

**ICIEA
2018**

2018 The 5th International Conference on Industrial Engineering and Applications

Technical Program

April 26-28, 2018

Shaw Foundation Alumni House, National University of Singapore

Singapore

www.iciea.org

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Assisted by



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Welcome Address

We would like to welcome you to ICIEA 2018, The 5th International Conference on Industrial Engineering and Applications, being held from Apr. 26 to Apr. 28, 2018, in Shaw Foundation Alumni House, National University of Singapore, Singapore.

After several rounds of review procedure, the program committee accepted those abstracts to be presented on conference, and papers to be published in conference proceedings. We wish to express our sincere appreciation to all the individuals who have contributed to ICIEA 2018 conference in various ways. Special thanks are extended to our colleagues in the program committee for their thorough review of all the submissions, which is vital to the success of the conference, and also to the members in the organizing committee and the volunteers who had dedicated their time and efforts in planning, promoting, organizing and helping the conference.

This conference program is highlighted by Five Keynote Speakers: Prof. Tang Loon Ching, National University of Singapore, Singapore; Prof. George Zhang, Western Washington University, USA; Prof. Shey-Huei Sheu, Providence University, Taiwan; Prof. Maode Ma, Nanyang Technological University, Singapore; Prof. Felix T. S. Chan, The Hong Kong Polytechnic University, Hong Kong.

One best presentation will be selected from each session, evaluated from: originality; applicability; technical Merit; qualities of PPT; English. The best one will be announced and awarded the certificate over the banquet after the conference.

Whizzing around Singapore can take a matter of minutes, thanks to one of the world's most efficient and widespread public transport systems. Hankering for a roti prata breakfast in Little India, but want to visit the temples in Chinatown before lunch? No problem, you'll be there in a jiffy using the sparkling MRT system – and why not stop at Marina Bay for a spot of shopping on your way? Plus, with new metro lines opening practically every two years, this tiny island just keeps on becoming easier to explore.

We wish you a successful conference and enjoyable experience in Singapore!

Conference Organizing Committee
Singapore

IGIEA 2018 Organizing Committee

International Advisory Committee

Zhe George Zhang, Western Washington University, USA

Conference Chairs

Felix T. S. Chan, The Hong Kong Polytechnic University, Hong Kong

Shey-Huei Sheu, Department of Statistics and Informatics Science, Providence University, Taiwan

Local Organizing Chair

TANG Loon Ching, National University of Singapore, Singapore

Organizing and Program Committees

Seoung Bum Kim, School of Industrial Management Engineering, Korea University

Usik Lee, Inha University, Korea

Maode Ma, Nanyang Technological University, Singapore

Finance Chair

Minghan Xi, Dalian Maritime University, China

International Technical Committees

Cheng-Feng Hu, National Chiayi University, Taiwan

Dong-Yuh Yang, National Taipei University of Business, Taiwan

Mario Hirz, Graz University of Technology, Austria

Amr Eltawil, Egypt Japan University of Science and Technology (E-JUST), Egypt

Po-Hsiang Liu, College of Business and Management in St. John's University, USA

Taesu Cheong, Korea University, Korea

Tien-Lun Liu, Chung Yuan Christian University, Taiwan

Wei Cai, Wuhan University of Technology, China

Jinguo Huang, Huazhong University of Science and Technology, China

Yu-Chung Tsao, National Taiwan University of Science Technology, Taiwan

Yip Mum Wai, Tunku Abdul Rahman University College, Malaysia

Pule Kholopane, University of Johannesburg, South Africa

Bonivasius Prasetya Ichtiarto, mercu buana university, Indonesia

Elita Amrina, Andalas University, Indonesia

Ren-Jieh Kuo, National Taiwan University of Science and Technology, Taiwan

Nguyen Thi Phuong Quyen, National Taiwan University of Science and Technology, Taiwan

Xuan Qiu, The Hong Kong University of Science and Technology, Hong Kong

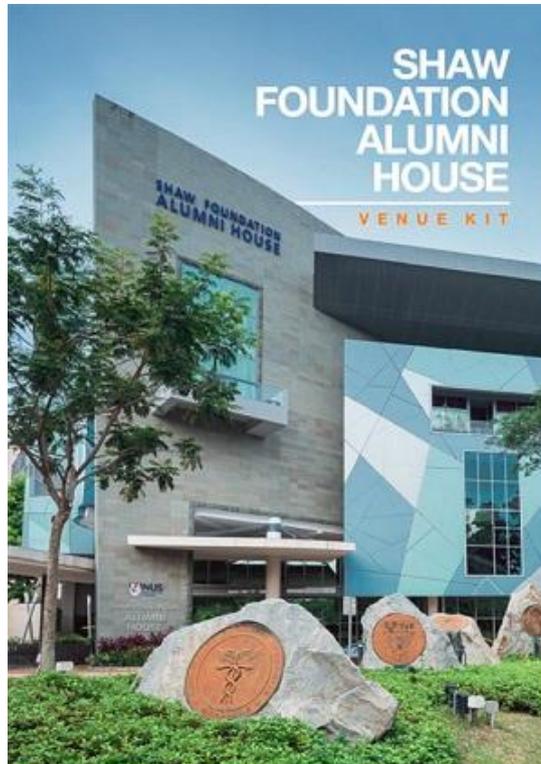
Mohamad Zairi Bin Baharom, Universiti Malaysia Pahang, Malaysia

Anand Jayakumar Arumugham, SVS College of Engineering, Coimbatore, Tamil Nadu, India
Byung Do Chung, Yonsei University, Korea
M. Mujiya Ulkhaq, Diponegoro University, Indonesia
Marek Kocisko, Technical University of Kosice, Slovakia
Sandeep Singhal, National Institute of Technology, India
J. W. Wang, The University of Hong Kong, Hong Kong
Ching-Chang Kuo, National Taichung University of Science and Technology, Taiwan
Kuo-Hsiung Wang, Providence University, Taiwan
ISMAIL MUSIRIN, Universiti Teknologi MARA, Malaysia
Sangbok Lee, Hansung University, Korea
Adrian E. Coronado Mondragon, Royal Holloway University of London, UK
Chin-I Lee, Ling Tung University, Taiwan
S. H. Choi/University of Hong Kong, Hong Kong
Shang-Juh Kao, National Chung-Hsing University Taichung City, Taiwan
Wei Cai, Wuhan University of Technology, China
Hashibah Hamid, Universiti Utara Malaysia, Malaysia
T.M.A. Ari Samadhi, Bandung Institute of Technology, Indonesia
Zainal Abidin Akasah, Universiti Tun Hussein Malaysia, Malaysia
Pi-Chun Hsu, Chaoyang University of Technology, Taiwan
Mu-Chen Chen, National Chiao Tung University, Taiwan
Murat Kucukvar, Qatar University, Qatar
Chaudry Bilal Ahmad Khan, Institute of Space Technology, Pakistan
Tsu-Wei Yu, Chaoyang University of Technology, Taiwan
Lingyun Wei, Beijing University of Posts and Telecommunications, China
Hamdi Bashir, University of Sharjah, United Arab Emirates
LERDLEKHA SRIRATANA, Ramkhamhaeng University, Thailand
LIU Hai-peng, Kunming University of Science and Technology, China
Elfira Febriani, Trisakti University, Indonesia
Yu-Hsiang Hsiao, National Taipei University, Taiwan
Chien-Chih Wang, Ming Chi University of Technology, Taiwan
Atichart Harncharnchai, Chiang Mai University, Thailand
Roberto Montemanni, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA - USI/SUPSI), Switzerland
Bambang Suhardi, Universitas Sebelas Maret, Indonesia
Ssu Han Chen, Ming Chi University of Technology, Taiwan
M'd Gapar M'd Johar, Management and Science University, Malaysia
FAZEEDA BINTI MOHAMAD, UNIVERSITI MALAYSIA PAHANG, Malaysia
Augustina Asih Rumanti, Bandung Institute of Technology, Indonesia
Maheshwar Dwivedy, BML Munjal University, India
Zhichuan Guan, China University of Petroleum (East China), China
Iwan Aang Soenandi, Krida Wacana Christian University, Indonesia
Amelia Kurniawati, Telkom University, Indonesia
Anas Ma'ruf, Bandung Institute of Technology, Indonesia
Gabriel Lodewijks, The University of New South Wales, Australia
Yenming J. Chen, National Kaohsiung University of Science and Technology, Taiwan
Ardyono Priyadi, Institut Teknologi, Sepuluh Nopember, Indonesia

TUANJAI SOMBOONWIWAT, King Mongkut's University of Technology Thonburi (KMUTT), Thailand
Li Li, Nanjing University of Science and Technology, China

Conference Site

2018 The 5th International Conference on Industrial Engineering and Applications (ICIEA 2018) will be held on Apr. 26-28, 2018, at Shaw Foundation Alumni House, National University of Singapore, Singapore. The conference site is shown in campus map below:



**SHAW FOUNDATION ALUMNI HOUSE, NATIONAL UNIVERSITY OF SINGAPORE
SINGAPORE**

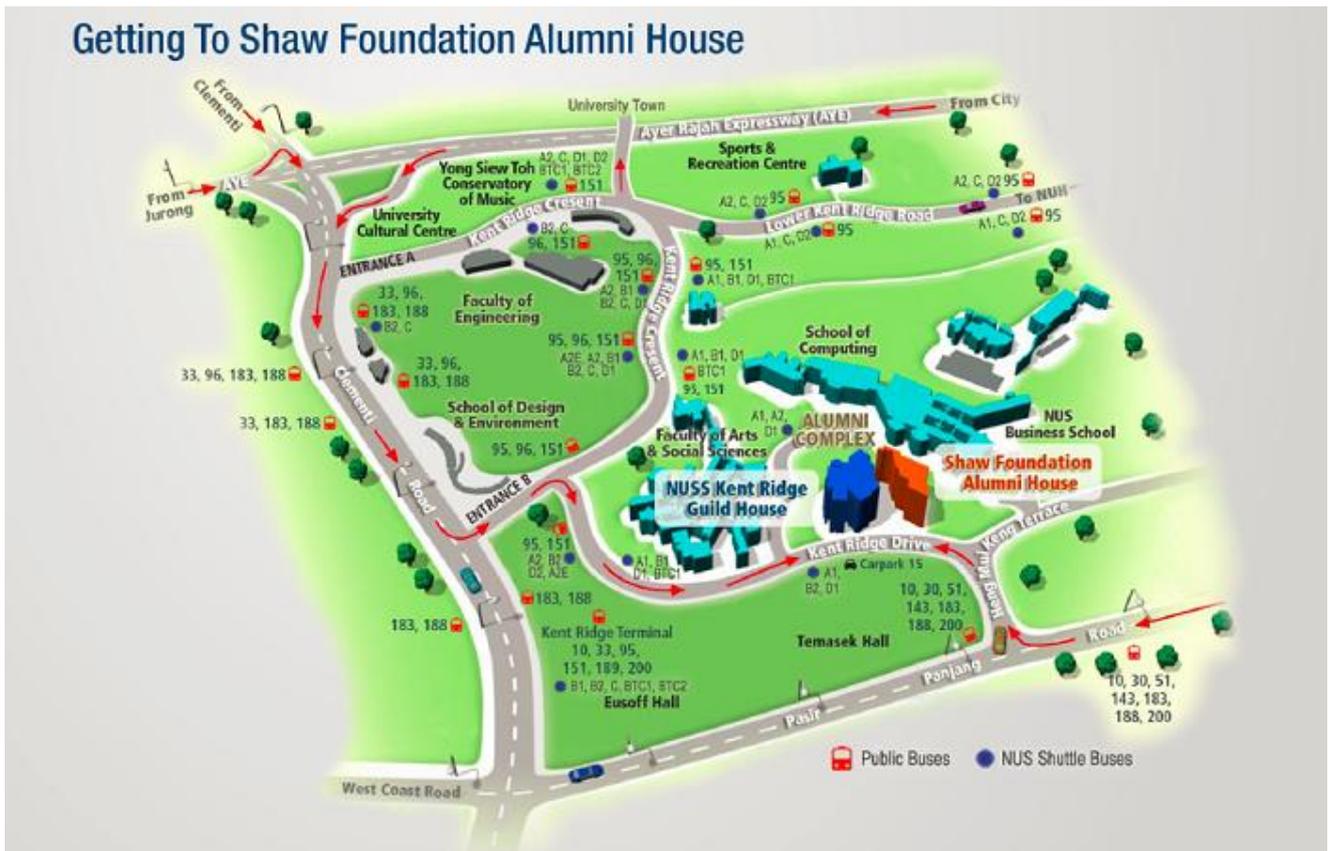
Address: 11 Kent Ridge Drive, Singapore 119244
<http://alumnet.nus.edu.sg/module/portal/index.htm>

Floor Plan



Access Map-

How to get to Shaw Foundation Alumni House?



Useful Info.



Time
UTC/GMT+8



Weather

The Weather Situation of Singapore in Apr.

Average daily minimum temperature

25°C

Average daily highest temperature

29°C



Money

The country's unit of currency is the Singapore dollar (S\$), locally referred to as the 'singdollar', which is made up of 100 cents. Singapore uses 5¢, 10¢, 20¢, 50¢ and S\$1 coins, while notes come in denominations of S\$2, S\$5, S\$10, S\$50, S\$100, S\$500 and S\$1000. The Singapore dollar is a highly stable and freely convertible currency. Cirrus-enabled ATMs are widely available at malls, banks, MRT stations and commercial areas. Banks change money, but virtually nobody uses them for currency conversion because the rates are better at the moneychangers dotted all over the city. These tiny stalls can be found in just about every shopping centre (though not necessarily in the more modern malls). Rates can be haggled a little if you're changing amounts of S\$500 or more.



Taxes & Refunds

Singapore applies a 7% GST to goods and services. Most prices in shops and food outlets will have GST already included – the symbol ++ shows GST and service charge (10%) is not included in the displayed price and will be added to the final bill. This is common in hotels, restaurants and luxury spas. Tourists are entitled to claim a refund of the GST paid on purchases made at participating retail stores before leaving the country. This refund is applicable for purchases above S\$100.



Transportation

Buy an EZ-Link card, an electronic travel card accepted on MRT trains, local buses and the Sentosa Express monorail, and by most taxis. Options include one-, two- or three-day 'Singapore Tourist Pass' cards, which offer unlimited travel on buses and trains.



What to take

Hat, sunglasses and sunscreen – and an umbrella

Mosquito repellent, especially if planning to explore nature reserves

Electrical adaptor

A smart outfit and a decent pair of shoes for higher-end restaurants and bars

Swimwear

A photocopy of your passport photo page, stored separately from your passport



Emergency Contact

If you are involved in a traffic accident or crime

- Emergency Contact TEL: 999

If you need emergency treatment for an illness or fire

- Contact TEL: 995

*Part of the local information above comes from the network.

Guidelines for Presentations

Oral presentations

Standard LCD projector (connected to a local PC) will be provided in each conference room.

Oral presentations have been allocated 15 minutes of effective presentation time, including Q/A time.

Authors must prepare their oral presentations to be sure to convey their message in clear and sharp manner, including giving outline of the key principles, facts and results. More detailed discussions can continue during the breaks.

In order to ensure a smooth performance during your session, we kindly ask you to consider the following instructions:

Be at the session room 15 minutes before session starts and introduce yourself to the session chairs.

A video projector and a PC will be available in all conference rooms. Speakers suggested not use their own laptop computer, avoiding useless time breaks in between papers.

Bring your presentation on a USB memory stick in MS-PowerPoint or Adobe PDF formats, and upload it in the Session Room computer no later than 10 minutes prior to your session start! You can also bring it earlier, during the coffee/lunch breaks before your presentation. Please upload your presentation in a right place in order to find it easily at the time of presentation.

Please wear formal clothes or national characteristics of clothing for participation.

In order to avoid any compatibility problems, read carefully the instructions below.

PowerPoint Instructions

For MS-PowerPoint presentations, please use the following versions only: PP 97-2003 (*.ppt) or 2007, 2010 to guarantee that it will be opened successfully on the on-site PC

We recommend to the PPT/PPTX format instead of PPS

All videos or animations in the presentation must run automatically!

Pictures/Videos

We cannot provide support for embedded videos in your presentation; please test your presentation with the on-site PC several hours before your presentation.

In case your video is not inserted in MS-PowerPoint, it is possible to have it in other formats – MPEG 2,4, AVI (codecs: DivX, XviD, h264) or WMV. Suggested bitrate for all mpeg4 based codecs is about 1 Mbps with SD PAL resolution (1024x576pix with square pixels, AR: 16/9).

Fonts

Only fonts that are included in the basic installation of MS-Windows will be available (English version of Windows). Use of other fonts not included in Windows can cause wrong layout/style of your presentation.

Suggested fonts: Arial, Times New Roman.

If you insist on using different fonts, these must be embedded into your presentation by choosing the right option when saving your presentation:

Click on “File”, then “Save As”

Check the “Tools” menu and select “Embed True Type Fonts”

Poster presentations

Suggested Poster with size of 60cm*80cm (width*height).

Posters are required to be condensed and attractive. The characters should be large enough so that they are visible from 1 meter apart.

During this poster presentation time, the presenter must stand by the display board to answer questions and discuss about the contents of the poster informally. The poster display should include a statement the topic, objectives of the research project, the methodology used to solve the problem or implement the program, the major findings or outcomes and their significance and conclusions. There should be a logical sequence---introduction, development and conclusion---of your display. Each sheet should numbered, a heading should be prepared for your presentation using lettering at least 3 cm high. The heading should include the title of the poster, all author names and institutional affiliations, and with ICIEA 2018+Paper ID at right-up corner.

Pins or tapes are provided by conference committee to mount your posters on the boards. All materials to be displayed should be prepared before your arrival. Supplies will not be available at the conference site.

Keynote Speech

Keynote Speech –I



Apr. 26(Thu), 2018, 13:05-13:50

Auditorium Room

“Planning Sequential Accelerated Life Testing”

Prof. Loon Ching TANG

National University of Singapore, Singapore

Abstract of speech

Many products are designed to last longer than the typical lifespan of human being. It's thus a challenge to validate the design life through reliability tests even when testing is conducted under much harsher environment. Not only that test duration is usually constrained, but the samples available for testing may also be costly and/or limited in quantity. Statistically optimal plans will allow for efficient use of testing resources and yet derive the most information from the test. In this presentation, we shall discuss ideas related to designing test plans for both constant stress and step stress ALT; leading to the statistical optimal plan for sequential ALT. While that of constant ALT is basically a Bayesian approach, that for the step stress ALT requires solving a dynamic program using backward induction. For the latter, optimal solutions are only available for exponential lifetime and there are rooms for further research.

Loon Ching TANG

BIO: Dr Loon Ching TANG is currently the Director of Temasek Defence Systems Institute and Professor of Department of Industrial Systems Engineering and Management at the National University of Singapore. He obtained his Ph.D degree from Cornell University in the field of Operations Research in 1992 and has published extensively in areas related to industrial engineering and operations research. He has been presented with a number of best paper awards including the IIE Transactions 2010 Best Application Paper Award and 2012 R.A. Evans/P.K. McElroy Award for the best paper at Annual RAMS. Prof Tang is the main author of the award-winning book: *Six Sigma: Advanced Tools for Black Belts and Master Black Belts*. Besides being active in the forefront of academic research, in the last 25 years, Prof Tang has served as consultant for many organizations, such as the Ministry of Home Affairs, Singapore Power, Republic of Singapore Air Force, Seagate, HP, Phillips, etc, on a wide range of projects aiming at improving organizational and operations efficiency; especially through better management of engineering assets. He is currently a fellow of ISEAM, the Editor of *Quality & Reliability Engineering International* and an editorial review board member of the flagship journal of ASQ, *Journal of Quality Technology* (since 2006). He has served as the Region VP (Asia) of IIE (2013-16) and a member of the advisory board of the Singapore Innovation and Productivity Institute

Keynote Speech -II



Apr. 26(Thu), 2018, 13:50-14:35

Auditorium Room

“”

Prof. George ZHANG

Western Washington University, USA

George ZHANG

BIO: Professor Zhe George Zhang is a professor of Management Science in the Department of Decision Sciences at Western Washington University and a professor of Operations Management in Beedie School of Business at Simon Fraser University. He is also visiting professor of Sauder School of Business at the University of British Columbia. Dr. Zhang received his BS in Computer Science and MA in Economics from Nankai University, China; his MBA from the Schulich School of Business at York University; and his PhD in Operations research from the University of Waterloo. Professor Zhang has published many papers in prestigious journals such as Management Science, Operations Research, Manufacturing & Service Operations Management, Production and Operations Management, IIE Transactions, IEEE Transactions, Queueing Systems, Journal of Applied Probability. Co-authored with Professor Tian in 2006, he published the research monograph "Vacation Queueing Models - Theory and Applications," the first book on this particular topic (now highly cited). Professor Zhang's research

interests include queueing theory and applications and stochastic models for manufacturing and service systems. The main theme of his research is to bridge the gap between theory and application, obtaining unobservable and sometimes counter-intuitive but significant/practical management insights via modeling and quantitative analysis. Currently, he is particularly interested in the quantitative and economic analysis of the congestion problems in urban/mass transportation networks, health/medical care systems, and public service systems with both customer service quality and security concerns. As an expert in data analysis and quantitative modeling, he has consulted in industry and has given research seminars and short lectures at leading universities around the world. He was invited to present plenary or keynote talks in several international conferences. Professor Zhang is the one of Editor-in-Chiefs for new journal Queueing Models and Service Management, an associate editor of INFOR (Information Systems and Operations Research), and is on the editorial board of several international journals in Operations Research and Management Science.

Keynote Speech -III



Apr. 26(Thu), 2018, 14:35-15:20

Auditorium Room

“The Generalized Age Maintenance Policies with Random Working Times”

Prof. Shey-Huei SHEU

Providence University, Taiwan

Abstract of speech

The purpose of this paper is to investigate the generalized age maintenance policies for a system with random working times. When the system fails, it is subject to one of two types of failures with age-dependent probability: type I failure can be removed by minimal repair and type II failure must be rectified by replacement. A First, the system is preventively replaced before type II failure at time T or at the completion of N th working projects, whichever occurs first. Two modified models, where the system is preventively replaced before type II failure at time T or at the completion of N th working projects, whichever occurs last, and it is preventively replaced at the first completion of the working project over time T or at the completion of N th working projects, whichever occurs first, are considered. By introducing costs due to repairs, maintenance and replacement, the expected cost per unit time is derived as a criterion of optimality and the optimal policy that minimizes that cost is discussed analytically.

