Kumar Das, Karthika Vijayan

Paralel Session IV (15.00-16.30), 25 Oct 2018
Information System
Room A
Chair :

Time	ID	Title	Author(s)
15.00-15.15	40	The Effect Of Successful Enterprise Resource Planning (Erp) Systems On Employee Performance	Jarot S Suroso, R. Bambang Budhijana, Rahma Indah Delfiani
15.15-15.30	48	Development of 3D Solar System Application Using RAD Model for Elementary Schools	Suhartono, Rachmawati Darma Astuti, Sfenrianto, Mustofa, Dewi Andriyani, Emil R. Kaburuan
15.30-15.45	53	Customer Acceptance Factors Against Internet Banking Analysis	Liza Yulianti, Emil R. Kaburuan, Karona Cahya Susena, Monica Mayeni, Wahyu Sardjono
15.45-16.00	54	Factors of Web Design, Application Design and Service Quality on Satisfaction of E-Billing Users in Indonesia	Leni Natalia Zulita, Abiyyu Fawwaz K, Sariful Bachtiar, Karona Cahya Susena, Sfenrianto, Emil R. Kaburuan
16.00-16.15	49	Information System Audit in SaaS Start-Up Company using COBIT 4.1 Focus on Deliver and Support Domain	Boike Janus Anshory, Sfenrianto, Emil R. Kaburuan, Ezra Peranginangin,
16.15-16.30	45	Financial Technology Integration Based on Service Oriented Architecture	Ardi Suryatmojo, Emil R. Kaburuan, Ahmad Nurul Fajar, Sepsellona Sutarty, Abba Suganda Girsang

Paralel Session IV (15.00-16.30), 25 Oct 2018
Digital Business II
Room B
Chair :

Time	ID	Title	Author(s)
15.00-15.15	51	Business Intelligence for Analyzing Department Unit Performance in eProcurement System	Suwarni, Sani Muhamad Isa, Karona Cahya Susena, Eko Cahyo Nugroho, Abba Suganda Girsang, Davy Yeria Gunarso
15.15-15.30	52	Business Intelligence for Evaluating Loan Collection Performance at Bank	Karona Cahya Susena, Dita Madonna Simanjuntak, Parwito, Wardi Fadillah, Yulyardo, Abba Suganda Girsang
15.30-15.45	34	Experiential Marketing in Sharia Accommodation on the Guest Loyalty	Amandus Jong Tallo, Didin Samsudin, Santi Palupi Arianti, Fajar Kusnadi Kusumah Putra
15.45-16.00	36	The AI Model Canvas for Successful Startup Companies in Education	Jarot S. Suroso, Aldian Nurcahyo, Emanuel Jando
16.00-16.15	56	Utilizing Data Mining for Comparison of the Classification in Sentiment Analysis about E-Commerce from Tweets	Achmad Bayhaqy, Sfenrianto, Kaman Nainggolan, Emil R. Kaburuan
16.15-16.30	28	Evaluation of Consumer-Grade SSD as a Primary Storage for Small-Scale Desktop Virtualization on VMware Environment	Marcel Yap

Business Intelligence for Analyzing Department Unit Performance in eProcurement System

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Abstract— ***Reporting using query script mostly takes the long process. It makes the company is too late to provide the strategy decision. This also results inefficient way because the updating and changing SQL query to be adjusted for matching the requirements of decision makers. So, this paper describes how to implement the data warehouse technology to create the fastest way to make a report based on the requirements without customize the SQL query and just read the required data only. With Kimball methodology, data could be reported in various forms and the decision makers could take the best decision in eProcurement System***.

Keywords—***Data warehouse, kimball, report, business intelligence, procurement system***

I. INTRODUCTION

Data warehouse may be known as older technology nowadays, but it is still powerful to make faster report system instead of creating the very long SQL query which is used to get the data from various related tables for one result of report as example. But in big data era, data warehouse becomes the most important because the various data should be transformed as information to get the decision as fast as possible instead of reading the unnecessary data [1][2][3].

