

# FRONT PAGE

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**ICCMA 2018**

2018 The 6th International Conference on Control,  
Mechatronics and Automation

**ICCEE 2018**

2018 The 11th International Conference on Computer and  
Electrical Engineering

Tokyo, Japan | October 12-14, 2018

Published by



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Proceedings services for science



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# AGENDA

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[October 12, 2018]

## Registration & Materials Collection



10:00-17:00



TKP Ichigaya Conference Center



Room 6F @ Level 6



Give your **Paper ID** to the staff



Sign your name in the attendance list and check the paper information



Check your **conference kit**, which includes conference bag, name tag, lunch & dinner coupon, conference program, the receipt of the payment, the USB of paper collection and a pen



### Tips for Participants

- ✧ Your punctual arrival and active involvement in each session will be highly appreciated.
- ✧ The listeners are welcome to register at any working time during the conference.
- ✧ Get your presentation PPT or PDF files prepared.
- ✧ Regular oral presentation: 15 minutes (including Q&A).
- ✧ Laptop (with MS-Office & Adobe Reader), projector & screen, laser pointer will be provided by the conference organizer.
- ✧ Please keep all your belongings (laptop and camera etc.) with you in the public places, buses, metro.
- ✧ About Dress

All participants are required to dress formally.

# AGENDA

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[October 13, 2018]

MORNING



TKP Ichigaya Conference Center



ROOM 6E @ Level 6



Speeches

Chaired by Prof. Genci Capi

Hosei University, Japan

09:00-09:10	Opening Remarks	<b>Prof. Genci Capi</b> Hosei University, Japan
09:10-09:50	Keynote Speech	<b>Dr. Akira Namatame</b> Professor Emeritus, National Defense Academy of Japan Scientific Advisor, Asian Office of Aerospace Research & Development, US Air Force Research Laboratory <b>Speech Title:</b> Autonomous systems
09:50-10:30	 Coffee Break & Group Photo  @ ROOM 6E	
	Poster Display CJ1-0011, CJ1-0013, CJ1-0035, CJ1-0044, CJ1-0048, CJ1-1003, CJ2-041, CJ2-045, CJ2-104	
10:30-11:10	Keynote Speech	<b>Prof. Dr. Matsumoto Mitsuharu</b> University of electro-communications, Japan <b>Speech Title:</b> Nonlinear filters and its application to image and audio processing
11:10-11:50	Keynote Speech	<b>Prof. Genci Capi</b> Hosei University, Japan <b>Speech Title:</b> Toward human friendly intelligent robotic systems



Lunch @ 3G @ Level 3 | <11:50-13:00>

# AGENDA



[October 13, 2018]

AFTERNOON

📍 ROOM 6G @ Level 6	
13:00-13:30	<b>Invited Speech--Complex Order Control for Precision Mechatronics</b> Dr. Hassan HosseinNia, TU Delft, Netherlands
13:30-16:00 	<b>Session I - Robot and Control System</b> Chaired by Dr. Hassan HosseinNia TU Delft, Netherlands <hr/> <b>10 Presentations</b> —CJ1-0005, CJ1-0030, CJ1-0042, CJ1-0046, CJ1-0004, CJ1-0008, CJ1-0043, CJ1-0047, CJ1-0026, CJ1-0052
16:00-16:15	 <b>Coffee Break @ ROOM 6G</b>
16:15-19:00 	<b>Session III - Data Science and Software Engineering</b> Chaired by Prof. Haklin Kimm East Stroudsburg University, USA <hr/> <b>11 Presentations</b> —CJ2-026, CJ2-062, CJ2-076, CJ2-082, CJ2-043, CJ2-008, CJ2-042, CJ2-057, CJ2-102, CJ2-048, CJ2-103

📍 ROOM 6F @ Level 6	
13:00-13:30	<b>Invited Speech-- Control issues in hybrid energy system under different operating conditions</b> Prof. Sathans Suhag, National Institute of Technology Kurukshetra, India
13:30-16:00 	<b>Session II –Power Machinery &amp; Measurement and Control Technology</b> Chaired by Prof. Sathans Suhag National Institute of Technology Kurukshetra, India <hr/> <b>10 Presentations</b> —CJ1-0020, CJ1-1001, CJ1-0027, CJ1-0029, CJ1-0031, CJ2-089, CJ2-093, CJ1-1002, CJ1-0039, CJ1-0012
16:00-16:15	 <b>Coffee Break @ ROOM 6F</b>
16:15-19:00 	<b>Session IV - Computer Science and Information Engineering</b> Chaired by TBA <hr/> <b>11 Presentations</b> —CJ1-0032, CJ2-023, CJ2-087, CJ2-024, CJ2-029, CJ2-068, CJ2-100, CJ1-0018, CJ2-075, CJ2-063, CJ2-101



**Dinner @ Room 3G @ Level 3 | <19:00-20:00>**

# AGENDA

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[October 14, 2018]

MORNING

ROOM 6G @ Level 6	
9:00-12:00 	<b>Session V—Electronics and Communication Engineering</b> Chaired by <b>Prof. Nji Raden Poespawati</b> Universitas Indonesia, Indonesia <hr/> <b>12 Presentations</b> —CJ1-0021, CJ1-0028, CJ1-0041, CJ2-017, CJ2-022, CJ2-069, CJ2-081, CJ2-090, CJ2-091, CJ2-003, CJ2-098, CJ2-078
ROOM 6F @ Level 6	
9:00-11:45 	<b>Session VI- Electronic Power Technology and Energy</b> Chaired by <b>Assoc. Prof. En-Chih Chang</b> I-Shou University, Taiwan <hr/> <b>11 Presentations</b> —CJ2-016, CJ2-021, CJ2-049, CJ2-054, CJ2-061, CJ2-066, CJ2-094, CJ2-074, CJ2-079, CJ2-055, CJ1-0036



Lunch @ 6G @ Level 6 | <12:00-13:00>



[October 14, 2018]

AFTERNOON

ROOM 6G @ Level 6	
13:00-14:45 	<b>Session VII—Image Analysis and Processing Technology</b> Chaired by TBA <hr/> <b>7 Presentations</b> —CJ1-0023, CJ1-2001, CJ2-015, CJ2-040, CJ2-086, CJ2-1003, CJ1-0033
ROOM 6F @ Level 6	
13:00-14:45 	<b>Session VIII- Vehicle Control and Mechanical Engineering</b> Chaired by TBA <hr/> <b>7 Presentations</b> —CJ1-0045, CJ2-001, CJ1-0007, CJ1-0014, CJ1-0019, CJ1-0025, CJ2-1007

# AGENDA

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## Tokyo Tours Recommendation



### ➤ Tokyo Afternoon



Guide



Bus



Walking

Enjoy a Sumida River Cruise as well as a visit to the Imperial Palace Sakashita-mon Gate and Senso-ji Temple with a National Government Licensed English Guide Interpreter on this sightseeing bus tour of Tokyo. This afternoon tour lasts for 4 hours.

1. Marvel at the sweeping view of the city including Odaiba and Tokyo Tower from the Seaside Top observatory deck on the 40th floor of the World Trade Center Building.
2. Enjoy a cruise up the Sumida River and visit Asakusa's Senso-ji Temple and Nakamise street, experiencing the traditional atmosphere of Tokyo.

\* Reservation Website:

<https://www.japanican.com/en/tour/detail/BUS1JT01H2MMS/?typecd=TOU&destcd=V10&typegrpcd=TPA>

### ➤ Tokyo Walking Tours

\* Reservation Website:

<https://www.tokyowalkingtours.com/>

### ➤ YOKOSO Japan Tour & Hotel

\* Reservation Website:

<https://www.yokosojapan-tour.com/en/tours>

# WELCOME

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Dear professors and distinguished delegates,

On behalf of the Conference Organizing Committee, we would like to welcome you to Tokyo, Japan for 2018 The 6th International Conference on Control, Mechatronics and Automation (ICCMA 2018) & 2018 The 11th International Conference on Computer and Electrical Engineering (ICCEE 2018).