Shey-Huei SHEU

BIO: Professor Shey-Huei Sheu is a Chair Professor of Department of Statistics and Informatics Science at the Providence University. He is an Honorary Chair Professor of the Department of Industrial Management at the National Taiwan University of Science and Technology. He received his M.S.

degree (1979) in applied mathematics from the National Tsing Hua University and his Ph.D. degree (1987) in statistics from the University of Kentucky. He has published in journals such as Naval Research Logistics, Journal of Applied Probability, RAIRO Operations Research, Microelectronics and Reliability, Reliability Engineering and System Safety, International Journal of Systems Science, Quality and Reliability Engineering International, International Journal of Reliability, Quality and Safety Engineering, Journal of the Operational Research Society, European Journal of the Operational Research, Computers and Operation Research, Computers and Industrial Engineering, Quality Engineering, Asia-Pacific Journal of the Operational Research, Communications in Statistics-Theory and Methods, Computers and Mathematics with Applications, Simulation Modeling Practice and Theory, Communications in Statistics-Simulation and Computation, Journal of Statistical Computation and Simulation, International Journal of Production Economics, Quality Technology and Quantitative Management, The International Journal of Advanced Manufacturing Technology, Expert Systems, International Journal of Computer Mathematics, Journal of Applied Statistics, Production Planning and Control, International Journal of Production Research, Applied Mathematical Modelling, IEEE Transactions on Reliability, and Annals of Operations Research.

Keynote Speech -IV



Apr. 26(Thu), 2018, 15:30-16:15
Auditorium Room

“Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks ”

Prof. Maode MA
Nanyang Technological University, Singapore

Abstract of speech

IEEE 802.11ah, a specification belonging to 802.11 wireless local area network (WLAN) protocol family, has been recently released to support the long-range, low-power and low-rate wireless communication among smart devices used in Internet of Thing (IoT) systems. However, security requirements of the energy-constrained devices have plenty of issues different from the traditional wireless devices. It requires that the lightweight security protocols have to support low-power and low-latency as well as the long-lasting features of quantities of IoT devices. The recently released IEEE standard, IEEE 802.11ah has specified a Fast Initial Link Setup (FILS), which is a brand-new approach aiming at establishing fast, stable and secure links among smart devices. IEEE 802.11ah could be applied to other wireless systems, such as the wireless system of IEEE 802.11ah with security enhancements. In this talk, I would address the security issues of IEEE 802.11ah and IEEE 802.11ah with a new proposal to enhance the authentication process in the link setup procedure specified by IEEE 802.11ah.

Maode MA

BIO: Dr. Maode Ma is a Fellow of IET. He received his Ph.D. degree in computer science from Hong Kong University of Science and Technology in 1999. Now, Dr. Ma is an Associate Professor in the School of Electrical and Electronic Engineering at Nanyang Technological University in Singapore. He has extensive research interests including network security and wireless networking. Dr. Ma has about 350 international academic publications including over 160 journal papers and about 190 conference papers. He has delivered over 50 keynote speeches at various international conferences. He has served as various chairs for over 100 international conferences. He currently serves as the Editor-in-Chief of *International Journal of Computer and Communication Engineering* and *International Journal of Electronic Transport*. He also serves as a Senior Editor or an Associate Editor for other 4 international academic journals. Dr. Ma is a Senior Member of *IEEE Communication Society* and *IEEE Education Society*, and a Member of *ACM*. He is the Chair of the *IEEE Education Society*, Singapore Chapter and the Chair of the *ACM*, Singapore Chapter. He has served as an *IEEE Communication Society Distinguished Lecturer* from 2013-2016.

Keynote Speech –V



Apr. 26(Thu), 2018, 16:15-17:00

Auditorium Room

“Investigating the Interrelationship between Stochastic Aircraft Routing of Airlines and Maintenance Staffing of Maintenance Providers”

Prof. Felix T.S. CHAN

The Hong Kong Polytechnic University, Hong Kong

Abstract of speech

Stochastic aircraft routing (SAR) plays a critical role in defining the routing plans of airlines, which include assigning the aircraft to flight legs and determining the time and location of maintenance to the aircraft. Based on the routing plan specified by the airlines, the maintenance providers should schedule their workforce to perform maintenance operations by solving the maintenance staffing problem (MSP). MSP helps maintenance providers to build their staffing plans, which include the assignment of manpower to each aircraft, so that aircraft receive the required maintenance operations as planned. Practically, for airlines, the routing plan will be interrupted (e.g. flight delays) if an aircraft cannot be released from the maintenance station punctually. Similarly, for maintenance providers, if an aircraft misses the scheduled appointment at the maintenance station, this will also cause a huge interruption to their staffing plan. Therefore, there is an interrelationship between SAR and MSP. In the literature, the focus of each problem has been traditionally considered separately, with only limited consideration of their interrelationship. In this paper, we study SAR along with MSP, with the objective of investigating the interrelationship between SAR and MSP. For this purpose, we propose a coordinated configuration of SAR and MSP that is formulated as a leader-follower Stackelberg game, in which SAR acts as a leader and MSP acts as a follower. This game is enacted through a bi-level optimization model, which is solved by a bi-level nested ant

colony optimization (ACO) algorithm. A case study of a major airline and maintenance provider located in the Middle East is presented to demonstrate the feasibility and potential of the proposed model. The results demonstrate significant saving in the costs of both companies.

Felix T.S. CHAN

BIO: Professor Felix T. S. Chan received his BSc Degree in Mechanical Engineering from Brighton Polytechnic (now University), UK, and obtained his MSc and PhD in Manufacturing Engineering from the Imperial College of Science and Technology, University of London, UK. Professor Chan is now working at the Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, and also serving as Associate Dean (Research) at the Faculty of Engineering. His current research interests are Logistics and Supply Chain Management, Operations Management, Distribution Coordination, Systems Modelling and Simulation, AI Optimisation. To date, he has published 16 book chapters, over 300 refereed international journal papers and 250 peer reviewed international conference papers, h index= 30 under the Web of Science. He is a chartered member of the Chartered Institute of Logistics and Transport in Hong Kong. According to a study lately published in the International Journal of Production Research (<http://dx.doi.org/10.1080/00207543.2015.1037935>), the study measured the research contributions over a 26-year time frame (1985-2010) of academic institutions and individual authors to the field of

Operations Management (OM) based on published articles in 11 top-rated and well-known academic OM journals. Professor Chan was among the top 50 prolific authors list who have made the greatest overall contribution to the field as measured by the number of distributed and shared articles published

in the 11 designated journals. Also, Professor Chan was Ranked No. 3 in The top 100 authors as the most productive researchers in the field of Operations Management over the past 10 years (2001-2010).

Program at a Glance

ICIEA2018

| | | | | | |
|-----------------------------|---------------------|---------------------------------|---|---|--------------|
| | 9:00-12:00 | Registration@ Thyme Room | | | |
| | | Auditorium Room | | | |
| | 13:00-17:00 | Registration | | | |
| | 13:00-13:05 | Opening Remarks | Address from Conference Chair: Felix T. S. Chan | | |
| Apr. 26 Thursday | | 13:05-13:50 | Planning Sequential Accelerated Life Testing | Loon Ching TANG | |
| | | | 13:50-14:35 | To be confirmed George ZHANG | |
| | | | 14:35-15:20 | The Generalized Age Maintenance Policies with Random Working Times Shey-Huei SHEU | |
| | 13:05-17:00 | | 15:20-15:30 | Coffee Break | |
| | Keynote Speeches | | 15:30-16:15 | Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks Maode MA | |
| | | | 16:15-17:00 | Investigating the Interrelationship Between Stochastic Aircraft Routing of Airlines and Maintenance Staffing of Maintenance Providers Felix T.S. CHAN | |
| | | 17:00-19:00 | Group Photo & Poster & Welcome Reception@ Waterway | | |
| | | Room | Clove | Lemongrass | Thyme |
| Apr. 27 Friday | | 9:00-10:30 | Session A-1 | Session B-1 | Session C-1 |
| | | 10:30-10:40 | Coffee Break | | |
| | | 10:40-12:10 | Session A-2 | Session B-2 | Session C-2 |
| | | 12:10-13:10 | Lunch | | |
| | | 13:10-14:55 | Session A-3 | Session B-3 | Session C-3 |
| | | 14:55-15:05 | Coffee Break | | |
| | | 15:05-17:05 | Session A-4 | Session B-4 | Session C-4 |
| | | 17:05-17:10 | Break | | |
| | | 17:10-19:10 | Session A-5 | Session B-5 | Session C-5 |
| | 19:20-20:20 | Dinner | | | |
| Apr. 28 Saturday | 9:00-17:00 | Optional One Day Visit | | | |

Oral Presentation

Date: 27 Apr. 2018(Friday)

Time: 9:00-19:10

Venue: Clove Room

| Time | |
|--------------------|--|
| 9:00-10:30 | Session A-1: <i>Product Innovation and Development</i> |
| 10:30-10:40 | <i>Coffee Break</i> |
| 10:40-12:10 | Session A-2: <i>Materials and Mechanical Engineering</i> |
| 12:10-13:10 | <i>Lunch</i> |
| 13:10-14:55 | Session A-3: <i>Information Theory and Applications</i> |
| 14:55-15:05 | <i>Coffee Break</i> |
| 15:05-17:05 | Session A-4: <i>Operational Research and Layout Strategy</i> |
| 17:05-17:10 | <i>Coffee Break</i> |
| 17:10-19:10 | Session A-5: <i>Management Science and Engineering Management</i> |
| 19:20-20:20 | <i>Dinner</i> |

Note:

- * Please control each presentation time within 15 mins, including Q & A.
- * The certification of Oral presentations, will be awarded at the end of each session.
- * Best Presentation of each session is encouraged to award to student author prior.
- * Winner of Best presentation will be announced at the end of each session and awarded winner certificate over the banquet on Apr. 27.
- * To show respect to other authors, especially to encourage the student authors, we strongly suggest you attend the whole session.
- * The scheduled time for presentations might be changed due to unexpected situations, please arrive meeting room at least 10 Mins before your Session starts.
- * Session photo will be taken at the end of each session and updated online.

9:00–10:30, Friday, 27 Apr.

Session A–1: Product Innovation and Development

Venue: *Clove Room*

Chair:



N016

Time: 9:00-9:15

Estimating Diffusion of Technology Using User Perceptual Values: A Conceptual Model

Assist. Prof. Chaudry Bilal Ahmad Khan

Institute of Space Technology, Pakistan

Technology diffusion models have been used for past several years to estimate the possible diffusion of certain technological product in the market. Over the period of time, multiple diffusion models have been proposed among which Bass Diffusion Model stands prominently for technological diffusion. Along with the technology diffusion models, the technology acceptance models have also been proposed. Technology acceptance models study the acceptance of any technological product by measuring the perception and belief system. This study takes the support of diffusion theory and belief system theory to propose a conceptual model to estimate the diffusion based on the perception and the belief structure.

N189

Time: 9:15-9:30

Wristwatch Development Based on Kansei Engineering

Dr. Imam Djati Widodo, Heavy Zerry Novibrilliawan

Universitas Islam Indonesia, Indonesia

Customer is the main goal for new product development projects, so the success in understanding and implementing customer needs will ensure to product success. Affective product design aims to incorporate customer's affective needs into design variables of a new product so as to optimize customers' affective satisfaction. This paper tries to show how to discover customer's affective needs and develop product specification through Kansei Engineering methodology through identifying wristwatch specification based on customer need. To reach the purpose, focus group discussion was run to identify product attributes and parameters. Five Kansei words and their combinations were analyzed. Kansei words applied were strong, fit size, comfortable, safe, and multifunction. Semantic differential was applied to explore customer needs. Then, conjoint analysis was applied to analyze relation between customer needs and design attributes and parameters. A database was applied to simplify the customers to choose desired wristwatch specification.



N3026

Time: 9:30-9:45

Innovative product development of fabric glass interlayer

Ms. Ploynaplus Thanasiritham, Natcha Thawesaengskulthai and Prasert Akkharaprathomphong

Department of Industrial Engineering Faculty of Engineering, Chulalongkorn University
Bangkok, Thailand

A glass manufacturer in Thailand developed the laminated fabric glass as innovative product in 2013 but sales had declined in 2016. Customer's survey shows that the satisfaction level decreased due to long production lead time, high-selling price and long installation time. This paper aims to develop a new innovative fabric glass interlayer product by adopting 5D innovation development process. 5D consists of Discover, Define, Design, Develop and Deploy. Firstly, discover phase adopted Five Forces Analysis, Customer Behavior Analysis and Customers Satisfaction Survey for specifying market position and seeking the hidden customers' expectations. Define is to summarize the project charter as initiation step in the project management and to scope resources and timeframe. Design, we adopted the integration of QFD, Kano Model and Product Quality Index for prioritizing and translating customer expectations to product specifications. Then all concepts were concluded by Pugh Matrix, Weighted Sum Score and confirmed the selected concept by financial feasibility study. Develop process is to prototyping to verify the production before scale up. Finally, generated the risk assessment plan by FMEA and contributed the business plan to ensure the effective commercialization in Deploy. The developed fabric glass interlayer shows higher customer satisfaction level by shorten production lead time from 14 days to 8 days (42.85%), lower price from 790 baht/ft² to 485 baht/ft²(38.61%) and shorten installation time from 180 minutes to 45 minutes (75%).



N183

Time: 9:45-10:00

A Framework for Analyzing and Developing Dashboard Templates for Small and Medium Enterprises

Dr. Wasinee Noonpakdee, Thitiporn Khunkornsiri, Acharaphun Phothichai, and Kriangsak Danaisawat
College of Innovation, Thammasat University, Thailand

This research proposes a framework for analyzing and developing dashboard templates for small and medium enterprises (SMEs) in order to analyze and visualize data effectively. The research focuses on sale templates because sale is a basic and significant function, and the implementation would be easy for SME users to understand. According to the analysis, the framework comprises four main components which are event/business operation, attribute list, visualization, and dashboard capabilities. The templates are employed by 40 SMEs for 6-9 months. The evaluation of the templates and possible improvement are studied together with benefits and challenges.



N3024

Time: 10:00-10:15

Loss time reduction for improve Overall Equipment Effectiveness (OEE)

Mr. Kamolchanok Krachangchan, Natcha Thawesaengskulthai
Department of Industrial Engineering, Faculty of Engineering, Chulalongkorn University
Bangkok, Thailand

A Tobacco industry was facing some problem due to breakdowns, equipment defects and poor working condition. During August 2016 to July 2017. The average OEE is 66%. The OEE performance indicator focusing on Availability rate is 89%, Performance rate is 75% and Quality rate is 99%. This is due to the lack of performance rate and this number is declining. The purpose of this paper is to reduce loss time in Tobacco industry and improve performance rate as well as to enhance the Overall Equipment Effectiveness (OEE) through the implementation of Total Productive Maintenance (TPM) and RCM

(Reliability Centered Maintenance) by using Failure Modes and Effects Analysis (FMEA). After implementation, the performance rate has increased from 75% to 79% which also enhance OEE from 66% to 72%



N118-A

Time: 10:15-10:30

The Use of ARIMA Model for Auto Parts Demand Forecasting and Analysis

Calvin Yu, **Ms. Hsiu-Ju Tsao**

Ming Chi University of Technology, Taiwan

Sales prediction is a very important component of any business plan and has been widely applied in many fields such as supply chain management. If a company has the capability to better forecast the sales quantities of a product, it will be in a more favorable position for manufacturing and inventory optimization across multiple time periods. Autoregressive integrated moving average (ARIMA) models have been explored in literature for time series prediction. In this paper, an extensive process of building auto parts predictive model using the ARIMA model is presented. The data used to develop auto parts predictive model is obtained from an automotive spare parts manufacturing company in Taiwan. Results indicate that the ARIMA model has a strong potential for short-term prediction and can also be used to determine the life cycle of the products.

Coffee Break

10:30-10:40

10:40–12:10, Friday, 27 Apr.

Session A–2: Materials and Mechanical Engineering

Venue: *Clove Room*

Chair:



N170

Time: 10:40-10:55

Experiment of Induction Heating Application for Heating Multilayer Metallic Hollow Altered Cylinder

Dr. Thanaset Thosdeekoraphat, Jakkarin Srituvanont, Samran Santalunai and Chanchai Thongsopa
Suranaree University of Technology, Thailand

This paper is focused on an experiment about the output load of heating induction during heat exchange. Reference was taken from the experiment of Keeratidech Thepsatitsilp and his further research found out the appropriate forms for output load have multilayer metallic hollow cylinder can make the outermost layer have more heat than the other layers next to it. These other layers are not commonly hot as observed during this experiment. The supply pattern in the experiment on output load reveals that the outermost layer will hot most. We used materials like zinc alike and pattern of output load and they look very similar to the original model. The results of the experiment found out the outermost load layer will be the hottest and the heat will decrease respectively when getting to the next layers. Also the dimensions width and space of opening on the slide in output load will produce heat which will also affects the inner layer.



N126

Time: 10:55-11:10

Evaluation of Thermal Comfort Room Garment Workshop in Textile Vocational School

Ms. Anastasia Febiyani, Bambang Suhardi, Eko Pujiyanto
Sebelas Maret University, Surakarta, Indonesia

Vocational school is an education provider where students can learn and operate machines. Students in the room feel uncomfortable because of heat from machines and equipment. In addition to heat from machines, inadequate room capacity makes students less comfortable while studying. The research was conducted in the textile vocational school garment workshop room which measured in afternoon. The focus in this paper is to evaluate thermal comfort based on student perceptions, temperature measurements, and humidity. Based on the initial data collection results, obtained room temperature more than 30 °C. The results obtained can be seen that the room does not meet the thermal comfort standards set by SNI so that it needs to be improved in order to minimize the heat pressure on the user of the classroom. In addition, the results obtained measurements of the level of user dissatisfaction is large enough in the user class. Thermal perception data collection obtained a mean value of a total of 0.45 in first day and 0.3 in second day, which means that the conditions felt by students tend to warm. The students as the room user want a more comfortable condition from the current condition. Improvements are made by using a cooling load derived from the air conditioner because the airflow rate required to discharge heat from inside to outside the room is too high and has exceeded the specified standard



N099

Time: 11:10-11:25

Micro-fabrication method of Au micro-wire structures on substrate by chemical printing and peeling process

Dr. Potejana Potejanasak

School of Engineering, University of Phayao, Thailand

In this paper, a newly developed manufacturing process of metallic micro structure arrays on a substrate is reported. This process comprises of chemical treating, sputter coating and peeling techniques. Firstly in this process, a silicon wafer mother mold of micro patterns is prepared by photolithography and dry etching technique and its micro patterns is transferred to a polymer film by hot embossing method. Then, a quartz glass is cleaned in the acetone bath and then by sputter etching before stamping process. A polymer film mold, whose surface has been patterned with the micro line structure arrays, is used to transfer directly of acetone molecular patterns onto the etched surface of quartz glass substrate. Then a substrate is coated with a gold film by the DC sputter coating method. Effect of the remarkable of acetone micro patterned to the adhesion behavior of gold film on a substrate is study experimentally. Finally, peeling technique by the vibration hot dipping technique is study. As a result, the metal films on the acetone stamped lines are removed by vibration hot dipping process, and micro-wire structure arrays are remained on the substrate. This is because of chemical stamp is effective to reduce surface energy of the substrate, and also reduce the adhesion between the Au film and substrate. Feasibility of the proposed process is confirmed by experimental study, and efficiency of the process is discussed.



N050

Time: 11:25-11:40

The structural design of 3D print head and execution of printing via the robotic arm ABB IRB 140

Dr. Martin Pollák, J. Třáček, J. Zajac, M. Kočíško and M. Telišková

Technical University of Kosice, Slovakia

At present, 3D printing is considered as a new phenomenon of the 21st century. 3D printing is an additive manufacturing technology which can create a physical model of layering material based on electronic data. It is a fast and efficient technology that uses real physical imaging of the exact dimensions of prototype models produced by the gradual application and curing layers of material in the form of foils, powders, wire coils, and the like. The current trend is the continuous development of 3D printing technology in the form of experimentation by using new types of materials and the development of new, specially designed 3D printers and devices that lead to progress in modeling in several areas of industry. By combining several advanced means of technology into one unit an interesting idea to create a device to print larger and more complex shapes of parts may arise. The article describes the design of a 3D print head working with the ABB IRB 140 robotic arm with goal to design a device which is able to print larger objects in size compared to conventional 3D printer.



N104-A

Time: 11:40-11:55

Effects of size and elongation of paired goblets on volume perceptions when viewing at various angles

Ms. Yi-Chien Lee and Yi-Lang Chen
Ming Chi University of Technology, Taiwan

Optical illusion is an interesting topic. For example, when considering two straight lines with identical length (one vertical line and one horizontal line), the vertical line appears longer than the horizontal line (the horizontal-vertical illusion). Although the optical illusions are noteworthy, they are only for academic research on psychological operations and are of little practical value. Recently, many investigators have begun applying human optical illusions to real-world settings. Since the problem of alcohol abuse was worsening, studies investigated the bias in volume perception of containers and primarily focused on the traditional straight tumblers with relatively regular shape; however, little focused on the goblet. This study therefore examined how goblets characteristics influenced the perception of volume at different viewing angles. At four viewing angles (0, 30, 60, and 90 degrees), 50 participants poured a certain amount of liquid (100 or 200 mL) into a designated goblet according to their perception. Two goblet characteristics were individually examined, namely, size (large vs. small) and elongation (tall-slender vs. short-wide). The results showed that two groups of goblets caused significant differences on volume perceptions. No matter in which viewing angle the poured volume of large goblet was all significantly higher than the required volume, which difference between them at 90 degrees was nearly 30%. The volume perceptions of small goblet at 0 and 30 degrees were relatively accurate. Participants tended to pour more juices into the tall-slender goblet than short-wide goblet. It seemed that participants were prone to underestimating the volumes of goblets, except for the small one. These findings suggested that the goblet should be cautiously used to avoid over-drinking.