The case study for this paper is a data analysis of eProcurement system implemented by one of Business School in Bandung which all procurement requests should be submitted on the system to be processed by procurement unit. But during the process, some procurement requests could be under approval process, rejected, failed, and approved. But during the implementation, top level management hard to find how many procurement request was failed in specific month or period. Also top level management hard to find how many department unit who submitted failed procurement process. So, with the data top level management can evaluate the department unit to make better budget plan in next year as example. But in fact, the institution does not have any report system to show it in detail but only showing the budget realization for every unit department means only showing approved procurement request only and ignoring failed or rejected procurement request data. Because failed and rejected procurement data also valuable as analysis data for evaluating the procurement process [4].

II. THEORITICAL BACKGROUND

A. Data Warehouse Concept

Data warehousing is the process of constructing and using a data warehouse. A data warehouse is constructed by integrating data from multiple heterogeneous sources that support analytical reporting, structured and/or ad hoc queries, and decision making. Data warehousing involves data cleaning, data integration, and data consolidations [7].

Data warehouse designed with relational database using query to select related data contained in dimension tables also as reference data for fact table data which contains all results of business process. Fact table also containing measurement data like transaction number or other data can be measured. But in the data warehouse implementation ignoring the normalization process because the design process only need the "core" data as the reference in decision support system. It is different with the system which does not use the dimension modeling like transactional process. Entity relation diagram (ERD) is mostly used to draw the online transactional process (OLTP) [8][9].

B. Data Warehouse Design

Kimball methodology has nine steps for designing the data warehouse:

Choose Business Process and Analysis. This is the very first step to choose and understand what is the business process implemented inside the system and institution. With this step, designer can choose the required tables contain the data and be transformed into dimension tables.

Choose the Granularity. This step for analyzing the granularity or the relation data and information within each row inside transaction table and the fact table. Started this steps, designer can start to create the dimension tables.

Create Dimension Tables. On this step, designer can start to create the required and related dimension tables. Dimension tables can be as references of fact table. As example, budget dimension table is the reference of budget realization fact table.

Create Fact Table. Fact table can be created after all dimension tables are finished. Fact table also contains the data which can be measured like transaction amount or else.

Storing Pre-calculation in the Fact Table. After the table fact is formed, the next step determines the function of each field that serves as a measurement field.

Rounding out the dimension table. Identify the dimension table to represent the attribute hierarchy to ease the analysis.

Choosing the duration of the database. The data duration needs to be specified for example three years backward. So presented data can be an analysis reference from the data behaviours. Data obtained in the form of spreadsheet is then converted into OLTP databases. The data on OLTP database is extracted and transformed through the ETL process and moved to the data warehouse [10][11].

Slowly changing dimension. In this step, designer has to make sure which dimension tables not affected with transaction changes. For example. unit department dimension table will not be changed until there is addition unit department in the future but not in the near time.

After dimension tables and the fact table can be determined, then relational links within dimension tables and fact table can be visualized for better understanding in data warehouse designing. According to Creative Data, Star Scheme is a standard technique in designing summary tables from the data warehouse. Star schemes consist of a central data table, or fact table connected to one or more dimension tables. It is called a star scheme because this model resembles a star, with points centered from the center. The center of the star scheme consists of one or more fact tables and the points in the schema are dimension tables that contain information on certain attributes in the fact table [10][12][13].

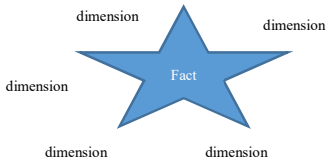

Figure 1 Star Schema

III. METHODOLOGY

In this section, will be described about the process to develop data warehouse for business intelligence in analyzing unit department performance by e-procurement system database.

A. Data Source

Source database is stored in MySQL database server under Linux Operating System and related tables contains the transaction data of unit department budget usages detected from procurement order submitted on the system also other tables related with unit department general data and budgets general data related with unit departments table. Entity Relational Diagram can be seen in Figure 2.