The aim of the conference is to bring together researchers and practitioners working on theory, techniques and applications that concern control, mechatronics and automation & computer and electrical engineering. We hope that the conference will present opportunities for many open technical interchanges in individual and group settings on key technology issues, during the conference and the potential for future collaborations among the participants, afterwards.

This year, we have accepted 88 presentations from 26 countries and regions including Norway, USA, Australia, Czech Republic, Malaysia, France, Mexico, China, Denmark, Iran, Taiwan, Japan, Colombia, Korea, Indonesia, Poland, Pakistan, India, Peru, South Africa, Russia, Senegal, Romania, Thailand, Egypt, Bosnia and Herzegovina in this program. All of the papers were subjected to peer-review by the program technical committee members and international reviewers.

The conference program is highlighted by the Keynote Speakers and Invited Speakers: Dr. Akira Namatame from National Defense Academy of Japan/ Asian Office of Aerospace Research & Development, US Air Force Research Laboratory; Prof. Genci Capi from Hosei University, Japan; Prof. Dr. Matsumoto Mitsuharu from University of electro-communications, Japan; Dr. Hassan HosseinNia from TU Delft, Netherlands; Prof. Sathans Suhag from National Institute of Technology Kurukshetra, India. Apart from this, the conference is set up with 8 parallel Sessions. Participants will make presentations and discussions over 8 topics, i.e. Robot and Control System; Power Machinery & Measurement and Control Technology; Data Science and Software Engineering; Computer Science and Information Engineering; Electronics and Communication Engineering; Electronic Power Technology and Energy; Image Analysis and Processing Technology; Vehicle Control and Mechanical Engineering. In addition to the core oral presentation, the conference also has poster session, which provides more opportunities for experts and scholars to communicate with each other.

Tokyo, where the conference is held, is the financial, political and commerce heart of Japan. While the pace of the city can be overwhelming, it also shows the quiet, tranquil side. Tokyo has an incredible variety of museums, galleries, shrines and temples. In the city of Tokyo there is a wide spectrum of places to visit, from the very distinguished Imperial Palace, home of the Emperor and past shogunates, the legendary Tokyo Tower, and Tokyo Sky Tree, the new landmark of Tokyo. To offer an opportunity to discover Tokyo, we recommend varied travel routes and forms for your reference.

We believe that by this conference, you can get more opportunities for further communication with researchers and practitioners with the common interest. Your suggestions are warmly welcomed for the further development of the conferences in the future. Wish you have a fruitful and memorable experience in Tokyo. We look forward to meeting you again next time.

Yours sincerely,

Conference Organizing Committee

# VENUE

## TKP Ichigaya Conference Center



### Address:

〒 162 - 0844 Tōkyōto shinjukuku Ichinotani Yahatamachi 8-Banchi TKP Ichigaya building



### Official Website:

<https://www.kashikaigishitsu.net/facilitys/cc-ichigaya/>



### Access

- ◆ Two minutes from JR Ichigaya station.
- ◆ One minute from Tokyo Metro Ichigaya station.

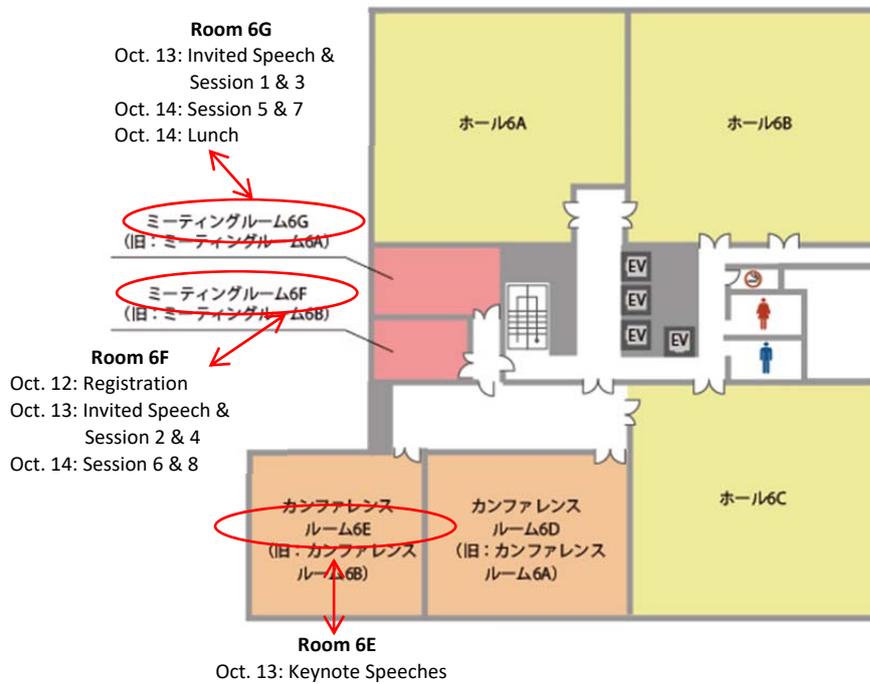


# VENUE

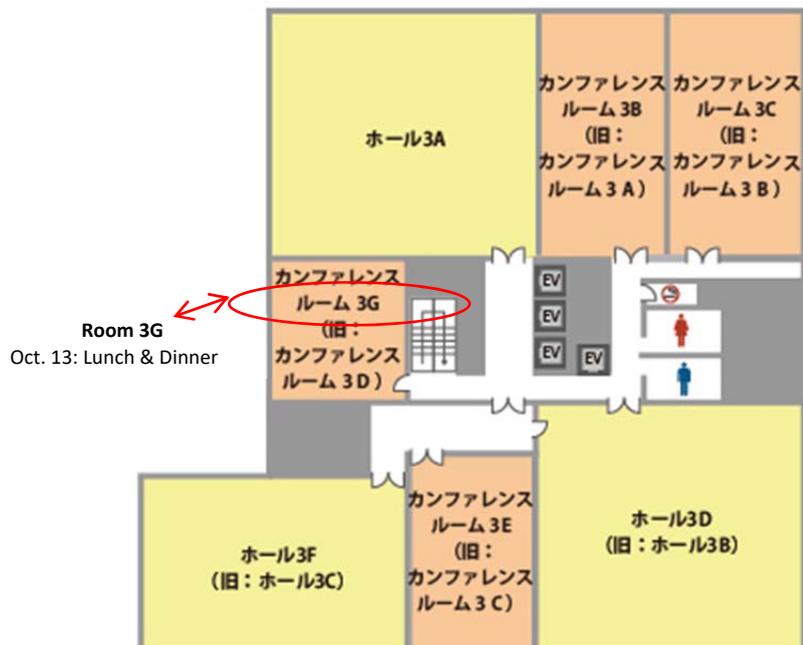


## Floor-plan

### ◆ Level 6



### ◆ Level 3



# SPEAKERS

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**Dr. Akira Namatame,**  
**Professor Emeritus, National Defense Academy of Japan**  
**Scientific Advisor, Asian Office of Aerospace Research & Development,**  
**US Air Force Research Laboratory**

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Dr. Akira Namatame is Professor emeritus of National Defense Academy, Japan. He is now Scientific Advisor, Asian Office of Aerospace Research & Development of US Air Force Research Laboratory.