N037

Time: 11:55-12:10

Investigation of the behavior of the fluid of a micro hydroelectric gravitational vortex, by means of the computational dynamics of high performance fluids, for the generation of electric power

Prof. Sánchez Ocaña Wilson, Haro Valladares Jonathan, Sanaguano Jiménez Edison, Salazar Jácome Elizabeth
Universidad de las Fuerzas Armadas ESPE, Ecuador

The demand for energy is increasing, especially in developing countries. Renewable energies such as hydroelectric power, has become one of the most demanded energy sources for its generation, that is why it was studied and analyzed, through the computational dynamics of fluids "CFD" in the software ANSYS, the flow of a micro vortex gravitational hydroelectric power station for the generation of electric power. This study analyzes a structure that, by its design, has the capacity to form a gravitational vortex current from a water flow with a small difference in height. To verify results, a prototype of the system is built, which will generate energy from the formation of the gravitational vortex

Lunch

12:10-13:10

13:10–14:55, Friday, 27 Apr.

Session A–3: Information Theory and Applications

Venue: *Clove Room*

Chair:



N069

Time: 13:10-13:25

Artificial Neural Network Approach for Technology Life Cycle Construction Based on Patent Data

Mr. Muhammad Hanif Ramadhan, Vialli Ibrahim Malik, Teddy Sjafrizal
Telkom University, Indonesia

Technology development and its future trends are essential for decision making consideration to decide on the appropriate technology investment. Constructing Technology Life Cycle (TLC) allows stakeholders to identify technology trends in the future. Therefore, the forecasting approaches play a key role to obtain right decision making since there is need forecasting result with high accuracy and less computational time required. This study aims to construct TLC approach based on artificial intelligence to overcome these problems. This approach was developed through Artificial Neural Network (ANN) that has intelligent capability to define the technology performance towards patent analysis for forecasting and fitting the TLC phases. This study also employed the analysis of numerical gradient to strengthen the forecasting result. The potential of the proposed approach has been demonstrated by cordless telephone patent data as the worldwide tools to obtain up-to-date technology information. The findings can contribute to a better understanding of constructing TLC through intelligence approach that supported by numerical gradient analysis. The implication of this study is possibility that the model can be applied to the diverse technologies for facilitating to make proper technology investment decision.



N085-A

Time: 13:25-13:40

Systematic and Objective Evaluation of Ideas in Innovation Processes

Prof. Yeh-Chun Juan, Ms. Chun-Yu Fan
Ming Chi University of Technology, Taiwan

In a rapidly changing market, innovation is an important element for companies to enhance their competitiveness. In the recent years, many innovation methods have been proposed, such as Double Diamond Design Process (4Ds), User eXperience Innovation Design (UXID) and Service Experience Engineering (SEE), etc. Every innovation methods has different ways of working, but there are two commonalities, ‘divergent thinking’ and ‘convergent thinking’, in their creative process. Divergent thinking first creates a lot of possible ideas. Convergent thinking then refines and narrows these ideas down to the best solution. However, in practice, a very subjective approach, voting, is usually adopted by innovation teams in the convergent stage of an innovation process to choose the best one from the possible ideas. This can result in a wrong selection. Consequently, this study will propose a systematic and objective approach to assist innovation teams in evaluating the possible ideas for successful innovation. An example is used to illustrate the procedure and validate the feasibility



of the proposed approach.

N086-A

Time: 13:40-13:55

Association Analysis of Elderly Blood Glucose Using Health Examination Data

Prof. Yeh-Chun Juan, Mr. Yun-Ren Huang

Ming Chi University of Technology, Taiwan

Diabetes has been one of the top five causes of death in Taiwan. High blood glucose, one of the main symptoms of diabetes, happens when the body has too little insulin or when the body can't use insulin properly. The rising prevalence of diabetes across the globe, particularly in the elderly, warns that monitoring and controlling blood glucose level is important for elderly health. High blood glucose can be measured via the HbA1c test. However, the elderly seldom monitor their blood glucose level at home, but always do it in the health examination at hospital. This study attempted to discover the association rules of elderly blood glucose levels from their health examination data. First, the elderly health examination data was collected. Then, Predictive Apriori (PA) algorithm was used to identify the significant association rules of elderly high blood glucose from health examination data. Finally, the risk factors and complications of high blood glucose were confirmed from the identified association rules by discussing with physicians. With these association rules, physicians and the elderly can obtain additional references for high blood glucose diagnosis and pay more attention to related causes and complications of high blood glucose.



N117

Time: 13:55-14:10

A Systematic Literature Review on Knowledge Sharing for Innovation: Empirical Study Approach

Assoc. Prof. Augustina Asih Rumanti, TMA Ari Samadhi, Iwan Inrawan

Wiratmadja, Indryati Sunaryo

Telkom University Bandung, Indonesia

In an organization knowledge sharing is needed in an effort to innovate. Knowledge sharing process required an enabler that will help the process. We know that today knowledge is one of the main factors in generating innovation, so this research aims to provide information, description and more comprehensively identifies the enablers of knowledge sharing and the relationship between knowledge sharing and innovation by using empirical literature review. Some steps need to be done to conduct a systematic and comprehensive literature review. In this research, the stages are Identification of potential study, Study Selection based on criteria, Quality assessment, Data Extraction, and Data analysis. Based on the literature review systematically compiled it is obtained 15 main articles that correspond to the purpose of research. From these 15 articles can be identified various enablers that are important in knowledge sharing, the type of innovation, as well as the relationship between knowledge sharing and innovation.



N131

Time: 14:10-14:25

The Analysis of Matching Learners in Pair Programming using K-means

Ms. Naladtaporn Aottiwerch and Urachart Kokaew

Khon Kaen University, Thailand

Programming is one of the educational fields that people of digital era have been taking a particular interest in. However, there has still been a shortage of programmer in the labor market as the majority of the graduates were relatively under par. This can be solved by accelerating the educational development to ensure learners are equipped with better quality. For the addressed problem, this study developed a matching system for pair programming. Pair programming theory believes that when an expert is paired with a beginner, it accelerates the beginner to progress more efficiently as oppose to coding alone. Nonetheless, the theory did not address the issue of programmer behavior, which is another important aspect in programming. Therefore, the study additionally employed k-means clustering to create a new cluster of programmers based on their common behaviors. This involved variables like programming competency (represented by A), learning behavior (represented by B), and behavioral interoperability (represented by C). The study employed a questionnaire based on a basic programmer test, the Learning and Study Strategies Inventory theory, and the Seven Synergistic Behaviors of Pair Programming theory. The analyzed data comprised 100 students from the Department of Computer Science. Grouping was done in four of the following categories (with sum square error of 8.92): 1) Those with high scores of A, B and C; 2) Those with high A scores, but with low B and C scores; 3) Those with low A scores but with high B and C scores; and 4) Those with low scores of A, B and C. Matching was conducted involving 10 matching patterns and the match with the fastest development of programming competency were group 1 matched with group 3. To reveal the pair analysis, the derived results were used to developed an online matching algorithm so that programming students could optimally pair with better learning speed.



N163

Time: 14:25-14:40

Belief Representation of Design Mental Model Based on Design Rationale

Ms. Chen Ying, Jing Shikai, Wang Yedong and Cheng Dada
Beijing Institute of Technology, China

Ignoring the designers' belief in the collaborative design process will lead to imperfect characterization of design information, and affect information sharing of collaborative designs, thus make the design inefficient. In order to solve this problem, this paper presents a belief representation method of designing a mental model based on Design Rationale. First, through the logic narration of designers, on the basis of the DR model, the knowledge semantic network is constructed based on the Bayesian Network. Then, the causality in the Bayesian Network is obtained by means of node conversion. Finally, the belief in designing mental models is calculated by reusing the design rationality for parameter learning. An example of cantilever beam structure design is used to verify the accuracy and effectiveness of the proposed method.



N177

Time: 14:40-14:55

The differences of individual spatial strategy on their solving performance

Ms. Sakulporn Pornpanom and Arisara Jiamsanguanwong
Chulalongkorn University, Thailand

Spatial ability has numerous definitions such as the ability to perceive and perform manipulation on perception accurately. While majority of researches in this area have been focusing on the development of the training materials despite a concern of human

factor as their cognitive strategy for solving spatial problems. Thus, the purpose of this study is to investigate the differences of individual spatial strategy on their spatial solving performance. Two-hundred-eighty-seven first-year Thai engineering student participated in this study. The results revealed the validity of individual spatial strategy and showed that people with analytic spatial strategy had the significantly lower performance in spatial solving than those with holistic and intermediate strategy. This study has the implication on the training process and materials that suit with the thought process of people to enhance the effectiveness and efficiency of the training. Discussion and future work were provided.

Coffee Break

14:55-15:05

15:05–17:05, Friday, 27 Apr.

Session A–4: Operational Research and Layout Strategy

Venue: *Clove Room*

Chair: Prof. M. I. M. Wahab (*Ryerson University, Canada*)



N039

Time: 15:05-15:20

Solar Concentrator Layout Optimization: Metaheuristic Method Solution

Mr. Le Duc Dao, Kung-Jeng Wang

National Taiwan University of Science and Technology, Taiwan

Solar energy is a potential project because it not only protects the environment, but also reserves the power for people to use in their daily life such as heating or lighting. This paper focuses on the natural sunlight saving system named solar concentrator layout. In our paper, we aim to bring the optimal profit for the firm when implementing the solar layout as well as helping a house get as much sunlight efficiency as possible for their using. We also consider some factors such as light reflection and light transmission loss to make the model more reliable. As for the economic scale, some constraints are added to make our study close to reality, such as the thickness of concentrator or the number of exits where a sunbeam is delivered to the main panel to enable energy transmission. To obtain a high brightness for the house, the firm would harm their profit. This study makes the balance between the conflict objectives to get a compromised solution. Finally, parallel-computing based genetic algorithm is introduced to accelerate the solution quality. To summarize, the result of our study will be the best strategy for the light efficiency to supply people and the profits that the firm earns for the job.



N045

Time: 15:20-15:35

Customer Kansei-Oriented Restaurant Location Evaluation Using Kansei Engineering

Assoc. Prof. Yu-Hsiang Hsiao, Guan-Ting Chen

National Taipei University, Taiwan

Location is one of the most critical factors in the long-term success of a restaurant. Location selection is a multicriteria decision problem primarily focused on creating maximum operational efficiency and profit for operators. However, the efficiency and profit-oriented operational objective is not the only option for current businesses, which instead can investigate whether a unique personalized atmosphere can be developed to meet customer needs based on affective perception. This study applied a Kansei Engineering-based approach to explore customer perspectives regarding location evaluation for personalized restaurants.



N062

Time: 15:35-15:50

Joint Optimization of Inventory and Preventive Maintenance: Systematic Literature Review and Research Agenda

Mr. Prafajar Suksessanno Muttaqin, Dida Diah Damayanti

Telkom University, Indonesia

Recently, integration between activities in operational areas has more attention to improve and optimize in supply chain management. Joint optimization of inventory and maintenance are one of important activities in achieve operational excellence. Good spare part inventory management aims to minimize buffer time between supply time and demand needs in maintenance activities and operational activities by increasing availability of spare parts at the time required. The authors only focusing on joint spare parts inventory and preventive maintenance. This paper uses sytematic literature review (SLR) as a methodology in reviewing literature. This paper will classified of each research on primary studies by objective function, decision variables, variables, and methods. From the literature review results it is known that joint optimization of spare parts inventory and preventive maintenance can be explored further on multi echelon networks and considering several factors such as deterioration and obsolence, moreover some papers doing integrated calculations simultaneously not sequential or separately.



N056

Time: 15:50-16:05

An Adjustment Method for Material Inventory Control Decision
Considered in Product Life Cycle

Assoc. Prof. Jiun-Shiung Lin, Jen-Huei Chang and Si-yan Yang
Ming Chi Univ. of Tech. , Taiwan

Corporate operation mainly targets at satisfying the needs of customers by providing products valuable for them. At different stages, product life cycle places different requirements upon the quantity of products. Product is made up of multiple types of materials, many of which must be procured or ordered from suppliers. To shorten the lead time and lower inventory control cost, enterprises have to make suitable decisions on inventory control methods. In the past, there were many inventory control methods developed, including fixed-order quantity method and contract buying method. However, there was little research discussing the adoption of suitable inventory control methods at different stages of product life cycle to cater to the changing demand quantities of customers. Therefore, the main purpose of this research lies in exploring the adjustment of material inventory control methods considering the different stages of product life cycle to be applied into practice in procurement, so as to shorten lead time and lower inventory control cost, and ultimately avoid occurrence of abnormal situations like scrap material, inactive material or suspension for shortage of materials. In addition, this research is also expected to provide reference for practice field.



N077

Time: 16:05-16:20

Decision Support System for Inventory Control of Raw Material (Case Study: PT Suwarni Agro Mandiri Plant Pariaman, Indonesia)

Ms. Difana Meilani, Dicky Fatrias, Amelia Andiningtias
Andalas University, Indonesia

PT Suwarni Agro Mandiri Plant Pariaman is a company which produces fertilizer. This company has a problem related to raw material inventory. The inventory can be overstock or stock out. It is due to their working which is not guided by an information system. Therefore, this research proposes a decision support system for controlling the inventory of the raw material. The system uses Material Requirement Planning (MRP) approach and is designed in three sub-systems. They are OLTP database for managing the daily activities, MRP for determining the lot size and the raw material ordering time, and OLAP with data warehouse for analyzing the raw material data.



N139-A

Time: 16:20-16:35

Overall Area Efficiency

Liew Kee Min Raymond, **Mr. Lieu Sip Khean**
Infineon Technologies Asia Pacific Pte Ltd, Singapore

Area is the key element in layout planning. Area ratio discussed in facility planning text book mainly focused on proportioning for calculating area requirement or forecasting future needs. Calculated ratio typically associated with general building standard area and not on production. This paper develops the classification for a systematic analysis of overall factory area performance. This new methodology called Overall Area Efficiency provides an OEE like classification that enables performance measurement on the production area, track improvement in area efficiency within the facility and offers benchmarking between similar production sites.

N190

Time: 16:35-16:50

Integration AHP and TOPSIS in Shipyard Location Selection

Dr. Imam Djati Widodo, Ali Parkhan and Aldrin Daeng Vatimbing,
Universitas Islam Indonesia, Indonesia

In determining the location of the shipyard, we must consider the factors that may significantly affect the sustainability of the company. With proper decision in selecting location, the operation process of shipyard will be effective and efficient. This research was conducted to help decision makers in analyzing the most potential location as the shipyard location by using integration of Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). Sensitivity analysis was also conducted to find out how big the main criteria weight changes can make the decision of the most potential for shipyard location changed. Case study in the selection of shipyard location at PT. Yasa Wahana Tirta Samudera was featured in this study. The most potential location outcome has been determined with some notes from the sensitivity analysis results.



N3002

Time: 16:50-17:05

The jointreplenishment problem with resource restriction: A note

Prof. M. I. M. Wahab and Y. Chen
Ryerson University, Canada

We first revisit the joint replenishment problem (JRP) investigated by Moon and Cha (European Journal of Operational Research, 173 (2006) 190–198) and we point out that defining the same amount budget for each cycle is vague and leads to an overestimated budget for the JRP. We then generalize the JRP with different budgets for different cycles. Finally, we present a genetic algorithm to solve the revised JRP. We also present a numerical study and show the advantage of the revised model.

Break

17:05-17:10

17:10–19:05, Friday, 27 Apr.

Session A–5: Management Science and Engineering Management

Venue: *Clove Room*

Chair: Assoc. Prof. Hamdi Bashir (*University of Sharjah, UAE*)



N029

Time: 17:10-17:25

Analyzing Interdependencies in a Project Portfolio Using Social Network Analysis Metrics

Helal Al Zaabi, **Assoc. Prof. Hamdi Bashir**
University of Sharjah, UAE

As an extension to a previous study on the use of network mapping as a tool for visual representation of interdependencies in a project portfolio, this study employs five social network metrics (density, centralization, betweenness centrality, in-degree centrality, and out-degree centrality) for analyzing interdependencies within a project portfolio. Based on the in-degree and out-degree centrality values, projects can be classified, in terms of their interdependencies, as being: autonomous, dependent, linkage, or independent projects. An example is presented of a portfolio comprising 18 projects.



N049

Time: 17:25-17:40

Towards a Decision Support Approach for Selecting Physical Objects in Collaborative Supply Chain Processes for Cyber Physical System-Transformation

Mr. Endric Hettterscheid, Florian Schlüter
Graduate School of Logistics, Germany

Facing the challenge of a flexible supply chain, the importance of Cyber Physical Systems has increased. Due to their ability to collaborate via open and global information networks they can support complex planning and control tasks in a supply chain. In this context, a large number of physical objects for potential transformation into Cyber Physical Systems exist. However, due to high implementation costs, companies are hesitant to integrate new systems in their supply chain. A method is needed to support the decision making process for selecting physical objects in order to transform them into Cyber Physical Systems. This paper presents a decision support approach based on a framework with five criteria. Its applicability is presented in a use case of a German steel producer.



N092-A

Time: 17:40-17:55

Cost Minimizing Project Critical Path

Chiu-Chi Wei, **Mr. Wei-Chieh Lu**
Chung Hua University, Taiwan

In the face of the current competitive market environment, many enterprises gradually realized that the project management methodology can improve their overall business efficiency and systematically solve critical problems. Because project management

enables enterprises to effectively control the project cost, risk and time required. Traditionally, project schedule management is mainly based on the duration, and the existing literatures do not mention the critical path of project cost. In fact, project cost plays a vital role in achieving project objective. This study intends to develop a mathematical model to explore how project value can be increased when activity costs are taken into account and decreased via methods such as value analysis. The model is validated using a simulated case and solved by Lingo software. The results indicate that, when considering project costs, the project can be managed in a more precise way, therefore, the success rate of achieving project objective can be greatly improved.



N168

Time: 17:55-18:10

An Experimental Study to Investigate Personality Traits on Pair Programming Efficiency in Extreme Programming

Ramlall Poonam, **Dr. Chuttur M. Yasser**
University of Mauritius, Mauritius

Human Factors should not be overlooked in software development project planning. While much emphasis is often laid on technical aspects of projects, attention is rarely given to the influence of team members' personality on project success. This study investigates the effects of personality traits on the efficiency of pair programming when programmers are at the same location compared to being at different locations. The personality test model used is the Myer-Briggs Indicator Type which comprises of four traits, namely: extraversion/ introversion, sensing/intuition, thinking/feeling and judging/perceiving. A series of experiments was conducted and preliminary findings indicate that depending on location, personality traits can have an effect on programmers' efficiency. Results presented in this paper are expected to inform project managers in planning for successful software development projects, which require pair programming.



N175

Time: 18:10-18:25

Success determinants to Product Lifecycle Management (PLM) Performance

Ms. Shikha Singh, Subhas Chandra Misra
Indian Institute of Technology (IIT) Kanpur, India.

Product Lifecycle Management (PLM) is a current need for companies to be competitive in the global market. PLM became a necessity to work collaboratively with least time and cost for the best quality production. PLM offerings are not only limited to 3D designing and visualization but also extended to data management, digitization, and virtual manufacturing. PLM is a management approach which manages the related product information in each phase of the product's lifecycle. Various companies and systems suppliers consider PLM as software systems only while it is a broad business management concept. Due to this ambiguity, most companies fail to understand and implement it properly. PLM is actually a concept which is backed up by PLM systems as the product related data is so enormous which needs technological support to manage. Implementation of PLM systems is complementary to institutionalization of the PLM concept. Hence, present study reviews success factors to PLM performance and empirically analyzes causal success factors. This work will be helpful to the managers in industries to utilize this unique approach to manage their products.



N2009

Time: 18:25-18:40

Business Process Reengineering for the Saline Management in Hospitals

Mr. Sith Vilasdechanon, Apichat Sopadang
Chiang Mai University, CMU, Thailand

In present logistics knowledge can apply to every business, that includes healthcare business too. In this research analysed saline-management in Maharaj Nakorn Chiang Mai Hospital. Used integration definition for function modelling (IDEF0) to present saline management process. Analysed all the activities occurring within the saline warehouse is possible. Subsequently, applying value stream analysis (VSA) to eliminate unnecessary non-value-added (NVA) waste for the saline management. After assessment of current status and eliminate unnecessary NVA waste, a future state of saline management was drawn by using IDEF0



N194

Time: 18:40-18:55

Company Performance Measurement for Automobile Companies: a Composite Indicator from an Environmental Perspective

Ms. Qinqin Zeng, Wouter W.A.Beelaerts van Blokland, Sicco C. Santema and Gabriel Lodewijks
Delft University of Technology, the Netherlands

Current research in the field of performance measurement hasn't presented a rigorous composite indicator for quantifying company performance, with environmental indicators for automobile companies. This paper aims to construct this missing composite indicator. A new approach is developed, including techniques of fuzzy logic, analytic network process, the entropy theory and a geometric mean with unequal weights. The method is transparent, and the composite indicator derived can serve as a statistical tool for benchmarking. A case study is conducted in six leading automobile companies with data from the fiscal year 2016.



N091-A

Time: 18:55-19:10

Optimizing Line Balancing and Operator Allocation Problem in Multiple Assembly Cell Systems

Yiyo Kuo, **Mr. Yu Cheng Wang**
Ming Chi University of Technology, Taiwan

In labor-intensive industries, appropriate manpower assignments can reduce costs and increase productivity. The purpose of this research is to solve the problem of manpower assignment for parallel assembly cells, in which the maximal number of operators available for each cell is less than the number of assembly tasks. A two-phase methodology for optimizing the manpower assignment was proposed. In the first phase, an integer programming that takes precedence relationships of assembly task into consideration was proposed to generate alternative configuration. The mathematical model aims to balance the workload of operators. Therefore, multiple tasks assigned to one operator and one task assigned to multiple operators are both allowed. In the second phase, we adopted an integer programming proposed by Sür

(1998) to minimize the total manpower requirements based on the results of the first phase. When given the product mixes, it can optimize the manpower allocation with lot-splitting. Finally, we used the proposed method in a bicycle assembly plant, the results proved that this method is applicable. Experimental results show that it can balance the cell loading and save manpower effectively.