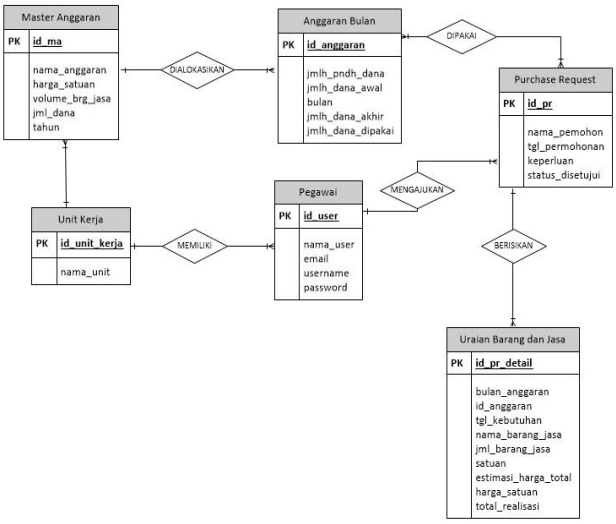

Figure 2 Entity Relational Diagram

B. Data Warehouse Design

In designing the data warehouse, there are 5 tables known as the dimension tables formed in star schema model which are "unit_kerja" dimension contains the general data of unit "department", "bulan anggaran" dimension contains the time dimension separated in quarterly, semester, and yearly, then "anggaran" dimension contains the general data for every budget post for each unit department, tanggal pengajuan dimension contains the time dimension started from days until years, "status permohonan" dimension contains the data of stated status for each submitted procurement order like, submitted order, rejected order, approved order, and failed order. The visualization of the star schema design can be seen in Figure 3.

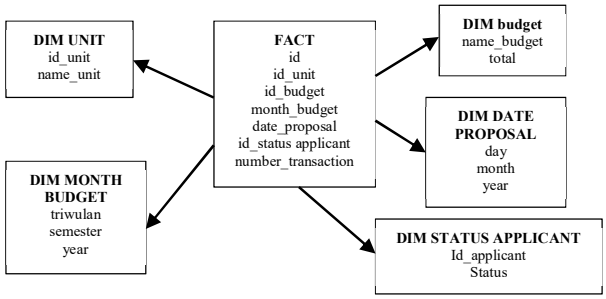

Figure 3 Star schema model of data warehouse design

C. Surrogate Keys

Surrogate key is a necessary generalization of the natural production key and is one of the basic elements of data warehouse design. Every join between dimension tables and fact tables in a data warehouse environment should be based on surrogate keys, not natural keys. Caused by multiple source tables into a single dimension, surrogate keys can avoid the duplication of the primary key after stored in

dimension tables because surrogate keys is auto increment after the data inserted in dimension tables.

D. Extract Transform Load

ETL is the step for get the data stored in main database stored in MySQL server and transformed into dimension tables. So, all related tables can be extracted, transformed, and loaded automatically when transformation process is connected to server or called OLTP (online transactional process). This paper is using Pentaho Data Integration for ETL process and can be seen on Figure 4 - 8.

Figure 4 Load budget dimension table

Figure 5 Load month budget dimension

Figure 6 Load date proposal dimension

Figure 7 Load unit dimension

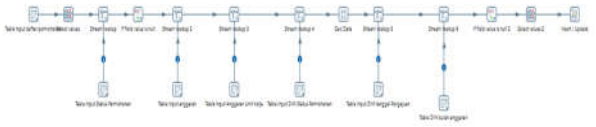

Figure 8 Load fact table

IV. ANALYSIS RESULT

After ETL process executed successfully, then dimension tables and fact table has been filled with extracted data and ready to be used as data warehouse source. In this section, Qlik Sense is used to make report dashboard with easily. Dashboard result can be seen in Figure 9 – 11.