His research interests include multi-agent systems, complex networks, artificial intelligence, computational social science, and game theory. In the past ten years, he has given over 35 invited talks, and over 15 tutorial lectures in international conferences and workshops, and academic institutions. He has organized more than 30 international conferences and workshops, and special sessions. He is the editor-in-chief of Springer's Journal of Economic Interaction and Coordination (JEIC), editor in Modeling and Simulation Society Letter. He has published more than 300 refereed scientific papers, together with eight books on multi-agent systems, agent modeling and network dynamics, collective systems and game theory. More detail information can be obtained through [www.nda.ac.jp/~nama](http://www.nda.ac.jp/~nama)

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## **Speech Title--- Autonomous systems**

**Abstract---** Autonomy is a growing field of research and application. Specialized robots in hazardous environments and repetitive industrial tasks have proven successful. As autonomous systems become more capable, they are able to handle increasingly complex tasks and highly uncertain environments but their capabilities in many domains are still insufficient to execute tasks robustly and efficiently in a variety of difficult situations. Autonomous systems are in their infancy and are capable only of performing well-defined tasks in predictable environments. Advances in technologies enabling autonomy are needed for these systems to respond to new situations in complex, dynamic environments.

Its interdisciplinary nature of autonomy also requires that researchers in the field understand their research within a broader context. The vision of autonomous systems working together to accomplish complex team tasks is driving much of the current research. Autonomous systems must be able to work naturally together if they are to become an integral part of society. The swarm engineering inspired from nature is a combination of swarm intelligence and robotics, which shows a great potential in several aspects. In this talk, a unified treatment of autonomy is discussed. We identify key themes and discuss challenge problems that are likely to shape autonomy and teaming of autonomous systems.

# SPEAKERS

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**Prof. Genci Capi**  
**Hosei University, Japan**

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Genci Capi is a professor of robotics and artificial intelligence at HOSEI University, Japan. He graduated with a Ph.D. in information systems engineering from Yamagata University in 2002. His teaching responsibilities include graduate courses in intelligent robots and undergraduate courses in control theory, robot programming, and numerical analysis. His research is in intelligent robots with a focus on brain machine interface, evolutionary robotics, map building, multi robot systems and humanoid robot. Know more about Prof. Genci Capi from here: <http://assistrobotics.ws.hosei.ac.jp/>

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## **Title--- Toward human friendly intelligent robotic systems**

**Abstract---** In the near future robots will coexist with humans, assisting them in everyday life environments. These environments pose a significant challenge because of their complexity and inherent uncertainty. In addition, human robot interaction is an important issue. Therefore the robot must

- a) deal with dynamic changes of the environment;
- b) have learning abilities;
- c) safely interact with humans.

In this talk, the recent advances in assistive robotics will be discussed. The main focus will be on application of deep learning for object recognition and robot grasping as well as robot localization and navigation. In addition, a new optimization method of deep learning parameters will be presented. This method employs a multiobjective evolutionary algorithm (MOEA) to optimize the DBNN parameters subject to the error rate and the network time as two conflicting objectives.

# SPEAKERS

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**Prof. Dr. Matsumoto Mitsuharu**

**University of electro-communications, Japan**

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Mitsuharu Matsumoto is currently an associate professor in the University of Electro-Communications. He received a B.E. in Applied Physics, and M.E. and Dr. Eng. in Pure and Applied Physics from Waseda University, Tokyo, Japan, in 2001, 2003, and 2006, respectively. His research interests include acoustical signal processing, image processing, pattern recognition, self-assembly, human-robot interaction and robotics. He received Ericsson Young Scientist Award from Nippon Ericsson K.K, Japan and FOST Kumada Award, in 2009 and 2011, respectively. He published around a hundred of journal and international conference papers. He is a member of the Institute of Electrical and Electronic Engineers (IEEE) and the Institute of Electronic, Information and Communication Engineers (IEICE).

URL: <http://www.mm-labo.com>

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**Title--- Nonlinear filters and its application to image and audio processing**

**Abstract---** In this speech, I focus on a nonlinear filter called epsilon-filter, and introduce its application to image and audio processing. Epsilon-filter is a simple nonlinear filter developed about 30 years ago. Original filter is developed for noise reduction from the image, but several improved versions are developed for many applications. They are also applicable not only to image signal but also to audio signal as some features used in epsilon-filter are common in image and audio signals. Therefore, in this speech, I also introduce some examples of the application of epsilon-filter to audio signal and discuss their common points.

# SPEAKERS

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**Dr. Hassan HosseinNia**  
**TU Delft, Netherlands**

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Hassan HosseinNia is an assistant professor in mechatronic system design at TU Delft, Netherlands. He received his PhD degree with honor in electrical engineering specializing in automatic control: application in mechatronics in 2013. His main research interests are in distributed actuation for mechatronic system design and motion control using fractional-order control, hybrid control, and iterative learning control. He has published more than 80 papers in international conferences, journals, special issues, and chapters in book. Hassan has an industrial background working as an R&D researcher at ABB corporate research in Sweden. Currently, he is developing high performance distributed actuator, and precision motion control for high-tech mechatronic system.

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**Title--- Complex Order Control for Precision Mechatronics**

**Abstract---** The high-tech mechatronics is highly competitive and requires machines to run with ever-increasing speed and precision. The need for high speed has resulted in system design favoring mass reduction of moving parts; hence increasing their compliance. Further, the performance specifications of control have also become extremely demanding. Classical Proportional-Integral-Derivative (PID) control still applied in 95% of the high-tech industry is no longer sufficient to meet these challenges. Advanced motion controllers are either so complex or incompatible with the industry standard. Dr. HosseinNia and his research group are developing the new generation of motion control which compatible with the industry standard and widely applicable in the high-tech mechatronic system. In this talk, Dr. HosseinNia will review the requirements of the high-tech mechatronic system and studies the current state of the art motion control in his research group. In addition, complex order precision control as the current activity of mechatronic system design group at TU Delft will be presented.

# SPEAKERS

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**Prof. Sathans Suhag**

**National Institute of Technology Kurukshetra, India**

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Dr. Sathans received the B. Tech., M. Tech. (Control Systems) and Ph.D. degrees in Electrical Engineering from the National Institute of Technology Kurukshetra (an Institution of National Importance), India, where he is currently a Professor in the Department of Electrical Engineering. He carries with him a teaching & research experience of nearly 23 years. Presently, he heads the students' welfare activities of the Institute as Dean (Students' Welfare) and is also working closely with the All India Council for Technical Education on various matters related to formulation of policy as the Chairman of All India Board of Technician Education. He has delivered many invited talks and chaired technical sessions in national/international conferences within and outside India. He is reviewer of different journals/conferences of repute. He is life member of Indian Society for Technical Education. His areas of interest include Intelligent Control and Applications, Automatic Generation Control, Advanced Control Applications in Power Systems, Micro Grid and Wind Energy Conversion Systems. He has got more than 50 publications to his credit in different international/national journals and conferences of repute. He has supervised many students at PG level and currently guiding many PG students and Ph.D. Research Scholars.

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**Title--- Control issues in hybrid energy system under different operating conditions**

**Abstract---** Being the most promising options from the viewpoint of sustainability, renewable energy sources (RESs) are becoming increasingly important in meeting the ever increasing demand of electric energy and reducing the adverse impact of fossil fuels on environment. But, renewable energy system based on one source also has its limitations. Therefore, hybrid energy systems, comprising different RESs along with the energy storage systems, are deployed for reliability and flexibility of operation. However, there are associated control issues rising out not only due to intermittency of the RESs but also due to their integration into the main grid. The focus of this talk is therefore, to address these control issues involved in hybrid energy systems under different operating conditions such as stand-alone system and/or in a cluster as a microgrid system working in islanding or grid connected modes.