Dinner

19:20-20:20

Date: 27 Apr. 2018(Friday)

Time: 9:00-19:10

Venue: Lemongrass Room

| | |
|--------------------|---|
| Time | |
| 9:00-10:30 | Session B-1: <i>Fault Detection and Maintenance</i> |
| 10:30-10:40 | <i>Coffee Break</i> |
| 10:40-12:10 | Session B-2: <i>Supply Chain Management</i> |
| 12:10-13:10 | <i>Lunch</i> |
| 13:10-14:55 | Session B-3: <i>Transportation and Dispatch</i> |
| 14:55-15:05 | <i>Coffee Break</i> |
| 15:05-17:05 | Session B-4: <i>E-commerce and Service Science</i> |
| 17:05-17:10 | <i>Coffee Break</i> |
| 17:10-19:10 | Session B-5: <i>Information System Design and Management</i> |
| 19:20-20:20 | <i>Dinner</i> |

Note:

- * Please control each presentation time within 15 mins, including Q & A.
- * The certification of Oral presentations, will be awarded at the end of each session.
- * Best Presentation of each session is encouraged to award to student author prior.
- * Winner of Best presentation will be announced at the end of each session and awarded winner certificate over the banquet on Apr. 27.
- * To show respect to other authors, especially to encourage the student authors, we strongly suggest you attend the whole session.
- * The scheduled time for presentations might be changed due to unexpected situations, please arrive meeting room at least 10 Mins before your Session starts.
- * Session photo will be taken at the end of each session and updated online.

9:00–10:30, Friday, 27 Apr.

Session B–1: Fault Detection and Maintenance

Venue: *Lemongrass Room*

Chair: Prof. Indrajit Mukherjee (*Indian Institute of Technology Bombay, India*)

N015



Time: 9:00-9:15

A Research Study on Unsupervised Machine Learning Algorithms for Early Fault Detection in Predictive Maintenance

Dr. Tarun Gupta and Nagdev Amruthnath
Western Michigan University, USA

The area of predictive maintenance has taken a lot of prominence in the last couple of years due to various reasons. With new algorithms and methodologies growing across different learning methods, it has remained a challenge for industries to adopt which method is fit, robust and provide most accurate detection. Fault detection is one of the critical components of predictive maintenance; it is very much needed for industries to detect faults early and accurately. In a production environment, to minimize the cost of maintenance, sometimes it is required to build a model with minimal or no historical data. In such cases, unsupervised learning would be a better option model building. In this paper, we have chosen a simple vibration data collected from an exhaust fan, and have fit different unsupervised learning algorithms such as PCA T2 statistic, Hierarchical clustering, K-Means, Fuzzy C-Means clustering and model-based clustering to test its accuracy, performance, and robustness. In the end, we have proposed a methodology to benchmark different algorithms and choosing the final model.

N032-A



Time: 9:15-9:30

Evaluation of Driving Behavior Using Vehicle On-Board Diagnostic System

Chien-Chih Wang, **Ms. Tzu-Ying, Ho**
Ming Chi University of Technology, Taiwan

Auto manufacturers based on safety considerations, they will use the onboard diagnostic system (OBD) to understand the status of car failure. When the system detects the car is an abnormal function, it will issue a warning to inform the driver that his car needs maintenance. The maintenance personnel will also OBD system to retrieve error code message for support. Sometimes the cause of a car malfunction is because of human-induced improper operation rather than the aging of the part. In this study, we use data mining technology to find out which of the many variables of the second-generation vehicle diagnostic system (OBDII) are related to driving behavior and model to predict the driving behavior. Using the research team of the Ming Chi University of Technology collected data as an example to carry out empirical. The results show that car speed, fuel consumption, and braking intervals are critical factors of driving behavior. The future will be developing the driving ability indicators in the driver's appointment mechanism.



N087-A

Time: 9:30-9:45

Genetic algorithms shorten overall repair time in motor repair industry

Heng Ma and **Mr. Po-Yuan Hisao**
Chung Hua University, Taiwan

This study aimed to investigate the effects of glove thickness, hand length and body mass index on grip strength. Thirty-six participations between the age of 20 and 27 were sampled equally from three hand length (ranged between 14.24 and 19.04 cm) strata, and grouped into slim, medium and obese figure types by their body mass index (BMI) ranged between 15.5 and 44.6 kg/m². The grip strengths of dominant hand of these participations were measured bare-handed, wearing gloves 500, 1000, 2000 and 4000 μm thick using T.K.K.5101 grip dynamometer manufactured by Takei Scientific Instruments Co., Ltd. The results of three factors analysis of variance showed significant effects of glove thickness, hand length, BMI and hand length-BMI interaction. The post hoc glove thickness effect analysis indicated that the mean grip strength of 4000 μm glove wearing significantly lower than that of bare-handed. The mean grip strength differences between the other glove thickness wearing and bare-handed were insignificant. The results of pair comparison of hand length-BMI interaction effect indicated that for slim group, only the difference between long and medium hand length subgroups was not significant. For obese group, only the difference between long and short hand length subgroups was significant. As for medium figure type group, the differences of all pairs of three hand length subgroups were all significant. Reviewing literature, the investigations of hand length-BMI interaction effect on grip strength were rare; and the results of this study about glove thickness effect on grip strength were roughly consistent with, yet some specifics need further discussions.



N136

Time: 9:45-10:00

Modelling the barriers for mass adoption of electric vehicles in Indian automotive sector: An interpretive structural modeling (ISM) approach

Dr. Surya Prakash, Maheshwar Dwivedy, Sameer Sharma Poudel, Dilesh Raj Shrestha
BML Munjal University, Gurugram, Haryana, India

The use of electric vehicles (EVs) as a means of sustainable transportation is being discussed worldwide. The Indian government has also reacted to this with commendable effort to accelerate the rate of diffusion of EVs in Indian automotive sector. However, many hurdles should be dealt with for wider and easy adoption of EVs in India. This article identifies a set of barriers for mass adoption of EVs in context of Indian automotive market, find relationship and hierarchy to interpret them using Interpretive Structural Modeling (ISM) technique. The study reveals that the government incentives and consumer characteristics are most crucial areas of concern to improve the EV penetration in mass market.



N140

Time: 10:00-10:15

Safety Analysis at Weaving Department of PT.X Bogor Using Failure Mode Effect Analysis (FMEA) and Fault Tree Analysis (FTA)

Ms. Prima Fithri, Nidi Annisa Riva, and Berry Yuliandra
Andalas University, West Sumatera, Indonesia

The research focus on reducing the number of occupational accidents by finding the root causes of work accidents and optimize the implementation of Health and Safety values in PT X. The possibility of risk identified using Failure Mode and Effect Analysis (FMEA) and analyze it by calculating Risk Priority Number (RPN). A list of critical risk then developed through calculation of total RPN value ratio. The cause of the accidents are analyze systematically using Fault Tree Analysis (FTA). Based on the largest RPN value on FMEA, the most dominant failure mode with the most dominant effect of the cable / source of electrical current is not in a safe condition with fire effects and operators work is not appropriate SOP with work accident effect (RPN : 172.99). FTA are designed to have 3 failures are fire failures, work accidents, and operators do not use personal protective equipment. Each FTA that has been designed contains a chart that is the cause and effect of an event.



N022

Time: 10:15-10:30

Simultaneous Prediction Interval-based Multiobjective Solution Approach for Multiple Quality Characteristics Optimization

Abhinav Kumar Sharma, **Prof. Indrajit Mukherjee**
Indian Institute of Technology Bombay, India

Simultaneous optimization of multiple quality characteristics is a critical and difficult task for researchers and practitioners. This is primarily due to presence of correlation between responses and therefore tradeoff between them is inevitable. Thus, there is no single global optimal solution for such problems. Such problems are also known as multiple response optimization (MRO) problems. Among the different solution approaches proposed for MRO problems, Pareto front solution is one such alternative. However, there is no evidence of systematic work that addresses response uncertainty considering simultaneous prediction interval. This paper illustrates a systematic approach to generate Pareto solutions using multiobjective optimization (MOO) techniques for MRO problems considering appropriate simultaneous prediction intervals. The proposed solution approach is verified using two MRO case instances. Pareto solutions for MRO problems are generated using two MOO strategy [Non-dominated Sorting Genetic Algorithm (NSGA-II) and Multiobjective Particle Swarm Optimization (MOPSO)]. A comparative study shows that NSGA-II provides better Pareto fronts than MOPSO. The MRO solution quality of NSGA-II is also found to be encouraging for future research.

Coffee Break

10:30-10:40

10:40–12:10, Friday, 27 Apr.

Session B–2: Supply Chain Management

Venue: *Lemongrass Room*

Chair:



N066

Time: 10:40-10:55

A study on Healthcare-product Supply Chain with a group purchasing organization

Ms. Yin Han, Lingyun Wei

Beijing University of posts and telecommunications, Beijing, China

In order to better understand the impact of group purchasing organization (GPO) on healthcare-product supply chain, we build a supply chain model consisting of one manufacturer, one competitive source, one group purchasing organization(GPO) and n healthcare providers for a single product. Providers may purchase from any source for minimizing their total costs. Through considering different providers' demands, power schemes and revenue sharing between GPO and providers, we analyze the performance of supply chain and its members under various situations. Numerical examples show some interesting findings: (1) When GPO dominates the supply chain, GPO can obtain more profits. (2)When manufacturer dominates the supply chain and GPO shares its revenue with providers, there exists specific revenue sharing rates, which increase GPO's profits and reduce providers' cost; (3) Manufacturer always can achieve a same optimal profit by changing quantity discount rate when GPO dominates supply chain and shares its revenue with providers.



N108

Time: 10:55-11:10

Exploring the Implementation of Green Supply Chain with Cluster and Discriminant Analysis Case Study: Furniture Industry at Central Java Semarang

Dr. Aries Susanty, Diana Puspitasari

Diponegoro Univeristy, Indonesia

This study has two objectives. First, this study aims to categorize the level of the implementation of Green Supply Chain Management (GSCM) practice among Small and Medium Enterprises (SMEs) of wooden furniture in several clusters. Second, this study aims to find the linear combination of five dimensions of GSCM practices that will discriminate best between prior defined clusters. The study used primary data through questionnaires enclosed with the Likert scale 1-5 at 162 SMEs of wooden furniture located in Surakarta, Jepara, Semarang, and Kudus. The raw data level of implementation of five dimensions of GSCM practice is analyzed using K-Means cluster and discriminant analysis with the aid of the Statistical Package for the Social Sciences (SPSS) software. The result of K-Means cluster analysis indicated that a two-cluster is the optimal number of a group for separating the data of the level of implementation of GSSM practice among SMEs of wooden furniture and the two clusters founded in this research are labeled as early adopter and laggards. Then, the result of the discriminant analysis indicated that as high as 98.77% of the SMEs of wooden furniture was classified correctly. The result of discriminant analysis also revealed the discriminant function as $Z = (0.238 * IEM) + (0.602 * GPU) + (1.161 * CCO) + (1.128 * ECO) + (1.126 * IRE) - 13.124$ and the threshold for evaluating a discriminant score of

implementation of GSCM practice is -0.276 . The implementation of GSCM practices by new SMEs of wooden furniture with discriminant scores above -0.276 would be assigned to the Early Adoption (cluster 1); otherwise, they would be classified as Laggards (cluster 2)



N191

Time: 11:10-11:25

Supply Chain Management Performance and Partial Least Square-Structural Equation Model. An application to Thai Tourism Supply Chain.

Ms. Daraka Palang and Korrakot Yaibuathet Tippayawong
Chiang Mai University, Thailand

The assessment of tourism supply chain management performance objective in the tourism industry is to maximize satisfaction to the tourists. The objective of this research is to evaluate the impact of performance indicators on each tier of tourism supply chain from customers' perspective. The samples are 50 tourists who travelling in Thailand in 2016. The 5 Likert scales questionnaires are used in the study. This research is based on the path study of all 19 metrics of service supply chain management whereby a total of 50 foreign tourists were questioned about their opinions toward the important factors that affect service satisfaction. The analysis was done through the factor analysis and partial least square-structure equation. The data analysis helps obtain the factors used for assessing the tourism supply chain performance in the tourists' perspectives. These factors are further used to create the model and investigate the impacts of the tourism supply chain assessment. In addition, they are likely to benefit the tourism operators regarding the operational strategies and enable the tourism supply chain management effectively satisfy the tourists and survive the aggressive competition in the middle of economic downturns.

N3027

Time: 11:25-11:40

Supplier Selection Considering Sustainability Criteria by Using A Hybrid Evaluation Method in Printing Business

Ms. Onsiree Mananawigapol, Chorkaew Jaturanonda, Tuanjai Somboonwiwat
King Mongkut's University of Technology Thonburi, Thailand

Supplier selection decision is a significant component for printing business to enhance the organizational performance. The decision is a multi-criteria decision-making problem that comprises of tangible and intangible factors. Sustainability has been addressed as a key issue in the printing business, but it has not been used as the factor for the supplier selection. This paper therefore proposes the sustainable criteria based on the hybrid approaches of supplier selection for printing business. The methodology of selecting the final supplier consists of three phrases. First, the sustainable criteria are identified by SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. Then, the weight of each criteria is determined and ranked by AHP (Analytical Hierarchy Process). Lastly, the supplier is evaluated and selected using TOPSIS (Technique for Order Preference by Similarity to Ideal Solution). Finally, a numerical example is applied in each phase to illustrate the proposed approaches. The proposed sustainable criteria and hybrid approaches have a great ability to evaluate sustainable supplier in printing business.





N040

Time: 11:40-11:55

Supply Chain Model for Renewable Energy Resource from Biomass in Vietnam

Narameth Nananukul, **Mr. Duy Nguyen Duc**
Sirindhorn International Institute of Technology, Thailand

Biomass is an important renewable energy resource. Typically, a biomass supply chain is often very large and complex due to the large number of facilities within the supply chain and uncertain factors considered. In this research, a mathematical model that can be used to determine the number and locations of biomass plants is proposed. The objective is to minimize the factory fixed cost, transportation cost, purchasing cost, and inventory cost. The model is applied to a case study in Vietnam, where every region in Vietnam is considered in biomass supply chain planning. First, all data related to demand, available biomass quantity, and various costs are collected and analyzed. Second, a mixed integer model is used to model and solve the problem with uncertain demand and available biomass quantity with seasonal effect. The result from the model gives the best potential biomass plant locations in every region. Also, the result reports the amount of biomass used and inventoried in each time period.



N052

Time: 11:55-12:10

An improvement scheme for the overall line effectiveness of a production line: a case study

Ms. Jieli Li, Yuhui Jia, Binbin Xu, Fei Chen, Zhaojun Yang and Xiaodong Li
Mechanical Science and Engineering, Jilin University, China

This paper formulates an overall line effectiveness (OLE) improvement scheme for a production line on the basis of Fourier amplitude sensitivity test (FAST) and stochastic Kriging (SK) surrogate model. It is known that improving the key parameters that have great influence on the target performance can bring better effect on the performance than improving other parameters. Thus this paper is concentrated on improving the OLE of a production line through improving multiple key parameters related to the OLE. In the proposed procedure, FAST is used to identify the key parameters for the OLE and a SK surrogate model is built to evaluate the OLE of the production line instead of a simulation model, improving the work efficiency effectively. At last, a comparison with the continuous improvement process (CIP) shows that the scheme formulated with FAST and SK surrogate model is easier to be implemented than the one generated by CIP, because the procedure provided in this paper can give further suggestion to improve the OLE when the improvement of the bottleneck is limited.

Lunch

12:10-13:10

13:10–14:55, Friday, 27 Apr.

Session B–3: Transportation and Dispatch

Venue: *Lemongrass Room*

Chair:



N035

Time: 13:10-13:25

Concurrent Optimization of Job Shop Scheduling and Dynamic and Flexible Facility Layout Planning

Mr. Ryota Kamoshida

Hitachi, Ltd. Japan

This paper presents a method for solving job shop scheduling (JSS) integrated with dynamic and flexible facility layout planning (FLP). The FLP is formulated as a strip packing problem under certain conditions and incorporated into the Giffler and Thompson (GT) algorithm, which is widely used to solve JSS. The makespan of the schedule is minimized by the tabu search algorithm. The performance of the proposed method is evaluated on the benchmark datasets for FLP integrated JSS (FLPIJSS), which are made anew for FLPIJSS. The evaluation results show that the proposed method can solve FLPIJSS efficiently and outperforms the sequential optimization approach of JSS and FLP.

N110-A

Time: 13:25-13:40

Bi-objective optimization for preventive maintenance and energy aware scheduling of a single machine

Mr. In Ho Sin, Yong Jun Kim, Dong Heon Cho and Byung Do Chung

Yonsei University, the Republic of Korea

A good quality can be achieved through several ways, and the reliability of the machine is one of key role. However, machine has a breakdown or deterioration in any way, which affects reliability of machine. To solve this problem, preventive maintenance is taken during production process, while this also causes unavailability of the production. Therefore, preventive maintenance should be executed in proper time to preventing machines from jeopardy of breakdowns and minimizing unavailability at the same time. Meanwhile, in recent days, energy consumption cost is another crucial issue to scheduling problems. Numerous manufacturing enterprises are facing with increasing energy prices due to demand for reducing environmental pollution. Specially, dynamic energy pricing make production scheduling much more complex. Thus, efficiency becomes a very important factor considering these problems, because inefficiency leads to waste of money. To accomplish energy saving, proper implementation of turning off machine and idle is required. Sometimes, leaving machine in idle state will consume less energy than turning off it. Both preventive maintenance and energy consumption issues are critical factors in production scheduling, but there are scarce researches about considering these problems at the same time. This paper proposes a mathematical model which simultaneously optimizes two objectives: minimizing the cost of energy consumption and minimizing the machine unavailability. In this model, a machine is separated into four states: processing, idle, shutdown, and preventive maintenance. The model determines what state the machine should be in each time period. Particularly, appropriate execution time of preventive maintenance will be decided while minimizing the unavailability of the system. To find a

near optimal solution, we use a metaheuristic method. Finally, the performances are compared and contrasted with existing models.



N074

Time: 13:40-13:55

The Optimal Routes and Modes Selection in Multimodal Transportation Networks Based on Improved A* Algorithm

Mr. Yan Liu, Lingyun Wei
Beijing University of Posts and Telecommunications, China

We build an integrated optimization model for the choice of transport mode and transport route in the multimodal transportation networks. The proposed optimization model consider the following factors , such as transport cost, transport time, transfer cost, transfer time, schedule of railway or water way, congestion of highway, frequency of accident, and frequent route under specific requirements. An improved A* algorithm with time window is presented to solve the proposed optimization under the gridding multimodal transportation network. This improved algorithm mainly designs a weighted evaluation function to integrate above factors for dynamically choosing transport routes and transport modes. Numerical example shows that the improved algorithm can obtain the optimal transport modes and routs simultaneously. It also that the proposed algorithm is extendable by using the weighted evaluation function.



N034

Time: 13:55-14:10

A functional design of a cost benefit analysis methodology for transport infrastructure projects

Dr. Tiep Nguyen, Stephen Cook, and Indra Gunawan
The University of Adelaide, South Australia 5005, Australia

The development of a transport infrastructure network is one of the critical factors contributing to the economic growth of regions. However, the challenge to transport infrastructure network extension is to mobilize and allocate limited resources for potential projects that can maximize socio-economic benefits and minimize project risk. Cost-benefit analysis (CBA) is one of the ‘common’ methods used for project proposal evaluation and it has been applied in a range of fields to provide comparisons. Many scholars have proposed methods, tools, techniques and procedures in CBA, but the current challenge to evaluators is to determine feasible methods for assessments. In addition, the socio-economic factors associated with transport infrastructure projects are varied and may have great impacts on project success. Thus, the need to develop CBA methodology that is able to capture key socio-economic factors and enable practitioners to select methods for project evaluation is crucial. In line with this, a functional design for CBA methodology was used to establish a generic framework with assessment functions. The significance of this paper is to propose a functional design approach to CBA methodology to deal with critical issues regarding assessment method selection. This approach also provides a holistic picture of project evaluation via the main processes of CBA system deployment.



N167

Time: 14:10-14:25

District Model with Two Types of Vehicles for Transporting Sugarcane

Asst. Prof. Dr. Kanchala Sudtachat and Rujirat Patcharamethanon

Suranaree University of Technology, Thailand

Minimization the cost of sugarcane mill is the desirable mill is the desirable factor to any sugarcane mills. The factor that effect the cost of operation is the transportation sugarcane from field to the factory. In this paper we proposed the mathematical model that represents two types of the vehicles, six-wheel truck and ten-wheel truck, in the model. The result of this paper is our districting model could provide the optimal policy for managing transportation system of sugar mill.



N186

Time: 14:25-14:40

A record-to-record travel algorithm for multi-product and multi-period inventory routing problem

Mr. Fadillah Ramadhan, Arif Imran, Afrin Fauzya Rizana
Institut Teknologi Nasional (Itenas), Indonesia

The Inventory Routing Problem (IRP) is a problem that can be found in distributing goods. It considers the two important aspect such as inventory management and vehicle routing processes. This paper addresses the IRP multi-period, multi-product, and multi-supplier with capacitated homogenous fleet that housed at depot. Products are transport from supplier to assembly plant in finite horizon. The objective of this study is to minimize inventory and travel cost in distribution processes. A two stage algorithm is proposed. In the first stage, the initial solution is obtained using the least cost insertion algorithm. The results are improved in the second stage with a record-to-record travel algorithm that employ the 1-0 and 2-Opt local search. The algorithm is tested using the data sets from the literature and the data is processed using the software program that has been built. The results obtained are good compare to previous research, and the proposed algorithm produce short computational time.



N115

Time: 14:40-14:55

Height-based heuristics for relocating containers during loading operations

Ms. Yifei Yuan, Canrong Zhang, Ting Huang
Tsinghua University, China

In order to reduce operating time and cost, this paper studies the container relocation problem during loading operations, with the objective to minimize the total number of relocation movements. Given the retrieval order, this paper focuses on the best position for the relocated containers which are stacked immediately above the targeted one, so that the total relocation number will be minimized. A Brand-and-bound algorithm is first proposed, and then a height-based heuristic algorithm (HH) is proposed to tackle large-scale instances. To further enhance the performance of the proposed HH, an improved algorithm (IHH) is proposed as well. Numerical experiments are conducted to compare the three proposed algorithms, and their superiority is also verified by comparing to the algorithm reported in the literature.

Coffee Break

14:55-15:05

15:05–17:05, Friday, 27 Apr.