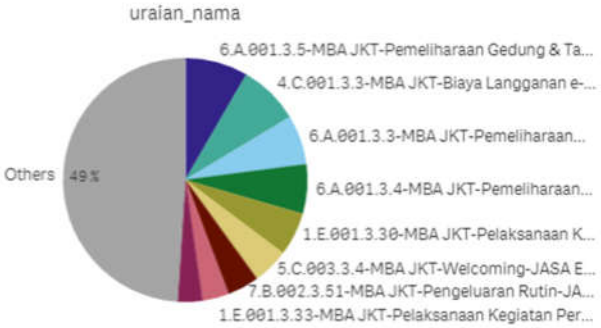

Figure 9 Round chart budget usages of MBA JKT unit

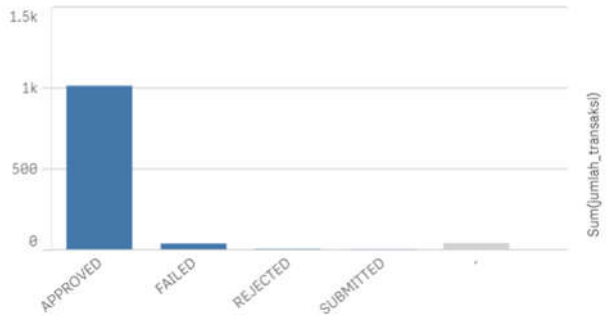

Figure 10 Chart of procurement order with order status

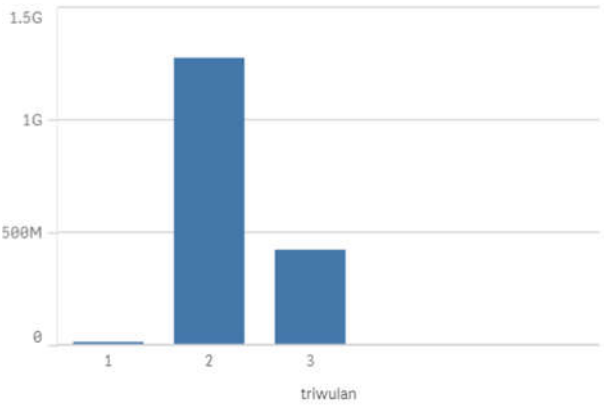

Figure 11 Chart of budget usages with time dimension

Another way to make a report is using Pentaho Report Design. Different with Qlik Sense where Qlick Sense only providing dashboard with interaction interface by clicking the chart to make a filtering data, Pentaho Report Design is providing more detailed. Means Pentaho Report Design also reporting the row data instead of Qlik Sense only providing chart dashboard. Report in Pentaho Report Design can be seen in Figure 12.

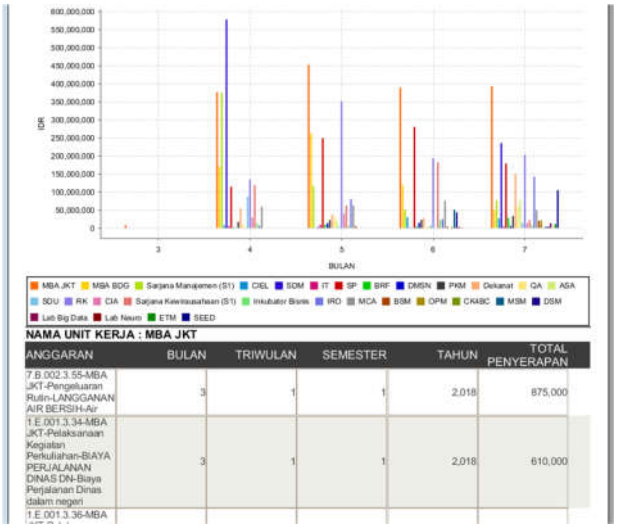

Figure 12 Report result using Pentaho Report Design

V. CONCLUSION

Using data warehouse technology and its method, data can be reported faster without typing the very long SQL query

to make a relation within related tables which are in actual there are many tables inside the system. Relation table process is helped by ETL process because data warehouse only needs the used data and does not need another data which is sometime is useless for making a report. So, administrator can give the report as soon as possible based on the requirement from decision maker without to create a new function program or new SQL query.

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