# SESSIONS

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**October 13, 2018**

## **Session I**

**[Robot and Control System]**

**🕒 13:30-16:00**

**📍 ROOM 6G @ Level 6**

Chaired by Dr. Hassan HosseinNia

TU Delft, Netherlands

**10 presentations—**

CJ1-0005, CJ1-0030, CJ1-0042, CJ1-0046, CJ1-0004, CJ1-0008, CJ1-0043, CJ1-0047,  
CJ1-0026, CJ1-0052

**\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

# SESSIONS

<p><b>CJ1-0005</b> <b>13:30-13:45</b></p>	<p>Adaptive Design and Analysis of Starvation Free Controller Area Network for Multi-Robot System: Barrier Synchronization Technique Applied <b>Haklin Kimm</b>, Hanke Kimm Department of Computer Science, East Stroudsburg University of Pennsylvania, East Stroudsburg, PA</p> <p><b>Abstract</b>— The Controller Area Network (CAN) is a message based event-triggered communication service, and primarily applied in automotive and various industries such as vehicles, multi-robot, real-time communication systems and others. The CAN bus connects several independent CAN modules and allows them to communicate and work together asynchronously and/or synchronously. All nodes can simultaneously transmit data to the CAN bus, and the collision of multiple messages on the bus is resolved by a bitwise arbitration algorithm, which operates by assigning a node with low-priority message to switch to a "listening" mode while a node with high-priority message remains in a "transmitting" mode. This arbitration mechanism results in the starvation of lower priority messages. Previous studies resolving the CAN starvation problem have been mostly focused on the arbitration between two nodes, not considering simultaneous transmission of two or more nodes. In this paper, we present a starvation free CAN model that resolves the arbitration of multiple simultaneous transmission of two or more messages.</p>
<p><b>CJ1-0030</b> <b>13:45-14:00</b></p>	<p>Inverse and Direct Kinematics of Hexa Parallel Robot of Six Degrees of Freedom Angie J Valencia C, <b>Mauricio Mauledoux</b>, Diego A. Nunez M. University Nueva Granada, Bogotá, Colombia</p> <p><b>Abstract</b>— The description of the kinematics of a parallel robot is based on its structure and geometry, it means, the position and orientation of the platform is analyzed by geometric methods. In addition, it deals with temporary aspects of movement in which the produced forces or torques are not considered. When the particle of a rigid body moves along equidistant trajectories of a fixed plane the body experiences plane movement, classified into three types: translational, rotational and general plane movement; necessary to specify the movement conditions of the active variables that make up a robotic mechanism for a kinematic analysis. Therefore, the present work focuses on the mathematical development of the direct and inverse kinematics of a parallel robot of six degrees of freedom type Hexa, using some strategies such as: spatial decomposition of robot, successive approximations by numerical methods, and Matlab simulations. Results shows the validity of the analysis.</p>
<p><b>CJ1-0042</b> <b>14:00-14:15</b></p>	<p>Efficient Path Planning and Following for Non-holonomic Robot <b>Chih-Ta Wu</b>, Jing-Xu Chen, Ying-Hao Yu, Ngaiming Kwok National Chung Cheng University, Taiwan</p> <p><b>Abstract</b>— Embedded robotic control usually faces the dilemma of low computing-power or strict real-time performance requirement. The processing speed of microprocessor is highly constrained from the clock cycle and architectures of data path, compiler, and algorithms. In this paper, we propose an efficient algorithm to resolve difficulties in the common form of Reeds-Shepp turning curves, which can be deployed for non-holonomic robot path planning</p>

# SESSIONS

	<p>and following. The salience of our algorithm is on removing the need for the use of trigonometric, logarithm, and sophisticated matrix functions. The robot's turning schemes can then be easily implemented on a microprocessor or field-programmable-gate-array (FPGA) chip with minimum computing effort. The proposed algorithm is promising for miniature robot maneuvering controls in the future.</p>
<p><b>CJ1-0046</b> <b>14:15-14:30</b></p>	<p>Bionic Reflex Control Strategy for Robotic Finger with Kinematic Constraints  <b>Kunal Sanjay Narkhede</b> and Shyamanta M. Hazarika          Department of Mechanical Engineering, Indian Institute of Technology, India</p> <p><b>Abstract</b>— Estimating a proper grasping force for a prosthetic hand is a difficult problem. This is partly due to a lack of detailed sensory feedback. Application of too small a grasping force may allow an object to slip; on the contrary a large applied force may deform the grasped object. For a prosthetic hand, bionic reflex refers to reconstruction of the humanoid reflex control function. This paper presents a bionic reflex control strategy for a kinematically constrained robotic finger. Here, the bionic reflex is achieved through a force tracking impedance control strategy. The dynamic model of the finger is reduced subject to kinematic constraints. Thereafter, an impedance control strategy that allows exact tracking of forces is discussed. Simulation results for a single finger holding a rectangular object against a flat surface are presented. The response time for the proposed bionic reflex is of the order of milliseconds.</p>
<p><b>CJ1-0004</b> <b>14:30-14:45</b></p>	<p>Controller and observer design for first order LTI systems with unknown dynamics  <b>Sveinung Johan Ohrem</b>, Christian Holden          Norwegian University of Science and Technology, Norway</p> <p><b>Abstract</b>— The design of controllers and observers often relies on first order models of the system in question. These models are often obtained either through step-response tests, through online or off-line identification, or through developing a mathematical model. When the system in question has unknown or uncertain parameters, the developed model also contains uncertainties and the controller/observer design may result in bad performance or even instability. In this paper, we present a combined design of a controller and an observer for scalar linear time-invariant systems with unknown parameters. We combine a model reference adaptive controller, which does not require a model of the system, with a Luenberger observer which uses the desired closed-loop dynamics as its model. The method is given the name MRACO. Our proposed method is similar to what is known as closed-loop reference model adaptive control, but the key difference is that our method does not use a closed-loop reference model. We show through Lyapunov theory and by application of Barbˆalat's lemma that all error states in the closed-loop system converge to zero and that all signals are bounded. Several simulations are performed to support the proofs.</p>
<p><b>CJ1-0008</b> <b>14:45-15:00</b></p>	<p>Developing a Real-Time Multi-Axis Servo Motion Control System  <b>Ji-Hung Lou</b>, Stephen P. Tseng          College of Mechanical and Electrical Engineering, National Taipei University of Technology, Taiwan</p>

# SESSIONS

	<p><b>Abstract</b>— The transmission speed of traditional pulse command servo control systems not only restricts the update rate of command but also limits the performance of the servo system. With the advantages of fast responding, interference rejection, and multi-axis synchronous control, Network Motion Control System (NMCS) becomes an excellent solution for modern multiple-axis servo control systems, such as CNC and robots. Although NCMS has been widely and successfully applied in the aforementioned industrial applications, the non-real-time performance of existing NMCS has been uncovered and renders it improper for real-time interactive time-varying command multi-axis servo system. To resolve this issue, this research develops a real-time multi-axis servo motion control system based on the existing NMCS hardware. The control program is written based on the multi-thread concept with high-precision timing control. In this study, the motion of an electrical Stewart platform has been tested to validate the effectiveness of the developed solution. The results show that the developed system does improve the real-time performance of electrical Stewart platform system, and successfully corrects the defect of improper real-time command updating of NMCS.</p>
<p><b>CJ1-0043</b> <b>15:00-15:15</b></p>	<p>Nonlinear Model Predictive Control Using State-space Recurrent Multi-dimensional Taylor Network  <b>Zheng-Yi Duan</b>, Hong-Sen Yan  the Key Laboratory of Measurement and Control Complex System of Engineering, Southeast University, China;</p> <p><b>Abstract</b>— In this paper, we propose a discrete-time infinite horizon nonlinear model predictive control (QIH-NMPC) based on state-space recurrent multi-dimensional Taylor network (RMTN). The purpose of this paper is to construct a state-space RMTN to be used as internal predictive model for QIH-NMPC and train this network by backpropagation through time (BPTT) algorithm. The multi-dimensional Taylor network (MTN) differs from the existing neural network (NN) on its structure and dynamic performance. RMTN gains advantages over recurrent neural network (RNN) on its training efficiency and ease of use, thus it reduces the on-line nonlinear optimization burden and enhances the efficiency of computation. The stability of closed loop system is guaranteed via Lyapunov stability theory. Finally, a numeric example is given to illustrate the effectiveness of the proposed design approach.</p>
<p><b>CJ1-0047</b> <b>15:15-15:30</b></p>	<p>H-infinity Controller Design with Constrained Control Effort: an LMI Approach  <b>Christian Monterrey</b>, Joao Fabian and Ruth Canahuire  Universidad de Ingenieria y Tecnologia - UTEC, Peru</p> <p><b>Abstract</b>— The vibration problem and its effects on mechanical systems require special attention because of the consequences that they can cause such as fracture, fatigue or wear. In this context, it is necessary for the design of controllers based on vibration attenuation to reduce these effects. The <math>H_\infty</math> controller synthesis is used to reduce the high vibrations, ensuring the stability of the controlled system since they work minimizing the resonance peak of the system. Furthermore, in the controller design process is important to consider the operation limits of the actuators to avoid possible saturation problems. Thus,</p>