Session B–4: E-commerce and Service Science

Venue: *Lemongrass Room*

Chair: Assoc. Prof. Josephine D. German (*Mapua University, Philippines*)



N025

Time: 15:05-15:20

Inventory Management in E-commerce Supply Chain With Lateral Transshipment and Quick Response

Ms. Xueqing Yu, Lingyun Wei

Beijing University of Posts and Telecommunications, Beijing, P. R. China

To enhance the competitiveness of an e-commerce enterprise by improving the performance of the supply chain, we discussed the effects of quick response (QR), lateral transshipment (LT) on inventory system, and propose a new inventory control strategy by combining QR and LT. System dynamics is used to model the inventory system for analyzing the effectiveness of QR, LT and the proposed strategy. Numerical example shows that QR has an impressive improvement on fulfillment rate if one pays higher cost, while LT could only increase the fulfillment rate slightly but maintain a lower cost. When using the proposed strategy, we found that the new inventory management strategy can improve the fulfillment rate by inheriting the advantages of QR and LT while maintaining the low cost. In addition, it has been found that the timing of LT may have an important impact on the performance of the supply chain.



N3010

Time: 15:20-15:35

Micro Enterprise and E-commerce Platform: literature review and agenda for future research

Clara Linggaputri, Isti Surjandari, Akhmad Hidayatno

Universitas Indonesia, Indonesia

With the development of E-Commerce platform in the last several years, Micro Enterprises have opportunities to develop its business in the better effective and efficient ways. As Micro Enterprises, in general, have limited resources, adopting, selecting and using the E-Commerce Platform should be conducted carefully. Very few research had been done in this area. Therefore, as the first step, it is essential to build the understanding of Micro Enterprises' needs in adopting, selecting and using E-Commerce platform. For that, a literature review had been conducted by using narrative approach. The analysis revealed research topics needed to get that understanding.



N182

Time: 15:35-15:50

Understanding the Model of User Satisfaction in Using Cloud Storage Systems of Employees in Thailand: A Conceptual Framework

Wornchanok Chaiyasoonthorn, **Ms. Kulapa Najantong** and Singha Chaveesu
King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand

The use of cloud storage technology has been dramatically increased in Thailand especially for most working people. Satisfaction in using cloud storage systems (e.g., for storing and retrieving information) is one of users' criteria for making a decision to use them. The purpose of this study is to develop a model of User Satisfaction of working people in Thailand in order to define relevant factors that affect their use of cloud storage systems. This conceptual framework is based on a technology acceptance theory (TAM3) that considers perceived usefulness and perceived ease of use and on a Unified Theory of Acceptance and Use of Technology (UTAUT2) that considers social influence and user's experience that affect user's satisfaction. In this model, the following service aspects of Cloud storage systems which have been taken from a service satisfaction research are defined as dependent variables: equitable service, timely service, ample service, continuous service and progressive service.



N2001

Time: 15:50-16:05

Evaluating Variables that Affect Job Satisfaction of Bank Customer Contact Centre Agents in South

Ms. Eveth Nwobodo-Anyadiegwu, Charles Mbohwa & Nokukhanya Ndlovu
University of Johannesburg, South Africa

Customer Contact Centres (CCCs) have become an essential part of most organisations today, especially the banking sector. With the aim to cultivate productivity while improving customer experience at a minimal cost, customer contact centres play a vital role in most banks in South Africa and the world. The purpose of this study was to evaluate job satisfaction among customer contact centre employees of a major South African commercial bank. It also evaluates the level of importance for job satisfaction variables. The standardised Minnesota questionnaire which measures job satisfaction was used for data collection. The relationship between the satisfaction level and importance levels of the variables testing job satisfaction was investigated using Pearson product-moment correlation coefficient. There was a weak, positive correlation between the two variables, $r=0.270$, $n=61$, $p=0.043$. This relationship was statistically significant at the 95% level of confidence. GAP analysis was used to find differences between the agents' rating on the level of importance of each of the variables and the level of satisfaction they have. Results show that generally job satisfaction among employees is relatively lower compared to the level of importance for each attribute of job satisfaction. The agents rated co-worker's relationship the highest on the importance scale and this item was also the one that they were most satisfied with. However, given the level of importance reported, advancement on the job is of relevance to employees. Executives, call center managers and team leaders should view the insights emerging from this study as an opportunity to engage their employees and aid them to be successful in their career. As these young employees look to reinvent themselves, companies can increase their prospects of growth by consciously creating opportunities to improve their skill sets and job advancement.



N1009

Time: 16:05-16:20

Assessment of service quality: Patients from south Africa University Clinic

Ms. Eveth Nwobodo-Anyadiegwu, Ibrahimu Kidoge and Charles Mbohwa
University of Johannesburg, South Africa

The evaluation of service quality in several service industries remains an important matter to researchers and the management. Providing satisfactory services through maintaining high quality is critical for the success of service industry. It is more challenging for customers to assess service quality than the quality of tangible products because there is a lack of perceptible evidence related to the service. Consequently, service industries need consistent, methodical and technical tools to appraise its performance, as service quality is a vital measure of organizational performance. SERVQUAL is one of the most used instrument to measure satisfaction of customers in service industry. The purpose of this study is to evaluate the gap between patients' expectation and perception of the quality of service that is offered at a university clinic. The SERVQUAL instrument was used to collect data from respondents. A total of 110 questionnaires were distributed and 74 were returned. The paper enhances a innovative viewpoint towards understanding how the concept of service quality is implemented in outpatient clinics on campus.



N123

Time: 16:20-16:35

A Study on Shortage of Hospital Beds in the Philippines Using System Dynamics

Assoc. Prof. Josephine D. German, John Karlo P. Miña, Claudine Mae N. Alfonso, and Dr. Kang-Hung Yang
Mapua University, Philippines

The availability of hospital beds reflects the accessibility of service in a hospital. Due to the Philippines' rapid population growth, hospital capacity has been an issue that needs to be addressed to assure that the people received the necessary service and access to healthcare. The study focused on evaluating the needs of Filipino patients in terms of in-patient bed density or hospital bed ratio per ten thousand populations. Based on the data of Department of Health, the country's health agency, only 4 out of 17 regions complied with the standard local hospital bed ratio and in international setting, only one, the National Capital Region, complied with World Health Organization's requirement. This poses a great challenge to both the government and its people because the ratio is a good measure of availability, access and distribution of health service delivery in the country. Through the application of systems modeling using system dynamics, the model identified that health professionals, the population, and financial sources greatly affect healthcare services while the 10-year simulation revealed that the country may be able to satisfy the hospital bed requirements by year 2021. This will only be possible if both public and private hospitals will provide just compensation to healthcare providers and invest on infrastructure and facility such as acquisition of new hospital beds to accommodate the healthcare needs of the growing population.



N133

Time: 16:35-16:50

Analysis of Customer Satisfaction in a Selected Bank: Signal-To-Noise Ratio Approach

Ms. Kanty Jefinally Nattadatri, Mr. Hartomo Soewardi

Islamic University of Indonesia, Indonesia



This paper presents an investigation about the level of customer satisfaction at the selected bank in Indonesia on basis five dimensions of service quality. They are reliability, responsiveness, assurance, empathy, and tangible. It is noteworthy for banks to provide the high quality of service but a few of a certain bank experiencing matters on service performance which is more and more declining. Thus, some improvements should be done on each attribute that has not achieved a quality target. Taguchi Signal-to-Noise Ratio approach is applied to assess service quality performance referring to the Ordered Categorical Data obtained from the paper-based survey with distributing questionnaire containing 21 attributes. The results of this study show that there are some attributes of dimensions respectively not satisfying the quality standard of the bank. They are Rel3 attribute: customer expectation-based service) of reliability dimension, Res1: understanding needs and wants of the customers of responsiveness dimension, A1 attribute: provide a clear explanation of bank's product to customer of assurance dimension, E1 attribute: polite and friendly staff of empathy dimension, and T1 attribute: modern looking equipment of tangible dimension.

N009

Time: 16:50-17:05

An economic competitiveness analysis of power generation plants

Ndala Mulongo, **Pule Kholopane** and Clinton Aigbavboa
University of Johannesburg, South Africa

Due to the fast growth of renewable energy resources, the analysis and comparison of costs associated with different forms of electricity generating sources are crucial for decision policy makers and investors. To this end, the Levelized Cost of Electricity (LCOE) is a widely tool employed to assess the economic viability of a power plant, however the issue with this tool is that it does not considers all the complexities involved. Thus, the Levelized Avoided Cost of Electricity (LACE) has been introduced to cover the elements ignored by LCOE, which are becoming critical to business decision. Despite the development of LACE, various studies continue using LCOE to evaluate the economic competitiveness of various power plants, especially in South Africa. To this end, this paper used both LCOE and LACE tools assess and compare the economic viability of 10 technologies which are: coal, gas, nuclear, biomass, geothermal, hydroelectric, wind offshore, wind onshore, solar photovoltaic, concentrated solar power. The results indicate that of all technologies, geothermal ranks at the first place as the most economic competitive alternative, followed by coal technology. Furthermore, the results illustrate that the worse technologies in terms of economic viability are solar photovoltaic, concentrated solar power, and wind. As far as the authors are aware this study is the first example in the context of the South African energy sector.

Break

17:05-17:10

17:10–19:10, Friday, 27 Apr.

Session B–5: Information System Design and Management

Venue: *Lemongrass Room*

Chair: Prof. Felix T.S. CHAN (*The Hong Kong Polytechnic University, Hong Kong*)

N024

Time: 17:10-17:25

Optimized Information Exchange Process between CAD and CAM Enhanced Data Exchange in the Field of Joining Technology from the Viewpoint of an Automotive Supplier

Mr. Alexander Kreis, Prof. Mario Hirz, Severin Stadler
Graz University of Technology, Austria

In recent years it has become more and more important in the automotive industry to find new ways to reduce the time required in developing a new vehicle. This reduction in development time can be ascertained through the introduction of new systems and strategies. One such example was the introduction of different CAx-systems and tools during past decades. However, there are still a number of issues that could be optimized or enhanced. For example; the data exchange process between different CAx-systems, especially in regards to design, analyses and manufacturing. This paper focuses on a proposed optimization approach of data exchange processes between CAD and CAM, in an attempt to further reduce the effort of data management and costs. However, the process presented in this paper is not only applicable to the automotive industry but can also be used in other industries, e.g. aircraft industry or general mechanical engineering.



N114

Time: 17:25-17:40

Real-Time Localization and Navigation in an Indoor Environment using Monocular Camera for Visually Impaired

Ms. Kruthika Ramesh, S N Nagananda, Hariharan Ramasangu, Rohini Deshpande
Ramaiah University of Applied Sciences, Bangalore, India

The aim of this research is to design an intelligent system that addresses the problem of real-time localization and navigation of visually impaired (VI) in an indoor environment using a monocular camera. Systems that have been developed so far for the VI use either many cameras (stereo and monocular) integrated with other sensors or use very complex algorithms that are computationally expensive. In this research work, a computationally less expensive integrated system has been proposed to combine imaging geometry, Visual Odometry (VO), Object Detection (OD) along with Distance-Depth (D-D) estimation algorithms for precise navigation and localization by utilizing a single monocular camera as the only sensor. The developed algorithm is tested for both standard Karlsruhe and indoor environment recorded datasets. Tests have been carried out in real-time using a smartphone camera that captures image data of the environment as the person moves and is sent over Wi-Fi for further processing to the MATLAB software model running on an Intel i7 processor. The algorithm provides accurate results on real-time navigation in the environment with an audio feedback about the person's location. The trajectory of the navigation is expressed in an arbitrary scale. Object detection based localization is accurate. The D-D estimation provides distance and depth measurements up to an accuracy of 94-98%.



N2011

Time: 17:40-17:55

Developing Tabu Search with Intensification and Diversification for the Seriation Problem

Dr. Pimprapai Thainiam

King Mongkut's Institute of Technology Ladkrabang, Thailand

The seriation problem is an important problem in combinatorial optimization. The goal of seriation is to find a linear order for data objects to reveal structural information given a loss or a merit objective function as an objective function. For the seriation problem, finding an optimal solution using exact algorithms (e.g., branch-and-bound) to find the optimal solution is currently impractical for problems with more than 35 objects. In this paper, we develop a new heuristic procedure to maximize the gradient measure which is our selected merit objective function. The proposed heuristic incorporates search intensification and diversification into standard tabu search (TS) algorithm. From our experimental results, it shows that intensification and diversification tabu search (IDTS) outperforms the standard TS algorithms in terms of efficiency, effectiveness, and robustness.



N3025

Time: 17:55-18:10

A Comparative Study of Mixed-Integer Linear Programming and Genetic Algorithms for Solving Binary Problems

Punyisa Kuendee, **Dr. Udom Janjarassuk**

King Mongkut's Institute of Technology Ladkrabang, Thailand

This paper aims to investigate the capability of mixed-integer linear programming (MILP) method and genetic algorithm (GA) to solve binary problem (BP). A comparative study on the MILP method and GA with default and tuned setting to find out an optimal solution is presented. The mixed-integer programming library (MIPLIB 2010) is used to test and evaluate algorithms. The evaluation is shown in quality of the solution and the execution time of computation. The results show that GA is superior to MILP in execution time with inconsistent results. However, MILP is superior to GA in quality of the solution with more stable results.



N3022

Time: 18:10-18:25

The Acceptance Model of Hospital Information Systems in Thailand: A Conceptual Framework Extending TAM

Ms. Paneepan Sombat, Wornchanok Chaiyasoonthorn, Singha Chaveesuk
Healthcare Systems and Management, Thailand

Technological advancements continue their development and improvement in living standards. Information technology plays a crucial role in the public health by increasing service standard. Hospital information systems (HIS) could improve healthcare quality, increase service efficiency, and manage and maintain data accuracy. Regarding a significant policy on Thailand's digital economy, the Thai government has launched and implemented HIS across the country to provide healthcare services. However, limited users are known about the benefits and challenges of HIS acceptance in many hospitals. Therefore, this research will generate a framework to explore the user's willingness to use

HIS in Thailand. This framework is developed by integrating Technology Acceptance Model (TAM) combined with Task Technology Fit Model (TTF), Personal Innovativeness in the domain of Information Technology (PIIT) and Self-Efficacy (SE). The contribution of this framework is to build a proposed model of HIS acceptance used to investigate potential factors affecting the use of HIS in Thailand.



N057

Time: 18:25-18:40

Sentiment Analysis of Twitter Corpus Related to Artificial Intelligence Assistants

Ms. Chae Won Park, Dae Ryong Seo
Paul Math School, South Korea

Providing an enhancing experience is one of the most significant current issues in the user's research. A process that improves user's experience should be required to evaluate the usability and emotion. Above all, sentiment analysis based on user's opinions can be used to understand user's tendency. This paper aims to make a criterion what artificial intelligence assistant is statistically better. User's opinions about three artificial intelligence assistants from Twitter were collected and classified into positive, negative, neutral opinions by a lexicon named Valence Aware Dictionary and sEntiment Reasoner (VADER). Also, we analyzed tweets through an independent samples T-test, Kruskal-Wallis test, and Mann-Whitney test to show the statistical significance among groups. The results suggested the highest rank of three artificial intelligence assistants by using statistical analysis.



N096-A

Time: 18:40-18:55

Bibliometric Analysis of Deep Learning

Ssu Han,Chen, **Mr. Jia Jie, Lai**
Ming Chi University of Technology, Taiwan ROC

Deep learning (DL) is one of the most popular topics in the field of artificial intelligence (AI). This study presents a study of bibliometrics in order to explore and hotspot the ongoing status of this field. Relevant conference papers as well as their bibliographic information were first retrieved throughout the Web of Science (WOS) database where a single large character vector was converted into a structured dataframe. Using the awesome bibliometrix package in the environment of R, a series of bibliometric analysis can be easily conducted. In this study, we summarized some useful information about the field of DL such as the most productive countries, the total citations per country, the most productive authors and the author's h-index to understand who the dominators are. We also applied co-words analysis for the key words and grouping all of them into four topics such as natural language processing, object detection, speech recognition and image classification.

N138

Time: 18:55-19:10

Barriers and Drivers of eBIZ adoption in the fashion supply chain: preliminary results

Dr. Bianca Bindi, Dr. Virginia Fani, Dr. Romeo Bandinelli, Gilda Massa,
Gessica Ciaccio, Arianna Brutti, Piero De Sabbata
University of Florence, Italy

The paper deal with the preliminary research of the European Prohect eBIZ 4.0 –

Enhancing textile/clothing sector by eBIZ and RFIDs technologies adoption. The objective of the work is to identify the main barriers and drivers in eBIZ adoption and its connection with RFID technology. The methodologies used in order to achieve the result are the explorative research and a single case based research. The main results of this paper is that the principle obstacle in eBIZ adoption is the lack of knowledge of the standard within both software houses than fashion brands, and the high effort in the implementation within the company. Once the project has started, benefits appear clear both to fashion companies than to software houses, and next steps of the project are carried out with lower efforts.

Dinner

19:20-20:20

Date: 27 Apr. 2018(Friday)

Time: 9:00-19:10

Venue: Thyme Room

| | |
|--------------------|--|
| Time | |
| 9:00-10:30 | Session C-1: <i>Modern Electronic Engineering and Technology</i> |
| 10:30-10:40 | <i>Coffee Break</i> |
| 10:40-12:10 | Session C-2: <i>Digital Manufacturing and Quality Control</i> |
| 12:10-13:10 | <i>Lunch</i> |
| 13:10-14:55 | Session C-3: <i>Ergonomics Design and Application</i> |
| 14:55-15:05 | <i>Coffee Break</i> |
| 15:05-17:05 | Session C-4: <i>Industrial Production and Planning</i> |
| 17:05-17:10 | <i>Coffee Break</i> |
| 17:10-19:10 | Session C-5: <i>Intelligent System Design and Environmental Resources</i> |
| 19:20-20:20 | <i>Dinner</i> |

Note:

- * Please control each presentation time within 15 mins, including Q & A.
- * The certification of Oral presentations, will be awarded at the end of each session.
- * Best Presentation of each session is encouraged to award to student author prior.
- * Winner of Best presentation will be announced at the end of each session and awarded winner certificate over the banquet on Apr. 27.
- * To show respect to other authors, especially to encourage the student authors, we strongly suggest you attend the whole session.
- * The scheduled time for presentations might be changed due to unexpected situations, please arrive meeting room at least 10 Mins before your Session starts.
- * Session photo will be taken at the end of each session and updated online.

9:00–10:30, Friday, 27 Apr.

Session C–1: Modern Electronic Engineering and Technology

Venue: *Thyme Room*

Chair:



N154

Time: 9:00-9:15

Voltage Stability In DC Micro Grid By Controlling Two Battery Units With Hybrid Network Systems

Mr. Adhi Kusmantoro, Ardyono Priyadi, Mauridhi Hery Purnomo
ITS Surabaya, Indonesia; Universitas PGRI Semarang, Indonesia

In DC network systems micro grid battery storage units are used to assist the main source of renewable energy (PV array) in providing stable voltage on the DC bus. Micro grid storage systems play an important role in providing services on demand. The lithium-ion batteries are used in this design, because these batteries have high energy density. In the micro-grid design is used three units of PV arrays and each unit consists of two PV arrays and two batteries. Battery units are used for storage of PV array sources and single phase grid AC. The PV array unit provides 22.8 V output voltage and the battery unit provides 22.78 V output voltage. Boost converter increases the voltage of the PV array and battery unit to a DC bus of 48 V. The PID controller is effectively used boost converter in raising or lowering the voltage. The advantage of using two battery storage systems is that if one unit is not sufficient to provide a voltage to the DC bus, then the battery unit on the AC grid side will also rapidly provide a voltage to the DC bus.



N031

Time: 9:15-9:30

Evaluation of lithium battery health status using Mahalanobis distance approach

Prof. Chien-Chih Wang, Ms. Chia-Ying Li
Ming Chi University of Technology, Taiwan



As the progress of technology, a variety of batteries used in different fields. The lithium batteries are the most likely and demanding batteries on the market, due to advantages of small size, high power, high energy density, long cycle life, no memory and low cost. The global climate change and energy crisis, electric vehicles have been widely developed, lithium batteries in the energy storage system play an essential role. In fact, battery reliability is a critical factor in whether the customer can accept a product. If we can efficiently estimate the battery health prediction, will help provide users with timely battery replacement information, and maintain product reliability. The Mahalanobis distance was proposed to develop a diagnostic prediction of lithium battery health status. In the first stage, taking the Mahalanobis distance as the reference and constructing a complete measurement scale. The second, confirm the full-scale measurement scale. The third, establish the critical characteristic variables, for attribute screening. The fourth, the use of essential characteristics of variables for future projections. A real battery test data was used to model validation. Preliminary results show that this method can reduce unnecessary battery testing items, shorten data collection time, and efficiently predict the battery health status.



N103

Time:9:30-9:45

Increasing the Yield of PV Panels: A Review

Mr. Pankaj Mann, Kuldeep Modh and Suraj Goel
IIM Lucknow, India

With the increasing rate at which fossil fuels are depleting, there is a recent advent of technology in solar cells. The efficiency of a typical industrial standard PV panel is around 18-20% which is quite low. To get more yield different approaches in installation design are there. Here we discussed solar tracking and soiling of PV panels. A comparative study of different implementations is presented. We made a comparison based on these, wherein there are different physical and geographical inputs based on which it suggests what type of PV panel should be installed and what should be done about soiling. From this data we made a tool which guides the people installing PV panels about which tracker and soiling solution they should use. At the end we presented our own hybrid solar tracking system using image processing.



N169

Time: 9:45-10:00

Experiment and optimization of magnetostrictive for long time operation to find amplitude of vibration and thermal limit

Mr. Nuttakorn Pukseesang, Samran Santalunai, Thanaset Thosdeekoraphat and Chanchai Thongsopa
Suranaree University of Technology, Thailand

In this paper an experiment and optimization of magnetostrictive transducer for long time operation to find maximum amplitude of vibration and thermal limit. This vibration helps dissolution limestone in the oil pipeline transportation. To solve the problem of magnetostrictive transducers breaking or crack from overheating by the decomposition of limestone in the oil pipeline transportation. It is a technique to finding suitable frequency, duty cycle and the appropriate range of amplitude and thermal that not causing of overheat in magnetostrictive transducers. In the experimental and results, it is found that the magnetostrictive transducers will be operated in suitable frequency 11 kHz at duty cycle 45% at amplitude 1240 mv and temperature at magnetostrictive transducer 82.5 °C, respectively. The advantage of the experimental results is that the system can be operated at appropriate amplitude and reasonable temperature without any failure.