# SESSIONS

	<p>this work presents the synthesis of the state-feedback <math>H^\infty</math> controller design as an optimization problem in the frequency domain in the linear matrix inequalities (LMIs) form to reduce the vibration amplitude avoiding the actuator saturation. The control problem includes an LMI constraint in the <math>H^\infty</math> synthesis to limit the amplitude of the control effort. The designed controller is implemented in an ECP Torsional Plant of 2DOF subject to electrical saturation limits of its actuator where the results obtained are discussed in this work.</p>
<p><b>CJ1-0026</b> <b>15:30-15:45</b></p>	<p>Nonlinear Parameters Auto-Tuning in Sliding Mode Controller for an Autonomous Underwater Vehicle Flight Control  <b>Ehsan Taheri</b>, Mohammad Hossien Ferdowsi, Mohammad Danesh, Paria Shams Ghahfarokhi Malek Ashtar University of Technology, Iran</p> <p><b>Abstract</b>— Performance of sliding mode controller (SMC) in the autonomous underwater vehicle (AUV) is affected by the nonlinear parameters selection, which are: boundary layer thickness and switching gain. Human expertise, knowledge on disturbance amplitude and information about the bounds of system uncertainties are required to design these parameters. In order to decrease these requirements an auto-tuning SMC (AT-SMC) with optimal parameters in the nonlinear part of the controller is proposed in this article. For this purpose, a fitness function is presented and a heuristic algorithm is applied for minimizing it. The AT-SMC is implemented on an Axiomtek 84710 through the xPC Target and then the abilities of that in AUV flight control is evaluated through the processor-in-the-loop (PIL) test. By this way, the execution codes of proposed method before the harbor acceptance tests (HAT) and sea acceptance tests (SAT) are verified and so the cost of field tests are reduced in a significant manner. The results of the PIL tests in AUV flight control indicate that the AT-SMC reduces the chattering phenomenon and overshoot in comparison with the conventional SMC.</p>
<p><b>CJ1-0052</b> <b>15:45-16:00</b></p>	<p>Altitude and Attitude Tracking of a Quadrotor-Based Aerial Manipulator using Super Twisting Sliding Mode Control  <b>Chioniso Kuchwa-Dube</b> and Jimoh O. Pedro  School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand, Johannesburg, South Africa</p> <p><b>Abstract</b>— This paper presents the altitude and attitude tracking using super twisting sliding mode control (SMC) for a quadrotor-based aerial manipulator. The aerial manipulator model is first derived analytically using the Newton-Euler formulation for the quadrotor and Recursive Newton-Euler formulation for the manipulator. The super twisting SMC for altitude and attitude tracking of the aerial manipulator is then presented. The controller is then tested via simulation for altitude and attitude tracking with manipulator motion and added noise. The results for the super twisting SMC show better tracking performance and reduced chattering when compared to a first-order SMC.</p>



**Coffee Break @ ROOM 6G**

**[16:00-16:15]**

# SESSIONS

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**October 13, 2018**

## **Session II**

[Power Machinery & Measurement  
and Control Technology]

**🕒 13:30-16:00**

**📍 ROOM 6F @ Level 6**

Chaired by Prof. Sathans Suhag

National Institute of Technology Kurukshetra, India

**10 presentations—**

CJ1-0020, CJ1-1001, CJ1-0027, CJ1-0029, CJ1-0031, CJ2-089, CJ2-093, CJ1-1002,  
CJ1-0039, CJ1-0012

**\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

# SESSIONS

<p><b>CJ1-0020</b> <b>13:30-13:45</b></p>	<p>Seamless Transfer of Hybrid Energy System in Different Operating Modes Rahul Sharma, <b>Sathans Suhag</b> NIT Kurukshetra, Electrical Engineering Department, NIT Kurukshetra, India</p> <p><b>Abstract</b>— In this paper, the seamless transfer control scheme is proposed for hybrid energy system (HES) to switch back and forth between standalone, islanded microgrid and grid connected modes, depending on the operating conditions. The conventional approach depends on switching to different control scheme for different mode, which introduces poor transient conditions. The control scheme, with the proposed synchronizing control block, is able to ensure seamless transfer of modes. Therefore, the transient conditions are much improved in the proposed scheme as against the conventional scheme. The HES is modeled in MATLAB SIMULINK to implement the proposed scheme. The results are compared with the conventional scheme to validate the improvement in the transient conditions.</p>
<p><b>CJ1-1001</b> <b>13:45-14:00</b></p>	<p>On Spectra of Wolfram Cellular Automata in Hamming Spaces Buslaev A.P., Tatashev A.G., Fomina M.Ju., <b>Yashina M.V.</b> Moscow Technical University of Communications and Informatics, Russia</p> <p><b>Abstract</b>— In the work a synthetic approach to traditional informatics frameworks is developed. In space of cellular automata we develop some analogies of classification in the classical theory of functions, Sobolev classes and Kolmogorov widths. An interpretation of classical cellular automata (CA) of Wolfram has been obtained in the form of flows on graph (closed and open chains). The characteristic of flows on graph - a spectrum - introduced in the works of Kozlov, Buslaev, Tatashev has been investigated. In the theory of functions in the mid-20th century, theorems on connection between the widths of Sobolev classes and spectra of corresponding differential equations have been obtained by Kolmogorov and Tikhomirov. Exact results for analogic problems for cellular automata have been obtained, software for dynamical system states simulation has been developed and future works are discussed.</p>
<p><b>CJ1-0027</b> <b>14:00-14:15</b></p>	<p>A Portable Exoskeleton Driven by Pneumatic Artificial Muscles for Upper Limb Motion Replication <b>Tsung-Yen Tsai</b>, Chia-Yu Chang, Mu-Ti Chung, Kuan-Chieh Lu, Jih-Fong Huang, and Wen-Pin Shih Department of Mechanical Engineering at National Taiwan University, Taipei, Taiwan</p> <p><b>Abstract</b>— This paper proposes a portable exoskeleton to assist patients suffering from upper limb dysfunction in their activities of daily livings (ADLs) independently. While therapies assisting patients with bi-manual activities, the exoskeleton is able to record trajectory and replicate motion. It is driven by pneumatic artificial muscles (PAMs) with 4 actuated DOFs (degrees of freedom) including 1 passive DOF. The total weight of the exoskeleton is only 5.6 kilograms, which makes it possible to wear it for a long period. At the medial/lateral rotation of shoulder joint and flexion-extension of the elbow joint, pairs of PAMs are used to imitate antagonistic muscles. Only one PAM is utilized to control each of shoulder flexion-extension and abduction-adduction, whose positions can be adjusted according to patient's weight. A kinematic model is built to simulate the trajectory in 3-D</p>

# SESSIONS

	<p>space, which is verified by the comparison of the simulated results with the experimental implementations. We have tested the function of motion replication on a platform and the value of error is within the tolerance. The future improvement of the device involves adding springs to cooperate with the single actuated PAM and modified control strategy to adapt to users' physical conditions.</p>
<p><b>CJ1-0029</b> <b>14:15-14:30</b></p>	<p>Layer ToF Methods for Ultrasonic Lubrication-film Thickness Measurements Rasmus Kæseler, <b>Per Johansen</b> Aalborg University, Denmark</p> <p><b>Abstract</b>— Reliability of mechatronic systems is of great importance in offshore industries, which entails increasing interest for monitoring techniques. The tribological interfaces in such mechatronic systems are frequently the failing parts of the system. In consequence, non-invasive tribological monitoring systems are receiving increasing interest. In particular lubrication film thickness measurements are of interest in hydraulic pumping and motoring units. Conventional methods for lubrication film thickness measurements using ultrasound is the spring method and the resonance method. However, to obtain sufficient accuracy the spring method requires thin films below <math>20\mu\text{m}</math>. Further, the resonance method requires the film thickness and layer speed of sound being such that the layer resonance frequency is in the transducer frequency band. The Time-of-flight (ToF) of ultrasonic waves in the lubrication film is the inverse of the resonance frequency and therefore can the resonance method be classified as a ToF method. In this paper this class of methods called Layer ToF methods is described and a discussion of appropriate choice of methods is given. In addition, a noise analysis comparing the spring model and the layer phase lag method is presented.</p>
<p><b>CJ1-0031</b> <b>14:30-14:45</b></p>	<p>Spectrum Estimation in Autocalibration of Ultrasonic Reflectometry Methods for Lubrication Film Thickness Measurements Rasmus Kæseler, Nicolaj Johansen, <b>Per Johansen</b> Aalborg University, Denmark</p> <p><b>Abstract</b>— Reliable and efficient mechatronic systems is the focus of a large number of engineers today. From this it follows that experimental techniques to study critical locations with respect to wear and energy dissipation, such as tribological contacts, are receiving much attention. A fundamental problem is that friction is not an intrinsic material property, but a system property, and this gap between real tribological systems and idealized laboratory test systems is a main research challenge in tribology today. An appealing approach to overcome this problem is the use of non-invasive experimental techniques. Ultrasound based techniques to study lubrication film thickness measurements is in this regard a tempting tool, however the calibration procedure for this technology can be challenging and the robustness of the calibration is limited in highly dynamic environments, such as wind power pumping and motoring units. In this paper the fundamental linear regression of an autocalibration algorithm is presented, which generalizes previous results, and show that the dot product of the incident and reflected wave spectrum vectors is proportional to the squared magnitude of the reflected wave spectrum. In consequence, the incident wave spectrum should in general be obtainable by use of linear adaptive filtering</p>

# SESSIONS

	techniques.
<p><b>CJ2-089</b> <b>14:45-15:00</b></p>	<p>Classification of Titanium Microstructure with Fully Convolutional Neural Networks  <b>S Mongkhonthanaphon</b> and Y Limpiyakorn  Chulalongkorn University, Bangkok, Thailand</p> <p><b>Abstract</b>— Titanium and its alloy exhibit excellent properties for biomedical applications, especially in implant surgery. Classification of Titanium microstructure is the process in material inspection that reveals background of the material. Generally, microstructure classification is manually performed. Due to the complexity of microstructure features, expertise is required for process operation. The traditional classification by humans is time consuming and possibly error prone if the inspection is not performed by titanium microstructure experts. Deep learning is considered the revolution of computer vision to enable computers to see and perceive like humans. The technique is widely used for automatically classifying images with high accuracy. In order to reduce human inspection time during quality control, this research presents the use of a type of deep learning, Fully Convolutional Neural Networks, for pixel-wise classification in the titanium microstructure images. The dataset contains private images of titanium samples taken by SEM microscopes. As the available training dataset is small, data augmentation using elastic deformations is applied for increasing the accuracy of the model. Constructed with the U-net architecture, the network achieves good performance with the pixel accuracy of 92.67% and mean IoU of 71.30%.</p>
<p><b>CJ2-093</b> <b>15:00-15:15</b></p>	<p>Numerical/multiphysical investigation of shrinking hole at notch tip under high electric energy  <b>Thomas Jin-Chee Liu</b>  Ming Chi University of Technology, Taiwan</p> <p><b>Abstract</b>— In this paper, the shrinking hole creation at the notch tip is simulated using the finite element method (FEM) and element birth and death (EBD) technique. The removed material, stress, temperature, and electric current density are obtained for estimating the effects of the hole creation. Also, the variation of the shrinking hole size is discussed by the numerical/multiphysical simulation. When the melting material is removed, it shows rational stress values. The stress field is affected by the shrinking hole size and it must be considered in the analysis.</p>
<p><b>CJ1-1002</b> <b>15:15-15:30</b></p>	<p>A rapid method for manufacturing conformal cooling channels with complex geometrics  <b>Chil-Chyuan Kuo</b>, Yi-Jun Zhu  Department of Mechanical Engineering, Ming Chi University of Technology, Taiwan</p> <p><b>Abstract</b>— A conformal cooling system can significantly improve the quality of the molded part in the injection molding. Rapid tooling is the fastest way for small-batch production of a new product by injection molding in the research and development stage. The productivity depends largely on the cycle time in the injection molding process. In order to enhance the productivity, the conformal cooling channels were integrated into the low-pressure wax injection molds. In this study, a simple method for producing wax conformal cooling channels with complex geometric shapes was demonstrated. The improved bisection</p>

# SESSIONS

	<p>method is a good method for producing wax conformal cooling channels with complex geometric shapes due to by less material used for fabricating the mold and wax conformal cooling channels were easy to produce.</p>
<p><b>CJ1-0039</b> 15:30-15:45</p>	<p>Price effect analysis on electric vehicle charging networks in Jeju city  <b>Junghoon Lee</b>, Gyung-Leen Park            Dept. of Computer Science, Jeju National University, Jeju-City, Republic of Korea</p> <p><b>Abstract</b>— This paper conducts an analysis on the occupancy rate according to price level, distance to the closest free charger, and charger density, taking advantage of data archives acquired from an electric vehicle charging network currently operation in Jeju City. In hour-by-hour traces, the occupancy rates for 3 price groups, namely, free, medium-price, and expensive chargers, are almost evenly separated by about 9.0 %. The daily occupancy rate gap between free and non-free chargers reaches 13 %, while medium-price chargers catch up with free chargers for some tour seasons. The distance and density factors have not so much effect on the occupancy rate than expected, judging from the Pearson coefficient of 0.12 and 0.25, but free chargers are more frequently used in high-density areas. According to the analysis, we find out that a differentiated pricing policy is needed during the time interval between 12 PM to 18 PM, especially on the high charger density areas, to distribute charging demand and integrate with an appropriate reservation mechanism.</p>
<p><b>CJ1-0012</b> 15:45-16:00</p>	<p>Flocking Control for Multiple Polygonal Agents with Limited Communication Ranges  <b>Thanh Binh Nguyen</b>, Sung Hyun Kim            Department of Electrical Engineering, University of Ulsan, 93 Daehak-ro, Namgu, Ulsan, Republic of Korea</p> <p><b>Abstract</b>— In the recent literatures on multiple-agent systems, each agent is considered as a single point or covered by a circle or ellipse in which, in many circumstances, these agents were not fitted in such as triangular, rectangle and hexagon agents, etc... This paper puts forward a distributed control law for arbitrarily polygonal shape agents under limited communication ranges. The proposed control laws guarantee all flocking properties such as: each agent stays close to its nearby neighbors, no collisions between any agents and the convergence of each agent’s velocity to the desire. In addition, the control signal is differentiable despite of agent’s limited communication ranges and non- smooth boundary in the agent shape. The control law is designed base on a new approach on collision avoidance conditions between the polygonal shape agents to generate the desired control law. The numerical simulations are implemented to demonstrate the performing in the same shape group of agents using the proposed control law.</p>