N3009

Time: 10:00-10:15

Improved Efficiency of Insect Pest Control System by SSPA

Mr. Phanupong Saeung, Samran Santalunai, Thanaset Thosdeekoraphat, Chanchai Thongsopa
Suranaree University of Technology, Thailand

This paper present experimental results of the prototype insect pest control system that use Laterally Diffused MOSFET (LDMOS) as active device in solid-state power amplifier (SSPA) for better efficiency dielectric heating. Nowadays, SSPA were known as the most efficiency device for radio frequency (RF) amplifier. Recently, insect pest control has been moving from chemical fumigation to dielectric heating technique because the chemical that use for insect pest control are affect the environments and they could remain as food

residue might affect health in long term. Generally, using high voltage in megahertz range, electric tube (or vacuum tube) can be done for this task. However, the tube, is suffer from low efficiency that might be bad in long term because of electricity bill. The results of using the prototype SSPA pest control system in rice weevil pest control 1000 Watts DC in. 64% overall efficiency was obtained. Cost of the treatment process is US\$ 0.00147/kg. The advantage of high efficiency in dielectric heating not only for insect pest control but also could apply to any related applications that use dielectric heating.



N048

Time: 10:15-10:30

Visual and Hearing Detection Capabilities to Discriminate whether a UAV Invade a Campus Airspace

Mr. S. J. Chang, K. W. Li
Chung Hua University, Taiwan, R.O.C.

Signal Detection Theory (SDT) has been widely applied in target detection. In this study, we applied the SDT to examine human visual and hearing detection capabilities to determine whether an unmanned aerial vehicle (UAV) had invaded an airspace. The UAV was remote controlled and hovered at air locations at altitudes ranged from 20 m to 80 m. The horizontal distances between the UAV and the subjects were from 101.3 m to 194.3 m. The participants watched and responded whether the UAV had invaded or not at a five-point scale: 1 definitely yes, 2 probably yes, 3 don't know, 4 probably no, and 5 definitely no. The receiver operating characteristic curves (ROC curve) under different air location conditions were plotted. The P(A), or the sensitivity to visually detect the target ranged from 0.77 to 0.86. Detection capabilities of invaded UAV using both visual and auditory perceptions were discussed.

Coffee Break

10:30-10:40

10:40–12:10, Friday, 27 Apr.

Session C–2: Digital Manufacturing and Quality Control

Venue: *Thyme Room*

Chair: Prof. Tarun Gupta (*Western Michigan University, US*)



N020

Time: 10:40-10:55

Optimal manufacturing outsourcing decision based on the degree of manufacturing process standardization

Ms. Thi Thanh Nhan Phan, PingYu – Chang
Ming Chi University of Technology, Taiwan

In recent decades, manufacturing outsourcing has become a strategic trend in industry as manufacturing organizations desire to reduce costs and focus on core competencies. Organizations have a range of location options for outsourcing to select, such as, local, nearshore and offshore. Lower labor cost is considered as a dominant factor for many companies to choose outsourcing and foreign vendors in particular. However, higher transaction costs always are considered as one of the most significant disadvantages of outsourcing especially in case of offshore and nearshore. Meanwhile, manufacturing process standardization, which is considered as a way to achieve, transparency and uniformity of manufacturing activities, resulting in reducing transaction costs. But up to now, there are a few studies of the impact of manufacturing process standardization on outsourcing decisions. So in this paper, we propose a framework including three factors, the degree of product or manufacturing process standardization, transaction costs and labor cost, to help the supply chain executives make optimal outsourcing location choice. Results show that, the higher the degree of process standardization is, the further focal firms can outsource their production.



N044

Time: 10:55-11:10

Efficiency Improvement of Door Frame Manufacturing Process in Wood Product Manufacturing Industry

Assist. Prof. Lerdlekha Sriratana
Ramkhamhaeng University, Thailand

This study aims to improve the efficiency of door frame manufacturing process in wood product manufacturing industry. The major causes of delay in the process were analyzed by using standard time analysis and Sinpaiboon Kamai Co., Ltd. was selected as a case study. It was observed that the standard times of fine polishing and assembling were higher than Takt time that finally resulted in low production capacity and delivery problem. Therefore, subtask procedures of those tasks were rearranged and work environment was improved. After implementing new work process, the cycle time was reduced from 100.3 min/unit to 63.1 min/unit or about 37.1%. The productive capacity could be increased from 560 units/month to 1,200 units/month or 53.3%. Moreover, the company could achieve the 100% delivery goal after improvement.



N174

Time: 11:10-11:25

Core Challenges to Cloud PLM Adoption in Large Manufacturing firms

Ms. Shikha Singh, Subhas Chandra Misra
Indian Institute of Technology (IIT) Kanpur, India.

As the globalization is at its peak and innovative products are at high demand, firms are forced to work in a collaborative manner. The product data must be lively available to all the collaborated partners. Although on-premise Product Lifecycle Management (PLM) systems are offering the collaborations and product data management through out the product's lifecycle, the Internet of Things (IoT) era offers more connectivity at lesser cost. Most Large manufacturing firms have established the on-premise PLM systems, but still face some difficulties related to maintenance and upgradations of inhouse information technology (IT) infrastructure. Hence, cloud PLM is under consideration for adoption among many large manufacturing firms. However, there are several challenges associated with cloud PLM adoption decision. The purpose of this work is to find out the challenges which large manufacturing firms face while deciding to adopt cloud PLM. The empirical investigations have been attempted to find out the relations among the challenges faced and to provide the guideline on how to find out the core challenges which needs to be attended before adopting cloud PLM in large manufacturing firms.



N2002

Time: 11:25-11:40

Demand Management Practices in the Manufacturing industry: An empirical South African Perspective

Ms. Eveth Nwobodo-Anyadiiegwu, Erick Mikobi Bakama and Charles Mbohwa
University of Johannesburg, South Africa

This paper aims to identify and explore Demand Management (DM) practices used within the South African Manufacturing industry. The study followed a qualitative design approach in order to identify the relationship between DM methods such as forecasting, and the best practices used by the respondents. Therefore, a purposive sampling technique was used whereby a questionnaire was sent out via email to 15 manufacturing companies before meeting them for a face to face interview conducted in two weeks. Respondents varied from different industries such as automotive, wood and paper, chemical, food and beverage, etc. The results demonstrated that although the respondents are aware of the best practices for a good DM system, they generally do not apply them entirely because of factors like fear of implementing change and failure to quickly adapt themselves to the change that would come with those best practices. In addition, the results also revealed that forecasting is the most used DM method by the respondents and a simple forecasting average is used to predict future demand. Depending on the company, the forecast is done either by a team or by functional areas.



N097-A

Time: 11:40-11:55

Investigating Service Quality of Funeral Industry using Kano-Two-dimensional Quality Model

Heng-Ma, **Mr. Ping-Lo**
Chung Hua University, Taiwan

According to the investigation of Taiwan Trend Research, the number funeral industry steadily grows at approximately 4% every year in recent 5 years. Currently, there are more than 4,000 practitioners and produce about 25 billion turnovers each year. Funeral industry is a special service industry, and it becomes much more socially acknowledged than ever as the technology and cultural greatly changed in Taiwan. Some of the practitioners have seek to promote themselves by adding entrepreneurship and branding to their businesses. Service quality starts to gain attention in this business, where a number of factors are particularly important, such as customized processes, fulltime standbys and localized culture. These factors are distinguished from other service industries, which play an important role to increase the customer return rate. This research employs the Kano 2-dimentional quality model to investigate key factors of service quality in the funeral industry. Such a model has been successful making contributions in a number of businesses. For example, car maintenance, chained restaurants and recreational farms. Our objective is to compare the differences of service quality based on consumers' views. Sample subjects are randomly acquired, who are 30 or above years old. The results could provide reference for further research.



N2007

Time: 11:55-12:10

Defect Reduction in the Board Front Door Trim Manufacturing Process

Ms. Punyisa Kuendee

Siam University, Thailand

Through the study of production process for Board Front Door Trim, significant production defects that affect the production cost were found. Therefore, the objective of this study is to reduce defects. By using 7 QC Tools in the analysis of the defect problem within the inefficient production process, the causes of the problems in each step of the plastic injection process were considered, categorized and classified. The problems are solved by improving the production process to decrease the defects. The results from improving production operation indicate that the number of defects in terms of the incomplete piece, the most common type of defects can be brought down from 609 units to 251 units per month. The total production defects of 1,306 units per month can be decreased to 814 units per month. Also, the average defective rate is decreased from 8.52% to 5.37%.

Lunch

12:10-13:10

13:10–14:55, Friday, 27 Apr.

Session C–3: Ergonomics Design and Application

Venue: *Thyme Room*

Chair: Assoc. Prof. Ma. Janice J. Gumasing (*Mapua University, Manila*)



N080-A

Time: 13:10-13:25

The Effects of Glove Thickness, Hand Length and Body Mass Index on Grip Strength

Mr. Chien-Hung Li, Ching-Hua Lin
Chung Hua University, Taiwan

This study aimed to investigate the effects of glove thickness, hand length and body mass index on grip strength. Thirty-six participations between the age of 20 and 27 were sampled equally from three hand length (ranged between 14.24 and 19.04 cm) strata, and grouped into slim, medium and obese figure types by their body mass index (BMI) ranged between 15.5 and 44.6 kg/m². The grip strengths of dominant hand of these participations were measured bare-handed, wearing gloves 500, 1000, 2000 and 4000 μm thick using T.K.K.5101 grip dynamometer manufactured by Takei Scientific Instruments Co., Ltd. The results of three factors analysis of variance showed significant effects of glove thickness, hand length, BMI and hand length-BMI interaction. The post hoc glove thickness effect analysis indicated that the mean grip strength of 4000 μm glove wearing significantly lower than that of bare-handed. The mean grip strength differences between the other glove thickness wearing and bare-handed were insignificant. The results of pair comparison of hand length-BMI interaction effect indicated that for slim group, only the difference between long and medium hand length subgroups was not significant. For obese group, only the difference between long and short hand length subgroups was significant. As for medium figure type group, the differences of all pairs of three hand length subgroups were all significant. Reviewing literature, the investigations of hand length-BMI interaction effect on grip strength were rare; and the results of this study about glove thickness effect on grip strength were roughly consistent with, yet some specifics need further discussions.



N076

Time: 13:25-13:40

Analyzing Circadian Rhythms for Breaktime Scheduling on Night Shift Work

Dr. Lovely Lady and Ansor Firdaus
University of Sultan Ageng Tirtayasa, Banten, Indonesia

Working for a long time needs a break. The break was used to keep the personal needs and reduce fatigue so workers have the physically and mentally readiness to continue his work. Work performed in the evening against the natural human body activity along with the human circadian patterns decreased on the night. This research was a field study at the ticket booth operator activities in the Merak Harbour. All subject worked in sitting position, and their position did not change along the observation. Change in position will affect the circadian rhythm. All the subject also experienced worked on night shift more than 6 months. The subject scheduling is grouped on four groups who have different breaktime schedules include of breaktime at 11.00 pm, 01.00 am, 03.00 am, and 05.00 am. Comparison on these groups have been seen on the change of body temperature and blood pressure from time to time during the night shift. Circadian rhythms among four group

shown difference decline and the lowest point or nadir of the circadian curve on each group was different. The group of operators who got break at 01.00 am has the smallest range of circadian curve decline than any other group. The smallest range of circadian curve decline indicate this group can adapt better than others on night work. On breaktime schedule at 01.00 am accoured phase shifting when the nadir point shifted to earlier time. This research recomended the break for night shift should schedule at 1 pm until 3 am and breaktime at 11.00 pm was not recomended. Breaktime will make the body out of monotonous activities during work and will active human neurobehavioral.



N081-A

Time: 13:40-13:55

A Study in Power Grip Normal Force for Cylindrical and Ergonomic Handles

Mr. Tzu-Chieh Lin and Ching-Hua Lin
Chung Hua University, Taiwan

This study aimed to investigate the power grip normal force for cylindrical and ergonomic handles. Thirty-six participations between the age of 20 and 27 were sampled equally from three hand length (ranged between 14.24 and 19.04 cm) strata. The power grip normal force of dominant hand of these participations were measured for both handles using A201 FlexiForce Sensel System manufactured by G-CHEN Technology Corp. Twelve sensels were stuck individually on tip and middle segments of five fingers and under the base knuckle of middle finger and thumb before the participation applied grip force on handles. The diameter of cylindrical handle was 40 mm which was calculated using the optimal handle diameter formulae of Garneau and Parkinson (2012) for the hand length sampling mean of 17.64 cm. And the handle was made by three dimensional printing. The ergonomic handle was made by stuffing enough clay in the palm of the participation under a grip posture with thumb and middle finger tip overlapping about 10 mm. The normal force was measured after the clay handle was totally dry. The results of three factors analysis of variance showed significant effects of hand length, palm (sensel) location and handle type-palm location interaction on normal force. The post hoc hand length effect analysis indicated that the mean normal force of long hand length group significantly larger than that of medium and short hand length groups. The results of pair comparison of handle type-palm location interaction effect indicated that on cylindrical handle the largest normal force was applied by tip segment of thumb, index, ring and baby fingers while on ergonomic handle the largest normal force was applied by the same four locations plus middle segment of index and ring fingers. Reviewing literature, the details of research settings like sampling, handle type, handle size, the divisions of palm surface, the way of applying force, the measurement system, and the consequent results of most related researches were all different in some specifics. Further discussions and suggestions for future researches are required.



N105-A

Time: 13:55-14:10

Predicting external ischial tuberosity width for both sexes to determine their bicycle - seat sizes

Prof. Yi - Lang Chen, Yu - Cing Huang
Ming Chi University of Technology, Taiwan

When riding, the buttock-seat contact causing distinct discomfort and pain perceived by riders are mainly affected by the bicycle seats. Seats with different widths may produce distinct seated pressuredistributions, which are influenced by the degree of seated pressure between the ischial tuberosities (ITs) of the human pelvis and the seat surface. Previous

studies have investigated the measurement of the external ischial tuberosity width (EITW) for bicycle seat design. However, the measurement of the EITW is not simple. In this study, the EITW values, as well as the anthropometric data, were obtained from 30 men and 30 women to develop the EITW prediction models separately for the men and the women by multiple stepwise regression analysis. The models were then validated by the data from another 8 men and 8 women. The results show that sex difference in EITW measurements was observed (male:12.0 cm; female:13.6 cm). Hip circumference is an effective predictor for EITW values with percentages of explained variances of 64.1% for male and 61.2% for female. The validation result also shows that there was no significant difference between the measured and the predicted EITWs for both sexes. In summary, previous method of measuring the EITW has generally employed the impression method, however, the method was limited by equipment restrictions or complex procedures. The predictive model established in this study proposed a simple and valid method for acquiring EITW values to assist riders to determine their seats for bicycling.



N164

Time: 14:10-14:25

Design of an ergonomic classroom chair and desk for preschool students of selected public schools in Cabuyao City, Laguna

Ms. Ezrha C. Godilano, Mark Kevin G. Galang, Hazel Elaine O. Ramilo, Kristian Roi F. Velayo
Malayan Colleges Laguna, Philippine

This study aimed to design an ergonomic classroom desk and chair that will be of comfortable use for the pre-school students of the selected public schools in Cabuyao City, Laguna. The sample consisted of 248 preschool students from four public schools. Nine dimensions each for the preschool students and the classroom furniture were taken. Findings showed that most of the students experience mismatch with the present design of the classroom chair and desk. Rapid Upper Limb Assessment (RULA) scores are high for the present design during their class activities. This indicated awkward postural patterns in the neck, trunk and arms area. The proposed design was based on the dimensions of the students with added ergonomic features. Post-evaluation included Failure Modes and Effects Analysis (FMEA), Cost-Benefit Analysis (CBA), Mismatch evaluation and post – test RULA. CBA showed a huge increase in the cost but benefits in terms of postural improvement were attained based on the post RULA scores which decreased considerably. Mismatch evaluation revealed that the proposed design decreased the proportion of students experiencing mismatch. Students' posture particularly in the neck, trunk, and arms area were greatly improved as the measurements of the classroom chair and desk in the proposed design are more suitable to the anthropometric dimensions of the preschool students.



N165

Time: 14:25-14:40

Design of an Ergonomic Wheelbarrow to Reduce Physiological Demands of General Users

Ms. Ezrha C. Godilano, Karl Vincent Casas, Aubrey Justine Vargas
Malayan Colleges Laguna, Philippines

Workers in the construction, agriculture, hotels and restaurants are most likely exposed to heavy loads as manual handling occurs in almost all working environments. To alleviate this problem issuance of handling aid was introduced in different industries. Continuous lifting and handling activities may gradually cause cumulative disorders which can also

cause acute trauma such as cuts or fractures due to accidents. Low back pain and injuries are considered as one of the most common musculoskeletal disorders caused by lifting. However, there are several factors that contribute to the increase of risk of workers these includes distance to be travelled, load weight to be carried, human attributes such as age, body weight, gender, and height. Controlled simulation of present and proposed design of wheelbarrow was done in order to analysed the problem and improvements respectively. Binomial Logistic Regression was performed to assess if the identified factors that might influence the likelihood of incurring pain in different body region are valid. Questionnaire was also used based on comfortability, ease of usage, and safety of the wheelabarrow, the questionnaire was perform to the current and proposed design in order to assess its performance and identify if there are signifacant differences between the two designs using Chi-square test. Failure Mode and Effect Analysis served as an efficient method in the risks involved with the use of the product. And lastly, ergonomic principle were applied to appropriately dimension the height, handle-to-handle gap, and grip diameter of the handle by applying the concepts of Anthropometry.



N178

Time: 14:40-14:55

Ergonomic Intervention Addressing Musculoskeletal Disorders Among Poultry Layer Workers

Assoc. Prof. Ma. Janice J. Gumasing and Rex Aurelius C. Robielos
Mapua University, Manila

Poultry Industry is one of the fastest growing sectors of the Philippine agriculture today. Though there is a tremendous growth in poultry industry and already providing employment to about 90,000 farmhands in Philippines, the poultry industry ranked ninth among the different industries with high occupational injuries due to musculoskeletal disorders. The main objective of this study is to predict the severity of musculoskeletal disorders that the poultry workers have been experiencing. This is done by analyzing the literature review, respondent survey, ergonomics assessment tools and statistical study. Stepwise Regression Technique and Residual Analysis were also done after analyzing the gathered data. Another output of this study is the design of the automatic feeder. The design is based from the analysis of the study and formulated predictive equation. To fully accomplish the design, Quality Function Deployment matrix and Product Costing were completed. The result of the final model was tested in the poultry farm to validate the usability issues, safety measures and its function. Time and Motion Study was used to analyze the improvements in the standard time of the feeding task. It is concluded that feeding using the automatic feeder significantly reduces the severity of musculoskeletal disorders of the workers and improves the process.

Coffee Break

14:55-15:05

15:05–17:05, Friday, 27 Apr.

Session C–4: Industrial Production and Planning

Venue: *Thyme Room*

Chair: **Prof. Roberto Montemanni** (*Dalle Molle Institute for Artificial Intelligence (IDSIA), Switzerland*)



N070

Time: 15:05-15:20

Productivity Improvement of Tapioca Packing Process through Simulation Modeling Analysis

Mr. Nara Samattapong

Suranaree University of Technology, Thailand

This research has focused on the packaging process of tapioca powder and aims to offer guidance for improvements using simulation modeling approach to analyze problems and designing a better process. The results of the simulations were compared with the current operations, it was found that the most suitable option can reduce testing time by 19.02%, sealing time by 17.99%, transport time by 47.18%, moving time by 34.10% moreover it can reduce the number of employees by three people.



N065

Time: 15:20-15:35

Application of a Hidden Markov Model for Consistency Checking of Process Plant Facility Tag Numbers - A Case Study

Mr. Jayaram Sivaramakrishnan and Gareth Lee

Murdoch University, Perth, Australia

This paper proposes a novel method for validating process plant design data using a self-organising machine-learning approach. The method, based on a Hidden Markov Model (HMM), is ideal for embedding within a decision support system for use by engineers that validates tag numbering conventions during the design of a large process facility. Results are presented drawn from a set of 541 artificial tag numbers and show that the HMM's performance is comparable to that of a custom-made design rule checking algorithm. The approach benefits from the increased interoperability resulting from widespread adoption of the ISO 15926 standard in industry.

N098

Time: 15:35-15:50

Industrial cluster optimization based on linear programming

Prof. Roberto Montemanni and Jafar Jamal

Dalle Molle Institute for Artificial Intelligence (IDSIA), Switzerland



Industrial Symbiosis is a symbiotic relationship between different production plants in a same area that is achieved by the flow of waste and byproducts from a production unit, that generates them during its activities, to another, that uses it as resource for its own production. The described symbiosis has many evident environmental and economic benefits. The main concern with implementing such system is the guarantee for an even

distribution of the extra profit generated through the byproducts exchange process among the participating production units. In this work, we model the problem through mathematical programming and we propose a solution based on a series of linear programs that maximises and balances the profit between the production units participating in the symbiosis.



N111

Time: 15:50-16:05

An Modified Relax-and-fix Algorithm for the Multi-level Lot-sizing Problem with Replaceability

Dr. Mingyuan Wei, Yifei Yuan and Canrong Zhang
Tsinghua University, China

This paper considers the multi-level capacitated lotsizing problems, especially pays attention paid to the replaceability among items. We establish two nonlinear programming models for the problem: the inventory and lot-sizing model (ILSR) and the simplified facility location model (SFLR) based on different variable definitions with the objective to minimize the system-wide costs, including inventory-holding cost, backlog cost and machine setup cost. For small-scale problems, the commercial solver can solve the problems to optimality. For largescale problems, we propose a modified relax-and-fix algorithm for exact algorithms encounters computational difficulty due to the NP-hardness of the problem. Numerical experiments are conducted to test the models and the designed algorithm, and the results show that the SFLR model performs better than the ILSR model and the designed algorithm works well.