**Coffee Break @ ROOM 6F**

**[16:00-16:15]**

# SESSIONS

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**October 13, 2018**

## **Session III**

[Data Science and Software  
Engineering]

**🕒 16:15-19:00**

**📍 ROOM 6G @ Level 6**

Chaired by Prof. Haklin Kimm

East Stroudsburg University, USA

**11 presentations—**

CJ2-026, CJ2-062, CJ2-076, CJ2-082, CJ2-043, CJ2-008, CJ2-042, CJ2-057, CJ2-102,  
CJ2-048, CJ2-103

**\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

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<p><b>CJ2-026</b> <b>16:15-16:30</b></p>	<p>Discovering Software Vulnerabilities Based on Fuzz Testing Yu-Ming Chung, <b>Chihli Hung</b> Chung Yuan Christian University, Taiwan</p> <p><b>Abstract</b>— In the era of the Internet, information security issues are of paramount importance. Software packages invariably have security vulnerabilities. If exploited by malicious hackers, vulnerabilities can cause substantial losses to software corporations and end users. Due to the increase in Advanced Persistent Threat (APT) attacks, vulnerabilities have to be discovered as rapidly as possible. This research focuses on Microsoft Office Word software and proposes the fuzzing vulnerability digging model. In the field of fuzz testing, the traditional approaches consume considerable time and system resources without analyzing file formats. Therefore, the fuzzing vulnerability digging model proposed in this research examines the file format to identify any possible weaknesses. According to the experiments, our proposed model outperforms two benchmarking models, i.e. the FileFuzz tester and MiniFuzz tester, for a fixed period of time. Finally, we present an example which imitates a Shellcode attack carried out via the weaknesses discovered by the proposed model. According to the comparison results, the proposed model has the potential to identify weaknesses in MS Office Word software more effectively and efficiently.</p>
<p><b>CJ2-062</b> <b>16:30-16:45</b></p>	<p>Design of an API Recommendation System in Android Programming <b>J Liu</b> and Z Ma Academy for Advanced Interdisciplinary Studies, Peking University, Beijing, China</p> <p><b>Abstract</b>— Android has been the most popular operation system in the smartphone field, and Android programming is an import branch in programming work. When dealing with programming tasks, there are many APIs that are often used by programmers, and it costs much time for them to choose and check the usages of APIs repeatedly. This paper raises a design of API recommendation system in android programming, which uses AST tools in Java to extract key features of codes, and uses tf-idf, LDA and API2Vec models on the data to generate recommendation results. +The experiment results— at maximum 80%+overall recall rate and nearly 50% top-10 recall rate prove the efficiency of the system.</p>
<p><b>CJ2-076</b> <b>16:45-17:00</b></p>	<p>Test Case Generation for WS-BPEL from a Static Call Graph <b>Wareerat Bousanoh</b> and Taratip Suwannasart Chulalongkorn University, Bangkok, Thailand</p> <p><b>Abstract</b>— Web service is reusable, easy to maintain, widely used, and very popular. However, web service development is not adhered to any development languages in variety of platforms or frameworks. There must be a standard in controlling and coordinating a business process through a web service. This standard is called WS-BPEL. Web service testing is an important process in software development to meet the needs of business process. Recently some researches proposed concepts and tools used to generate test case for WS-BPEL, while they focus only a business processes within a single WS-BPEL file. This paper proposes an approach for generating a WS-BPEL test cases from a static call graph to support the case which has a calling subprocess between WS-BPEL files. The generated test</p>

# SESSIONS

	cases are complied with test paths based on the branch coverage.
<b>CJ2-082</b> <b>17:00-17:15</b>	<p>Impact Analysis and Version Control of Functional Requirements' Input and Output Changes  <b>Nannaphat Cherd sakulwong</b> and Taratip Suwannasart  Chulalongkorn University, Bangkok, Thailand</p> <p><b>Abstract</b>— In the software development process, requirement gathering process is very important because if the requirement collection is incomplete, it will result in changes of requirements. When changes occur, it may impact functional requirements and thus the changes should be controlled under the organization chart of that project for approval of all changes. Functional requirements consist of input and output data which are related and not related to database schema. Thus, changes to a functional requirement will affect database schema if that functional requirement is related to the database schema and whether the functional requirement is related to the database schema or not it will affect test cases. If functional requirements and test cases are affected, it is necessary to perform version control for the purpose of logging and to enable rollback to the version needed. This paper proposes an approach to verify the authority to change inputs and outputs of function requirements to analyze the impact to functional requirements and test cases, to control version and can be rollback to the version of a desired function.</p>
<b>CJ2-043</b> <b>17:15-17:30</b>	<p>A Systematic Model of Big Data Analytics for Clustering Browsing Records into Sessions Based on Web Log Data  <b>Chung Yung*</b>, Chia-Ching Chen, Yu-Lan Yuan, and Ching Li  National Dong Hwa University, Taiwan</p> <p><b>Abstract</b>— This paper presents a systematic model of big data analytics for clustering browsing records into sessions based on the web log data. With the rapid development of the Internet and World Wide Web technologies, the behavior of web users becomes more and more complicated. The analysis on web log data may reveal some hint at the browsing behavior of web users. Since the information of browsing sessions has a great impact on the effectiveness of analysis on web log data, especially in the precision of describing the behavior of web users, this motivates our work in developing a systematic model of clustering browsing sessions. First, we present a five-phase architecture that we develop for big data analytics. We have built a computing environment with the architecture, and we have implemented a few methods of big data analytics with such an architecture. Then, we propose the new systematic model, called EDCP model, of big data analytics for clustering browsing records into sessions based on the web log data. Since the analysis on the web log data with various goals may pose distinct criteria for clustering browsing records into sessions, the design of EDCP model allows simple adaption for the distinct criteria in order to meet the need of various goals. We demonstrate the application of EDCP model with the session criteria given by a research group in the tourism and recreation area. We present the experiments of applying EDCP model on the web log data from the official web site provided by Taiwan Tourism Bureau with a goal of clustering the browsing sessions for the web users of 2018 Taiwan Lantern Festival. As a summary, we have a total of 344,963,578 browsing records in the web log data, and we find 55,318,326 records among them are</p>

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	related to 2018 Taiwan Lantern Festival. Our systematic model successfully clusters the records into 307,154 browsing sessions, as a result.
<b>CJ2-008</b> <b>17:30-17:45</b>	<p>Pattern recognition of UAV flight data based on semi-supervised clustering  <b>Nan Wang, Z SH Xu, SH W Sun, Y Liu</b>          Jilin University of Finance and Economics, China</p> <p><b>Abstract</b>— UAV is an unmanned aerial vehicle controlled by a remote radio signal or a trajectory planning software carried itself. It is widely used in military, civil and scientific research fields. However, due to the lack of real-time decision-making ability, the UAV has high fault rate. The flight quality assessment of UAV and the construction of fault prediction model can be used for debugging and fault-removing to customer’s aircraft, and also to increase the added value of the civilian UAV products. Before building a fault prediction model, a very important step is to identify the pattern of sampled data. For each group of flight data, the efficiency and accuracy rate of manual quality evaluation and fault identification are not acceptable. Based on the UAV flight data accumulated in the big data platform of an UAV production company in Shenyang, Liaoning Province of China, this paper proposes a semi-supervised clustering technique to do automatic pattern recognition for the sampling points. According to the characteristics of UAV flight data, two different methods are designed to choose initial centroids. Meanwhile, we use the existing normal flight data to train distance thresholds to combine some clusters to eliminate the resulting error clustering. Real flight data or flight test data with manually added labels are used to run the proposed algorithms to verify the recognition results. The experimental results show that the proposed methods greatly improve the efficiency and accuracy of adding precise labels to the historical flight data and play a role in assisting the manual recognition of sampling points while strengthening the management and statistics.</p>
<b>CJ2-042</b> <b>17:45-18:00</b>	<p>Cloud storage platform for efficient RDF compression  <b>Y X Sun, S H Lee and Y J Lee</b>          Kyungpook National University, Daegu, Republic of Korea</p> <p><b>Abstract</b>— In current web environment, a large of RDF datasets are producing. Thus, the storage of RDF data is becoming an important part of Semantic Web development. Due to the triple structure of RDF data, how to efficiently compress RDF data as much as possible without breaking the integrity of data is become one of the important issues. by Comparing previous research, we found that people had made many efforts in the compression of static, large RDF datasets. In this paper, we not only propose a cloud-based compression approach based on previous research, but also made efforts in data security. Due to the openness of the internet, anyone can publish their Linked Data. At this time, the security of personal data will become very important. Our cloud storage platform not only provides publishers with efficient compression services but also maximizes the security of data. To improve the openness of the platform, we adopt REST (REpresentational State Transfer) architecture to exchange data between publishers and cloud.</p>
<b>CJ2-057</b> <b>18:00-18:15</b>	<p>BGP anomaly prediction using ensemble learning  <b>Marijana Cosovic, Emina Junuz</b></p>