N119

Time: 16:05-16:20

Resource-reconfigured Flow Shop Scheduling and Lot-sizing Problems in Semiconductor Test

Ms. Yige Zhang, Yuangen Lu, Canrong Zhang
Tsinghua University, China

This paper presents a study of the production planning decisions in the context of semiconductor test industry. In our problem, the items to be tested need to go through a series of stages (stations) which require different configurations of resources (kits) which are shared among stages. We establish two novel mixed integer programming models, with the objective to minimize the total processing cost, subject to the resource reconfiguration constraints on the test resources, machine capacity, and the changing-over time for setting up the station for different stages. Numerical examples are conducted to illustrate the performance of our models, and the comparisons between the two models are given as well.



N193

Time: 16:20-16:35

Process Flow Improvement in Production of Noise Filter Products Through Lean Manufacturing Technique

Mr. Rattarak Moonpragarn and Rungchat Chompu-Inwai
I Chiang Mai University, Thailand

This research has applied Lean Manufacturing Technique to improve process flow in the manufacture of noise filter products at a case study company. The research procedure started from studying the process and process times at every step in the manufacture of

noise filter products. After this was written the current state value stream map to study the overall picture and indicate main problems in the process. From there was conducted brainstorming with the relevant personnel to identify areas of waste. Then methods were proposed to adjust the process, using Line Balancing technique which specified the working time of a semi-automatic soldering machine to determine the cycle time of the process. Adjustments were made to the layout design and to reduce the time used to move components and work pieces. Also, equipment was designed to speed up the work. From there was written the future state value stream map. Once the methods had been applied, it was found that the efficiency of the production line was increased from 56.9% to 85.76% , and staff reduced from 16 to 11, while maintaining production to meet customer demand. Moreover, work in process was reduced by 69.28% , waiting time reduced by 38.91% , working space reduced by 46.91% , the movement of components and work pieces reduced by 56.25% , and non-value added time reduced from 93.92% to 85.64% .



N2008

Time: 16:35-16:50

Waste Reduction in the Shoe Sewing Factory

Assist. Prof. Pongpat Phetrungrueng
Siam University, Thailand

From the study of the recent production process for the case study shoe factory, it is found that staff and machines performance not fully utilized resulting from the improper production process or incorrect working concepts. This study aims to analyze the causes of the problems and improve the production process so that the problem and its impact can be reduced. In this study, the concepts of work study have been implemented and help to analyze for seeking production wastes. The work study techniques approach to improve the production process for eliminating all production losses. As a result of the operational process improvement, the labor efficiency in the Shoes Sewing processes increased by 7.98 % and 29.39 % , meanwhile, non-value added work can be reduced by 30% and 29 % . The total production output was increased by 50 % and 56.2% in turn.



N3028

Time: 16:50-17:05

Aggregate Planning in Canned Pineapple Production Lines

Mr. Datepard Charoenponyarrat and Tuanjai Somboonwiwat
King Mongkut's University of Technology Thonburi, Thailand

The production of canned pineapple products depends on the fresh pineapple while the factory is trying to match the orders with the available raw material. Thus, the aggregate planning is used to plan on the resources from the raw material and man power to finished goods on medium time range to meet the orders. Planning on canned pineapple is considered on pineapple colors, cutting shapes and can sizes to match with customer orders. The various sizes of pineapple are cut into different cutting shapes depends on the pineapple colors. Therefore, the mathematical model is developed to formulate the aggregate planning for canned pineapple. Moreover, the developed methodology is applied to the data set on the canned pineapple factory which results in advance planning resources, high cutting yield, satisfy the customer needs and reduce the total production cost.

Break

17:05-17:10

17:10–19:10, Friday, 27 Apr.

Session C–5: Intelligent System Design and Environmental Resources

Venue: *Thyme Room*

Chair:



N127

Time: 17:10-17:25

Development of The Optimum Composition of Organic Liquid Fertilizer

Hartomo Soewardi, **Ms. Raizsa Laksmita**
Islamic University, Indonesia

Organic Liquid Fertilizer is a liquid made from the decomposition of organic material such as plant residue and animal waste in which its content is more than one nutrient. The advantages of this fertilizer are to resolve a deficiency of nutrient and provide the additional nutrients quickly. Most of the liquid organic fertilizers sold in the market are inappropriate with the national standard of agriculture in Indonesia that is in value range 4 to 9 of the potential of Hydrogen (pH). Majority of the existing fertilizer contains the pH value of less than 4 or higher than 9. It means these fertilizers are too sour and overly bases. This condition hampers the plant growth. Thus, it is necessary to supply the proper fertilizer. This study primarily aims to develop the optimum composition of the organic liquid fertilizer that satisfies the national standard of Indonesian agriculture. Taguchi method was used to design the optimal composition and experimental study was conducted to determine a value of Signal Noise Ratio as well as to validate the best composition. Statistical analysis by using t-test was done to test the hypothesis. The result of this study shows that the new composition of organic liquid fertilizer is valid to satisfy the national standard of pH value that is 7. Thus, it is known that the optimum composition encompassing A1 is the cow urine with 1000 ml, B3 is the probiotic with 6 ml, C1 is the goat dung with 500 grams, and D3 is the spices with 30 grams (A1-B3-C1-D3).



N152

Time: 17:25-17:40

Easy Implementation of Intra-Period Water Market Clearing using CDDP models

Dr. Indranjaka Mahakalanda
University of Moratuwa, Sri Lanka

This paper shows how to clear a market for water, spatially with both consumptive and non-consumptive uses of water. A set of demand/supply nodes in a tree, radiating from a single reservoir represents a mixed-use river catchment. The multi-nodal version of the deterministic Constructive Dual Dynamic Programming (CDDP) procedure developed in this study constructs a net demand curve for water released for the reservoir which to efficiently and implicitly clears the market across all nodes in the catchment. The main advantage of the CDDP approach is that it enables us to backtrack and pick apart prices in ways that allow participants and analysts to understand why prices are, what they are, and from where the value derives



N166

Time: 17:40-17:55

Analysis of Microwave Precipitation in the Topographic Barrier for the Lifting Condensation Level of Clouds Formation

Dr. Thanaset Thosdeekoraphat, Supawat Kotchapradit, Samran Santalunai and

Chanchai Thongsopa
Suranaree University of Technology, Thailand

This paper introduces a physics-based of cloud dynamics that has been considered to calculate the dynamics of rising air parcels in vertically altitude. It is a novel technique to force the lifting condensation level (LCL) by using microwave heating disturbance method to increase the temperature of moist air. The natural process of cloud formation is depended on LCL, relative humidity (R.H.), temperature at altitude (Td), and surface temperature (T0). Theoretical analysis investigations were carried out using a microwave heating to increase temperature at surface level for moist air parcels are uplifted vertically at the condensation level. The calculation of liquid water per cubic meter were performed by using commercial software. The initial condition of terrain barrier equal to 2 km. Considering a moist air parcel as energy absorption load and calculate by using different power are equal to 100, 200, 300, 400 and 500 kW, respectively. In this context, the results are compared by considering at the liquid water density values. The advantage of the LCL algorithm and temperature results at various times of microwave heating is that it can be applied to modify the equilibrium of condensation level for the warm orographic cloud formation.



N142

Time: 17:55-18:10

Modular measuring system for the force distribution in forming processes

Zorn, W., **Mr. Lucas Hamm**, Elsner, R., Drossel, W.-G.
Fraunhofer Institute for Machine Tools and Forming Technology IWU, Dresden

This paper describes a novel approach and its realization for measuring the force distribution within a forming process. Using a modular system integrated between the ram of the machine and the upper die of the forming tool a tool independent application is possible. First metrological examinations will prove the functionality of the system with respect to the detection of process parameter changes and quality indicators. The benefit of such an approach will be shown by means of several use-cases.



N155

Time: 18:10-18:25

A Design of Automated Parking System for Shopping Centers in Metro Manila

Ms. Ma. Janice J. Gumasing and Charles Aaron Atienza
Mapua University, Manila

Parking plays a vital role in a customers' shopping experience. It greatly affects the quality of service of shopping facilities due to long queues, long waiting time and difficulties of customers in finding parking spaces. Investing in an excellent parking system can give shopping malls the edge that will keep their customers retention and loyalty. The primary goal of this study is to design an intelligent parking guidance system for shopping centers in Metro Manila that will enhance the customers' experience in parking facility. 5 shopping centers were selected for the study. Structured questionnaires like ServQual tool, gap analysis, process mapping and time study were used in order to identify weaknesses and problems in the present parking facilities of shopping centers. In addition, regression analysis was also employed to determine significant factors affecting the service quality satisfaction of customers. With this, the researchers were able to design an intelligent parking guidance system that will quickly direct drivers to the closest available parking slot. The proposed parking system was validated through Monte Carlo simulation and failure mode and effects analysis. It was concluded that the new system will significantly improve the queuing time and searching time of drivers and thus improve the overall service quality of parking facilities in Metro Manila.



N159

Time: 18:25-18:40

Design and Implementation of Iot Based Smart Laboratory

Assoc. Prof. M. POONGOTHAI, P. MUTHUSUBRAMANIAN, A.RAJESWARI
Coimbatore Institute of Technology, Coimbatore, India

Internet of things (IoT) provides a platform that allows devices to be connected, sensed and controlled remotely across a network infrastructure. This work aims to develop a smart laboratory system in CIT campus based on IoT and mobile application technologies to monitor the overall activities of the lab including energy consumption and utilization of devices, environmental parameters via sensors, thereby providing a smart environment to CIT with energy efficiency and comfort. IoT smart hardware kits are designed using ESP8266, Arduino UNO, relays, current transformers, Raspberry Pi3 and sensors. The proposed work controls and monitors the devices of the CIT IoT lab using the dashboard developed in Node-RED or ANDROID STUDIO Mobile Application. Devices in laboratory are connected to IoT smart hardware kit. Dashboard and Mobile Application has been developed for interfacing IoT smart hardware kit & MQTT broker. Node MCU is also coded to monitor and update the temperature, humidity and light intensity inside laboratory. A database has been created for a prototype switch to view status history. From the results of implementation, it is observed that the appliances in our lab are remotely monitored and controlled, thereby reducing their energy consumption considerably.



N113

Time: 18:40-18:55

Topological Evolution of Public Transportation Network: A case study of Bangkok Rail Transit Network

Ms. Pijaya Na Bangxang and Pisit Jarumaneeroj
Chulalongkorn University, Thailand

Bangkok Rail Transit Network (BRTN) is the first urban rail transit system in Thailand, initially operated in 1999. Once completed in 2029, the BRTN will be one of the world largest urban rail transit networks, with 285 stations accounting for 508 kilometers of travel distance. To investigate and explain the topological evolution of BRTN from 1999 to 2029, five network indicators were selected, including network diameter, gamma index, degree centrality, closeness centrality, and betweenness centrality. We found that, as the BRTN evolves, both diameter and gamma index seemingly rise indicating better spread and connectivity over time. Likewise, average degree centrality increases from 1.91 to 2.27, while both average closeness and betweenness centrality gradually decline; but with different intensity patterns. More specifically, stations with high closeness tend to be those in the central Bangkok area as they conveniently reach the rest of the network with fewer links; however, as betweenness gives more weights to stations that facilitate transportation, stations with high betweenness tend to be those joining central area to the suburbs.

N007

A sustainability assessment of electricity supply systems

Ndala Mulongo, **Pule Kholopane** and Clinton Aigbavboa
University of Johannesburg, South Africa

One of the major concern striking the 21st century is the development of Sustainable Development (SD) whilst rising mankind welfare. Contemporary technology generally has

controverting impacts over the concept of SD, as portrayed through the present power supply system. Low-priced, easily-available electrical energy is very important to various contemporary society 's most significant technologies and SD advances. Meanwhile, the immense mainstream of the global' s electrical energy is produced by means of fossil fuels, which caused stern ecological burdens. Thus, any shift towards a sustainable, thriving future will necessitate resources of electrical energy, which can offer the benefits of current 's power production system whilst diminishing its harmful impacts. To achieve growing power supplies with negligible ecological effect, shift to the present electricity production practices are needed to take in augmented power efficiency as of fossil fuel burning technologies by introducing renewable energy sources into the market. However, fossil fuels electricity generating resources provide high reliability and low-priced. Therefore, cautious assessment of the sustainability regarding each technology is required to manage upcoming investment and policy. In this paper, we assessed the sustainability of 10 power production, including coal, gas, nuclear, wind, biomass, geothermal, solar thermal, solar Photovoltaic (PV), hydro, wave, on basis of 11 sustainability indicators, including initial investment cost, Levelised Cost of Electricity (LCOE), load factor, Global Warming Potential (GWP), Abiotic Depletion Potential (ADP), Acidification Potential (AD), Eutrophication potential (EP), Freshwater Aquatic Ecotoxicity Potential (FAETP), Human Toxicity Potential (HTP), Marine Aquatic Ecotoxicity Potential (MAETP), Terrestrial Ecotoxicity Potential (TETP). It should be noted that this assessment is conducted in the context of the South African electricity sector context. Additionally, is the first of its kind and aims to provide decision-makers a comprehensive outlook to navigate environmental and economic analysis.

Dinner

19:20-20:20

Poster Presentation

Date: 26 Apr. 2018(Thursday)

Time: 17:00-19:00

Venue: Waterway

| No. | Paper ID | Title |
|-----|----------|---|
| 01 | N003-A | Pricing and cooperative advertising decisions in a dual channel supply chain and uncertain demand function with game theoretical approach |
| 02 | N027 | Implementation of innovative digitalization methods in Reverse Engineering |
| 03 | N042 | Makespan Minimization on Single Batch-processing Machine Considering Preventive Maintenance |
| 04 | N043 | A Simulation Study of Multi-dimensional Clearing Function Considering Degradation for Semiconductor Manufacturing |
| 05 | N053-A | Coating Unit Supply Chain Management by Automated Product Tracking |
| 06 | N055 | Onomic Order Quantity Model with Continuous Quantity Discount and Probabilistic Demand |
| 07 | N060 | Integrated Railway Timetable Scheduling Optimization Model and Rescheduling Recovery Optimization Model: A Systematic Literature Review |
| 08 | N068 | A Comparative Analysis about the Balance Design of the Assembly Line by Branching & Bound Method and Lingo Method |
| 09 | N1001 | Multi-objective Joint Optimization of Batch-discrete hybrid flow shop Scheduling Integrated with Machine Maintenance |
| 10 | N1004 | Reflections on Facilitating the Development of “Internet Plus” Intelligent Manufacturing in China |
| 11 | N101 | A Study of Small Complicated Axisymmetric Parts Manufacturing in Industry 4.0 |
| 12 | N102-A | A Study on the Relationships between Organizational Justice, Job Involvement, and Paternalistic Leadership |
| 13 | N107 | Study on Teaching Methods of Fundamental Electrical Courses in Engineering Education |
| 14 | N109 | Using CDIO to Design a Career-oriented Electrical Engineering Curriculum for Regional Universities of China |
| 15 | N124 | The TQM Integration in Purchasing Function Performance |
| 16 | N128 | Research on health monitoring mechanism based on service invocation |
| 17 | N130 | Impact of Recommender Systems on Unplanned Purchase Behaviours in E-commerce |
| 18 | N147 | Diagnostics of the wire coating production line by implementation of computation methods |
| 19 | N171 | Machine Learning Based Approach for Demand Forecasting Anti-aircraft Missiles |
| 20 | N173 | Some methods for measuring the efficiency of firms utilizing different technologies |
| 21 | N176 | Intention of Opening Up the Network of Personal Data |
| 22 | N187 | Systematic Literature Review and Improved Model for Mitigating Bullwhip Effect in Low Shelf Life Food Supply Chain |
| 23 | N2004 | Gravity filling system of slurry for rod mill sand with high concentration and research on technical transformation in Jinchuan mine |
| 24 | N3006 | Evaluating and analyzing the effectiveness of online advertising |

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|----|-------|---|
| 25 | N3007 | A Simulation Analysis on Regional Logistics Development Based on System Dynamics: the Case of Yunnan Province |
|----|-------|---|



N003-A

Pricing and cooperative advertising decisions in a dual channel supply chain and uncertain demand function with game theoretical approach

Ms. Tayebeh Savoji, Seyed Reza Hejazi
Isfahan University of Technology, Isfahan, Iran

In this work, we investigated pricing and cooperative advertising as the two problems in a dual channel supply chain to verify the coordinate of supply chain. It has been known that coordinate of decisions in supply chain results in increased efficiency of the system as a whole. Therefore, other organizations increasingly benefit from various innovations and strategies to survive and succeed in the competitive market. To this end, one of the most influential parameters is to coordinate these strategies, two of which are pricing and cooperative advertising to attract the customers to the brand and encourage them to purchase. These strategies are currently being applied in a variety of companies, including electronic businesses. Establishment of the internet channel and services is a successful example of new innovations in marketing, thanks to the fast internet growth. The necessity of coordinating becomes more essential in this context to avoid the conflicts between supply chain members. On the other hand, demand and supply is often uncertain, which should be taken into account to approach the real world.

The Stackelberg-manufacturer game was selected in this work to thoroughly study the cooperative advertising. We also used Nash and cooperative games to verify the results. Finally, the effect of parameters on demand functions, profit functions, internet channel price, and retail price was investigated.

N027

Implementation of innovative digitalization methods in Reverse Engineering

Dr. Monika Telišková, Martin Pollák
The Technical University of Kosice Presov, Slovakia

The use of contemporary reverse engineering techniques may be classified in the modern field of tools which enhance the development of the economy not only in the engineering industry. Nowadays, the producers of reverse engineering devices come up daily with new possibilities of how to significantly reduce the preparation time and rationalize the development process, yet the link between the non-destructive diagnostics and reverse engineering is still not covered. This article considers the aim of creating a device, by integrating a specific software and hardware platform, which will serve to diagnose hard to reach places, and based on data recovered by the technique of laser beam scanning, identify trouble spots and find convenient solutions for creating new components or modifying old ones.



N042

Makespan Minimization on Single Batch-processing Machine Considering Preventive Maintenance

Ms. Jingying Huang, Liya Wang
Shanghai Jiao Tong University, China

This paper considers the problem of minimizing makespan on a single batch-processing machine considering preventive maintenance. A mathematical model for integrating flexible preventive maintenance into the batch-processing machine scheduling is proposed. A two-stage method is proposed to solve the problem. A batching rule considering maintenance is proposed to group jobs into batches firstly. And then we improve existing heuristics to schedule production and maintenance. Computational results indicate that the two-stage method based on proposed batching rule and improved heuristics is effective.

N043

A Simulation Study of Multi-dimensional Clearing Function Considering Degradation for Semiconductor Manufacturing

Ms. Jingying Huang, Liya Wang and Jianqiu Huang
Shanghai Jiao Tong University, China

Clearing function (CF) is a function describing the nonlinear relationship between output and different forms of workload of a specific manufacturing facility. Recent studies on clearing function assume fixed availability level without considering degradation when the machines are at high workload. In reality, maintenance activities and failures will result in changes in the availability level. This paper proposes a multi-dimensional clearing function considering machine's degradation, and then a simulation model is built for semiconductor manufacturing using the idea of CF. The correlation between throughput, availability and production workload is studied through a detailed analysis of the simulation model. And the influence of degradation on the CF is verified.



N053-A

Coating Unit Supply Chain Management by Automated Product Tracking

Mr. Ehsan Saedi, Keivan Hosseini and Tayebeh Savoji
Yazd University, Iran

An automated product tracking method is introduced in this work to fully control the supply chain management of any desired coating unit. The mechanism of this system is to specify a unique code for each input part at very beginning of the process. Such special code, generated by Work In Process (WIP) software, correlate the parts specifications with the customer requirements. Principal equipment in this system are barcode and data collector. Essential information that can be achieved and processed from the software in supply chain management are:

1. Raw material management,
2. Part's position and situation,
3. Activities that have been done on each part at any desired time,
4. Assigned worker to each task,
5. Activity real time,
6. Quality control information,
7. Staff efficiency calculation based on their real output, and
8. Outsourcing management.



Although this software is generated for a special coating unit, it is potential to be adjusted to respond to any customer's needs.

N055

An Economic Order Quantity Model with Continuous Quantity Discount and Probabilistic Demand

Ms. Fitri A. Anugrah, Ardian Rizaldi, Ashaeurizky Dilianaputri, Riska Ummaya and Senator Nur Bahagia
Bandung Institute of Technology, Indonesia

In this research we develop mathematical model of inventory problem which considers interaction of unit cost and order quantity. It is assumed that demand is a function of selling price which depends on unit cost. Furthermore, unit cost is a function of order quantity. We develop two kinds of relationship between unit cost and order quantity, which are linear and hyperbolic. Customer demand is probabilistic with known mean and standard deviation. Service level is calculated based on the number of fulfilled demand. We assume that backorder policy will be decided if there is a shortage. The result shows that there is no significant difference between linear and hyperbolic relationship. However, hyperbolic model is considered more realistic than linear model because it can ensure that the unit cost is not less than minimum determined unit cost

N060



Integrated Railway Timetable Scheduling Optimization Model and Rescheduling Recovery Optimization Model: A Systematic Literature Review

Mr. Erlangga Bayu Setyawan, Dida Diah Damayanti
Telkom University, Indonesia

Research study in the railway optimization can be divided into strategic, tactical and operational area. In this paper, we will focus on discussing railway scheduling optimization and rescheduling recovery technique which (tactical and operational area) because these topics are usually complex and in the real case train is often delay from a predetermined schedule. We use Systematic Literature Review (SLR) to reviewing selected journals and articles which related with our research focus. The output of this Systematic Literature Review is possibility opportunity study in the railway scheduling and rescheduling recovery technique optimization. We also proposed an enhanced no-wait blocking parallel-machine job-shop-scheduling model optimization on railway scheduling and rescheduling recovery technique for our next research. The proposed model will consider new variable about rail line balancing using drum buffer rope, one of theory of constrained, and integrated with number of passenger car composition number and track backup rescheduling in partial double track rail line.

N068



A Comparative Analysis about the Balance Design of the Assembly Line by Branching & Bound Method and Lingo Method

Ms. Jia Shuyuan, Huang Li, Li Qin and Gu Yonghu
PanZhiHua University, China

Through field research on the assembly of household electric fans, the analysis of the existing problems was analyzed, and the time of product assembly process were measured. Using the branch and bound method and lingo method, respectively, to solve the problem of balance, redesign a assembly line with high balance rate and high capacity. Finally, the two methods were compared with each index, selected the optimal program.

N1001

Multi-objective Joint Optimization of Batch-discrete hybrid flow shop Scheduling Integrated with Machine Maintenance

Yangyang Fei, Huimin Ma

University of Shanghai for Science and Technology, China

Many studies on production scheduling are focusing on production line composed of same type of machines. However, multiple processing form are existing in real production environment. And preventive maintenance and emergency repair cause the unavailability of machine will affect production efficiency. In order to solve the conflict between dispatch schedule and preventive maintenance plan. This paper develop a joint optimization on a hybrid flow shop model including not only batch processor but also discrete processor. And a preventive maintenance strategy based on reliability is designed. The multi-objective is to simultaneously minimize the makespan and total production cost. Particle swarm optimization and heuristic algorithm are proposed to solve the problem. Then a large number of computational instances are conducted. The experimental results show that joint optimization are superior compared with independent decision-making. And it also show the effects of different unit production cost for batch size in the end.

N1004

Reflections on Facilitating the Development of “Internet Plus” Intelligent Manufacturing in China

Assoc. Prof. Yong Tao, Qiushi Li, Gang Zhao, Wen Zhao

Beihang University, Beijing, China

The definition and connotation of “Internet plus” intelligent manufacturing are introduced. The development status of internet plus intelligent manufacturing is proposed.

The problems in the whole industry chain coordination, intelligent manufacturing simulation, virtualization research and intelligent decision-making are presented. From the perspective of resource input ability, application level integration and collaborative innovation capability, the development trend of “Internet plus” intelligent manufacturing is given. The key technologies of “Internet plus” intelligent manufacturing such as intelligent R&D platform, knowledge automation, industrial cognitive network, industrial big data and industrial cloud, intelligent service and management are proposed. The key task of integrated industrial ecology for “Internet plus” intelligent manufacturing are given. Finally, the policy suggestion and guarantee to speed up the development of Internet plus intelligent manufacturing are proposed.

N101

A Study of Small Complicated Axisymmetric Parts Manufacturing in Industry 4.0

Mr. Chengcheng Zhu, Shengdun Zhao and Shuaipeng Li

Xi'an Jiaotong University, China

The Industry 4.0 is regard as the fourth industrial revolution which is geared to the demand of customization products. As one kind of basic components in industry, the small complicated axisymmetric parts are usually low-volume customization products. So it is significant to explore their manufacturing process in the Industry 4.0 era. The production procedure of a representative 4 stages cone has been studied. First, requirements of customers are sent to the industrial internet. Then technology suppliers will design an appropriate forming process with the CAD (Computer-Aided Design), CAE (Computer-Aided Engineering), CAPP (Computer-Aided Process Planning), CAM (Computer-Aided Manufacturing) and other

Industry 4.0 technologies. Finally, distributed smart factories will organize production and send target products to customers depending on the industrial internet. Based on this study, it can be seen that the metal spinning method is suitable for the small complicated axisymmetric parts producing in Industry 4.0. The remote customization manufacturing will be more popularize. Even, the CAD, CAE, CAPP and CAM method will play more important roles in manufacture with the help of industrial internet.



N102-A

A Study on the Relationships between Organizational Justice, Job Involvement, and Paternalistic Leadership

Assoc. Prof. Shu-Ping Yu

Ming Chi University of Technology, Taiwan

Business environments are changing rapidly at this time. Human capital has become a key factor in the competitiveness of enterprises and often determines organizational performance and survival. Therefore, an important issue for businesses is that of understanding how to improve employee satisfaction and job involvement, to reduce turnover rates. To this end, it is worth exploring what kinds of systems and leadership styles managers use to improve job involvement effectively, especially with regard to the young people of Generation Y. This research draws on previous studies in the literature on organizational justice, paternalistic leadership styles, and job involvement as a theoretical basis and a frame for its hypothesis. We used a questionnaire to survey the employees of small and medium-sized enterprises. There was a total of 331 valid questionnaires; the effective response rate was 94.57%. A regression analysis using SPSS statistical software revealed the following results: distributive justice, procedural justice, and interactional justice as part of organizational justice all had a significant positive effect on employee job involvement. Authoritarian leadership styles weakened the relationship between organizational justice and employee job involvement, while benevolent and moral leadership strengthened this relationship. In particular, population attributes of the job involvement results demonstrated that job involvement was higher for female than for male employees, higher for married than unmarried employees, higher for senior than junior employees, and higher for more educated employees. The conclusion of the article's implications for research and practice are also examined and provided.



N107

Study on Teaching Methods of Fundamental Electrical Courses in Engineering Education

Ms. Jianpei Chen, Fei Gao, Lingling Kong, Lin Cui

Yunnan Minzu University, China

Developing students' engineering ability is a core issue of undergraduate education on Electrical Engineering (EE) program. There are many student-centered teaching methods have been applied to technological courses, special for junior and senior, in EE program during the past decades. However, just a few of the methods were used in main fundamental electrical courses for fresh man and sophomore. The paper reviews the student-centered teaching approaches used in EE and then propose to integrate Project Based Learning(PjBL) and Problem Based Learning(PBL) pedagogical approaches into fundamental electrical courses. Our objective of proposal is to improve engineering ability for fresh man and sophomore through teaching design based on the methods. Furthermore, we design two teaching processes based on PBL and PjBL methods in Analog Electronic Circuit course.



N109

Using CDIO to Design a Career-oriented Electrical Engineering Curriculum for Regional Universities of China

Ms. Lin Cui, Fei Gao, Jianpei Chen and Lingling Kong
Yunnan Minzu University, China

In China, some traditional Electrical Engineering curriculum are designed based on the knowledge structure of discipline and lack of practice, which cause the graduates hard to fully meet the requirement of applied and compound talents. So Ministry of Education has put forward the strategy of transition for some regional universities. Curriculum reform is one of the key reforms. Considering the knowledge and the comprehensive abilities needed for career, this paper presents a double closed-loop model for curriculum design. Taking the career of 418 graduates as a sample, it designs a two-dimensional curriculum with the career-oriented outer loop. The horizontal axis is three modules according to the career classification, and the vertical axes respectively follow the progressive relationship of the theoretical knowledge and engineering practice. It contains professional module courses, project design courses, career guidance courses, and so on. In the CDIO-oriented inner loop, student outcomes are assessed in order to adjust the curriculum. CDIO Syllabus and ITU skills are integrated into the curriculum, which enhances the achievement of student outcomes.

N124

The TQM Integration in Purchasing Function Performance

Assoc. Prof. Krisda Bisaslyaputra
Ramkhamhaeng University, Thailand

The Industrial Engineering techniques have been applied to the performance improvement in organization constantly. The major extents include supply chain management is the main element in productivity improvement and firm operational performance. Many researchers have referred to the factors to make progress of the performance. The productivity improvement is fundamentally related to the quality management therefore, the improvement can be interrelated. The prominence of total quality management (TQM) principles are establish significantly correlated with overall performance in both qualitative and quality. Through a studies of various manufacturing and service firms in many countries also found that each of the TQM factor a noteworthy positive association with performance. A recent elaboration in purchasing is the extensive embracing of the philosophy of SCM. The focus on SCM has not led to a lessening of importance for purchasing function as the leading function and foremost in the process of supply chain, since SCM philosophy subsumes purchasinbg. For instance, it has been noted that supply chain coordination should clearly increase the usage and performance of purchasing. The weighted importance of the factors in TQM constituted to the improvement depending on environment and factors. The important role the supply chain take part in the quality process. However, the role of the each TQM elements and the performance improvement relationship by applying the TQM process has not been directly investigated to any large extent. Two hypotheses regarding the role of relationships in the success of TQM implementation were tested. The impact of a TQM strategy within purchasing function, and analyze a organizational culture model incorporating TQM as the focal construct with supply chain management strategy (SCMS) as an antecedent and supply chain competency (SCC) and organizational performance as consequences. Data from both private and government purchasing managers and workforce were collected. Study results indicate significant, positive relationships between a purchasing strategy and TQM, and supply chain performance. The results demonstrate that buyerDsupplier relationships are diærent in Firms with successful TQM programs. Hypothesis 1 suggests that those organizations with successful TQM programs will have more formal appliances for interacting with suppliers. The second hypothesis suggests. The second hypothesis reports to a greater perceptive consumer needs by successful TQM.



N128

Research on health monitoring mechanism based on service invocation

Ms. Xuan Mei, Xinming Tan
Wuhan University of Technology, China

During the process of service discovery in Eureka, the status information in the service registry can't be updated in time once the registration was successful, and some services with fault were invoked by the client because they were indistinguishable in the registry, resulting in a reduction in the success rate of the service invocation. Aim to solve the problems, this article added the health monitoring about the result of service invocation based on the health checks in Eureka, then the results fed back to the service registry to update the health status of the service instance, which guaranteed the success rate of follow-up service invocation, and enhanced the stability of the service through improvement of health monitoring.



N130

Impact of Recommender Systems on Unplanned Purchase Behaviours in E-commerce

Ms. Ying Zhang, Chen Caixia, Gu Wen , and Liu Xiaogang
Donghua University, China

The emergence of the Chinese online marketplace has stimulated the increasing popularity of recommender systems among websites as a tool that assists consumers to reduce information overload. This study proposes a framework that employs a user-centered approach to evaluate the impact of recommender systems on unplanned purchase behaviours of Chinese consumers in e-commerce. Multi-item scales are adopted from the literature and used to measure five constructs, namely, perceived ease of use, perceived usefulness, shopping enjoyment, consumer satisfaction, and unplanned purchase behaviour. The final samples comprised 281 usable Chinese respondents in both gender groups via online survey. Structural equation modelling technique is employed to test all hypotheses. Results show that perceived usefulness plays a leading role in influencing impulse buying. Apart from having a direct and positive effect on unplanned purchase behaviours, perceived usefulness indirectly contributes to impulse buying by affecting consumer satisfaction, which is also essential to promoting unplanned purchases.



N147

Diagnostics of the wire coating production line by implementation of computation methods

Prof. Ivan Kuric, Ivan Zajačko, Miroslav Císar, Tomáš Gál
University of Žilina, Slovakia

If we want to understand and manage any manufacturing process, it is necessary to ensure its objective and detailed description in real time. Diagnostic tools and methods are used for this purpose, but often they contain isolated descriptions of each process parameter. For the diagnosis to be as accurate as possible, we need to ensure a comprehensive collection of parameters describing the manufacturing process, which usually creates a very large set of data. A sufficiently large set of data obtained by diagnostic process enables us to discover, in addition to the obvious characteristics of the manufacturing process, also the hidden correlations between the parameters of the manufacturing process that allow us to understand the mutually affecting phenomena in the production process by implementing progressive and modify them to improve the results of the manufacturing process. Application of progressive methods in the complex diagnosis of the manufacturing process is the subject of our research.



N171

Machine Learning Based Approach for Demand Forecasting Anti-aircraft Missiles

Mr. Jaedong Kim, Hanjun Lee, Soobin Choi
South Korea

The Korean military's demand forecasting of spare parts is a major topic for logistics assistance, which considerably affects efficient management of the national defense budget. A time series forecasting method has previously been used, but the results lack accuracy and need improvement. In this study, we collected mass data including 17,451,247 structured and unstructured data on anti-aircraft missile data in the army's DELIIS. Then, we used an ensemble technique to reduce the model's variability and demonstrated increased accuracy for demand forecasting compared with the previous time series method.



N173

Some methods for measuring the efficiency of firms utilizing different technologies

Mr. Soobin Choi, Jaedong Kim, Hanjun Lee
South Korea

In business or economic analysis, measuring the technical efficiency of firms (or production units) plays a key role in finding out causes of inefficiency and improving productivity. Until recently, most of the studies regarding this issue have focused on evaluating homogeneous firms operating with a same technology. However, very often, practitioners should compare firms classified into different groups which use different group technologies. In this paper, to compare the technical efficiency of firms in distinct groups, we develop models of aggregate production frontiers: convex hull frontier and optimal allocation frontier. Our methods present several important benefits. First, our methods do not require any prior assumption on the shape of the aggregate frontier and group frontiers. Second, based on convex optimization, our models measure the technical efficiency with efficient (fast) computation, using convex programming algorithms. Third, our methods give the upper and lower bounds on the technical efficiency scores.



N176

Intention of Opening Up the Network of Personal Data

Mr. Mao-Sung Chen, Tung-Kuan Liu and Ming-Tien Tsai
University Rd., Yanchao Dist. ,Taiwan

The emergence of Internet changing people's lifestyle, its social networking site gradually shift from physical space to virtual space above, in this context, the Internet has become indispensable to life at the same time, the establishment of personal files on the network has become a new trend. A large number of users on Facebook to share their personal information, opened in the past many researches are still mostly the community web site of the information, products, systems and service quality issues to investigate the user satisfaction and continued use intentions.

This research focuses on the user point of view, description of planned behavior to explore the personal attitudes, subjective norms, perceived behavior, combined with the network behavior of construct-related dimensions, to discuss individual factors of the personal network files. Finally, this research found that users due to "gender", "age", "education", "monthly income", "occupation" of the different intentions for opening up personal network files. Among the relevant dimensions in the research, the reference peer group is the greatest impact to make people open personal network files or not. The users' own network capacity does not affect the intention. Website trust mechanisms influence behavioral intentions, But when put it with the risk, it will affected by the risk to the user's intent.



N187

Systematic Literature Review and Improved Model for Mitigating Bullwhip Effect in Low Shelf Life Food Supply Chain

Ms. Nia Novitasari and Dida Diah Damayanti
Telkom University, Indonesia

Bullwhip effect in the supply chain distribution network is a phenomenon that is highly avoided because it can lead to high operational costs. It drew the attention of researchers to examine ways to minimize the bullwhip effect. Bullwhip effect occurs because of incorrect company planning in pursuit of customer demand. Bullwhip effect occurs due to increased amplitude of demand variance towards upper supply chain level. If the product handled is a perishable product it will make the bullwhip effect more sensitive. The purpose of this systematic literature review is to map out some of the variables used in constructing mathematical models to minimize the bullwhip effect on food supply chains that have perishable product characteristics. The result of this systematic literature review is that the authors propose an appropriate optimization model that will be applied in the food supply chain sales on the train in Indonesian railways in the next research.

N2004

Gravity filling system of slurry for rod mill sand with high concentration and research on technical transformation in Jinchuan mine

LI Litao, YANG Zhiqiang, GAO Qian, WANG Yongding
University of Science and Technology of Beijing, China

The key technology of the filling mining is the gravity transportation of high-density slurry, and the filling system design is an important part of this key technology. In view of the problems during design and filling producer in the phase I and phase II project for filling system in Jinchuan mine, the study on the filling system design optimization and technical renovation were carried out. First the first phase of filling system process flow and main production system was introduced; Then research results on filling system design and technical innovation in the gravity filling pulp for rod mill sand filling material was given which include filling process flow, whole tailings processing, material transport and slurry preparation, etc. Finally, the filling testing instrument and the function of the high concentration filling system of rod mill sand were provided. The project experience of filling system design and technical transformation in Jinchuan mine can provide valuable experience for similar mine filling system design.



N3006

Evaluating and analyzing the effectiveness of online advertising

Ms. Huini Zhou, Li Li, Xiaoguang Gu
Nanjing University of Science and Technology, China

This paper analyzes similarities and differences between online advertising and traditional advertising, and puts forward the push-pull model for communication process of online advertising firstly. Then the evaluation index system is constructed from four dimensions (psychological effectiveness, communication effectiveness, economic effectiveness and social effectiveness) based on the push-pull model. Next, cloud model is used to transform the qualitative index of index system into quantitative data. Finally, the independent design of evaluation indexes is carried out by Mahalanobis-Taguchi Gram-Schmidt (MTGS) method. The

numerical study shows that the evaluation index system can be used to evaluate the effectiveness of online advertising comprehensively and rationally, and the transform problem of qualitative indexes and the correlation problem of indexes can be solved by cloud model and Mahalanobis-Taguchi Gram-Schmidt method.



N3007

A Simulation Analysis on Regional Logistics Development Based on System Dynamics: the Case of Yunnan Province

Mr. Yinyuan Si, Wensheng YANG, Huini Zhou
Nanjing University of Science and Technology, China

With the rapid development of e-commerce, logistics is facing great pressure and challenges. In order to give full play to logistics for the promotion of economy, this paper analyzes systematically Regional Logistics' architecture based on system dynamics and establishes the system dynamics model of Regional Logistics Development according to the systematic relationship between causal feedback loops. Besides, the paper simulate the impact of different policy factors on regional logistics and economy. The result shows that the promotion effect of fixed assets investment is more obvious, compared with logistics efficiency and capital conversion rate. But the combination of the three policies perfects well, and it can provide theoretical support for developing Yunnan logistics and optimizing logistics resource allocation.

Listener

L001

Mr. Duy Nguyen Duc

Sirindhorn International Institute of Technology, Thailand

L002

Mr. Si-Yan, Yang

Ming Chi University of Technology, Taiwan

L003

Prof. Byung Do, Chung

Yonsei University, the Republic of Korea

L004

Mr. Dong Heon, Cho

Yonsei University, the Republic of Korea

L005

Mr. Yong Jun, Kim

Yonsei University, the Republic of Korea

L006

Mr. P. MUTHU SUBRAMANIAN

Coimbatore Institute of Technology, Coimbatore, India

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Singapore Visit

Date: 28 Apr. 2018(Saturday)

Time: 9:00-17:00

Attention:

- This visit will charge **100USD** for each. (Pay to join before Apr. 15, 2018);
- or you could choose to enjoy free time on Apr. 28 to explore Singapore by yourself;
- **9:00 AM**, pick up at gathering spot.
- Please be there on time, or you will miss the visit.

Route:

you will visit:

Apr. 28: Merlion Park -- Gardens by the Bay -- Little India -- China Town-- Clarke Quay

End around 17:00.

Service includes:

- Transportation, Fuel, Parking fees, Entrance fees;
- English speaking tour guide;
- Lunch;
- Pick-up & drop-off at gathering spot.

Service excludes:

- Personal expenses (not mentioned above).

Remarks

- The itinerary / duration to visit may change without advance notice depending on group size or unexpected local situation.
- The participants should go to the assembly point by themselves, no pick-up service.

Scenic Introduction:

No.1 Merlion Park



The body symbolises Singapore's humble beginnings as a fishing village when it was called Temasek, meaning 'sea town' in Old Javanese. Its head represents Singapore's original name, Singapura, or 'lion city' in Malay. Today, you can glimpse this legend at Merlion Park. Spouting water from its mouth, the Merlion statue stands tall at 8.6 metres and weighs 70 tonnes. This icon is a 'must-see' for tourists visiting Singapore, similar to other significant landmarks around the world. Built by local craftsman Lim Nang Seng, it was unveiled on 15 September 1972 by then Prime Minister Lee Kuan Yew at the mouth of the Singapore River, to welcome all visitors to Singapore.

No.2 Gardens by the Bay



Located next to Marina Reservoir, Gardens by the Bay offers breath-taking waterfront views. This multi-award winning horticultural destination spans 101 hectares of reclaimed land, and is made up of two main areas – Bay South Garden and Bay East Garden. At the Cloud Forest, a 35-metre tall mountain is veiled in mist and covered in lush vegetation amidst the world's tallest indoor waterfall. Bay South Garden is the largest of the gardens. Inspired by an orchid, the design resembles Singapore's national flower, Vanda 'Miss Joaquim'. You can't miss the massive Supertrees here. These tree-shaped vertical gardens are between nine to 16 storeys tall. Walk on the suspended walkway between two Supertrees to enjoy a bird's eye view of the gardens. In the evening, catch the sky show of choreographed lights and sounds at the Garden Rhapsody amidst the Supertrees. Head to Bay East Garden for the perfect picnic setting with lush lawns and tropical palm trees. From the waterfront promenade, you will see a picturesque view of the city skyline.

No.3 Little India



Little India today is one of Singapore's most vibrant districts. As you walk down Serangoon Road and neighbouring streets, explore their mix of Hindu and Chinese temples, mosques and churches. Fill your tummy with South Indian vegetarian food, North Indian tandoori dishes and local fare like roti prata (round pancakes) and teh tarik (pulled tea in Malay). Try to spot the brewers 'pull' the hot milk tea – it's amazing showmanship. Don't forget to shop. The 24-hour shopping mall Mustafa Centre offers everything from electronics to groceries, or take your pick from open-air Tekka Centre, goldsmith shops and sari stores. With its close proximity to the city and a bohemian vibe, many artists also call Little India home. Do visit during Deepavali (usually October or November) and Pongal (mid-January) – the joyous celebrations are wonderful to observe.

No.4 Chinatown



The cramped five-foot-ways, dingy alleys and raucous street hawkers are relics of Chinatown's past. Yet pockets of history remain in Chinatown, along with more modern sights. You could easily spend a few days wandering through these still-narrow streets. Family-run goldsmiths, medicinal halls and teahouses ply their trades next to sleeker neighbours such as hipster bars and lifestyle shops. If you're a foodie, try 'char kway teow' (stir-fried noodles) and 'satay' (barbecued meat skewers) at Chinatown Food Street, a row of hawker stalls, shophouse restaurants and kiosks along Smith Street. For trendier tastes, chic restaurants and bars are in Neil Road, Duxton Road and Keong Saik Road. The vibe is electric in Club Street and Ann Siang Road on Friday and Saturday nights, when locals and expats head down for dinner and drinks.

No.5 Clarke Quay



Clarke Quay is a historical riverside quay in Singapore, located within the Singapore River Planning Area. The quay is situated upstream from the mouth of the Singapore River and Boat Quay. At present, five blocks of restored warehouses house various restaurants and nightclubs. There are also moored Chinese junks (tongkangs) that have been refurbished into floating pubs and restaurants. The Cannery is one of the anchor tenants of the place. There are over 5 different concepts in one block. Another anchor tenant, The Arena, will be home to Singapore's First Permanent Illusion Show (starting August 2008) starring J C Sum and 'Magic Babe' Ning. The G-MAX reverse bungee, the first in Singapore, is located at the entrance which opened in November 2003. Notable restaurants and nightclubs include Hooters and Indochine. River cruises and river taxis on the Singapore River can be accessed from Clarke Quay. One of its most popular attractions is its exciting host of CQ's signature events happening once every quarter. Clarke Quay has become known as a hub of Singaporean nightclubs including Zirca, and up until 2008, the Ministry of Sound.