# SESSIONS

	<p>Faculty of Electrical Engineering, University of East Sarajevo, Istocno Sarajevo, BiH</p> <p><b>Abstract</b>— This paper investigates anomalies such as worms, power outages, routing table leak (RTL) events occurring in Border Gateway Protocol (BGP) that can cause connectivity and data loss issues. Ensemble learning is a machine learning model employing multiple classifiers in order to reliably identify network anomalies. We use Bagging, Boosting, and Random Forests ensemble models trained on network anomaly datasets for classification improvement. Models were compared in respect to following performance metrics: F-measure, Matthews correlation coefficient (MCC), Receiver operating characteristic (ROC) curve, precision-recall (PR) curves and model execution time. We observed improvement in performance measures when ensemble classifiers realized in Python were used in comparison to our previously reported results on single classifiers. Further improvement in most performance measures was observed by using sampling techniques (oversampling and undersampling) on anomalous datasets. This approach increases model execution time which is not favorable for real-time anomaly detection models.</p>
<p><b>CJ2-102</b> <b>18:15-18:30</b></p>	<p>A data mining approach for creating a job position in the system for evaluating competencies Ondrej Pektor, <b>Bogdan Walek</b> and Ivo Martinik University of Ostrava, Czech Republic</p> <p><b>Abstract</b>— This paper focuses on a data mining approach for automated retrieval of job position competencies based on a given job title and keywords that represent important competencies or concepts that are associated with a given position. The main aim is to retrieve and process the content of relevant job vacancies on the selected job portal. The output is a list of relevant words found along with their occurrence in crawled job vacancies that indicate important competencies that are required for a given job position. The HR manager then obtains a list of relevant competencies for the selected job position and the selected competencies can be added to the profile of job position in the system. Additionally, for the HR manager, the output is also a proposal to remove competencies from the job position profile, because they are not relevant (not found in searched job vacancies). These outputs are then a support tool for HR managers to create a list of all the competencies of a given job position and to store them in the job position profile. The implemented approach is verified on a specific example and the results are presented.</p>
<p><b>CJ2-048</b> <b>18:30-18:45</b></p>	<p>The <math>r</math>-hyper-panconnectedness of faulty crossed cubes <b>Hon-Chan Chen</b> National Chin-Yi University of Technology, Taiwan</p> <p><b>Abstract</b>— Among the many kinds of network topologies, the crossed cube is one of the most popular. It is a variant of the hypercube with some attracting properties. A network topology is usually represented by a graph, where vertices and edges of the graph represent the nodes and communication links of the network. In this paper, we investigate the <math>r</math>-hyper-panconnectedness of faulty crossed cubes. A graph <math>G</math> is said to be <math>r</math>-hyper-panconnected if for any two distinct vertices <math>x</math> and <math>y</math> of <math>G</math>, it contains a Hamiltonian path <math>P</math> starting from <math>x</math> such that <math>d_P(x, y) = m</math> for any integer <math>m</math> satisfying <math>r \leq m \leq  V(G)  - 1</math>,</p>

# SESSIONS

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	<p>in which <math>d_P(x, y)</math> denotes the distance between <math>x</math> and <math>y</math> in <math>P</math>. Let <math>CQ_n</math> be an <math>n</math>-dimensional crossed cube. We demonstrate that for any one faulty vertex <math>w</math> of <math>CQ_n</math> and for any two distinct vertices <math>x</math> and <math>y</math> of <math>CQ_n - \{w\}</math>, <math>n \geq 5</math>, there exists a Hamiltonian path <math>P</math> of <math>CQ_n - \{w\}</math> starting from <math>x</math> such that <math>d_P(x, y) = m</math> for any integer <math>m</math> satisfying <math>2n \leq m \leq 2n - 2</math>. That is, the crossed cube of one vertex fault is <math>2n</math>-hyper-panconnected.</p>
<p><b>CJ2-103</b> <b>18:45-19:00</b></p>	<p>A hierarchical system for optimising a dynamic system of traffic crossroads control using an expert system          Jakub Gaj, <b>Bogdan Walek</b>, Radim Farana and Martin Kotyrba          University of Ostrava, Czech Republic</p> <p><b>Abstract</b>— Nowadays in the field of the automotive industry and urban public transport, there are a lot of challenges and problems to solve. Every day there are closures, roadworks, and other aspects of public transport, which cause traffic jams. This paper deals with a hierarchical system for optimising a dynamic system of traffic crossroads control using an expert system. The hierarchical system uses an expert system constructed in a few layers which evaluate the length of the green signal for each phase of the crossroad. The main goal of the proposed system is traffic optimisation at crossroads and reduction of traffic jams. The proposed system was verified on a real crossroad in the city of Ostrava.</p>



**Dinner @ Room 3G @ Level 3**

**[19:00-20:00]**

# SESSIONS

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**October 13, 2018**

## **Session IV**

[Computer Science and Information  
Engineering]

**🕒 16:15-19:00**

**📍 ROOM 6F @ Level 6**

Chaired by TBA

### **11 presentations—**

CJ1-0032, CJ2-023, CJ2-087, CJ2-024, CJ2-029, CJ2-068, CJ2-100, CJ1-0018, CJ2-075,  
CJ2-063, CJ2-101

### **\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

# SESSIONS

<p><b>CJ1-0032</b> <b>16:15-16:30</b></p>	<p>Design and Implementation of Lightweight Messaging Middleware for Edge Computing <b>Byonggon Chun</b>, Chihyun Cho, Beomseok Oh, and Dongyeob Lee Samsung Research, Samsung Electronics Co., Ltd., Seoul, South Korea</p> <p><b>Abstract</b>— Internet of Things (IoT) is one of the most desirable and interesting technologies developed over the past decades. Nowadays, smart things such as mobile phone, home and industrial IoT devices generates massive data and send it to centric cloud system. Edge computing which processes data using its own resources without cloud system became a trend in industrial field. In this paper, we propose the design and implementation of a lightweight messaging middleware for edge computing that allows real-time message transmission with low resources. Result of experiment shows that the proposed middleware allows better throughput and efficient resource usage than existing schemes on device that has low resources.</p>
<p><b>CJ2-023</b> <b>16:30-16:45</b></p>	<p>Replacement of Virtual Service Resources for Virtual Networks with Tree Structure <b>S Horiuchi</b> and T Tachibana University of Fukui, Japan</p> <p><b>Abstract</b>— With the network virtualization technology, multiple virtual networks can be constructed on a substrate network. Over each virtual network, a particular service can be provided with users by using virtual service resources. Here, the quality of the service depends on the amount of traffic. Therefore, it is expected that the virtual service resource should be replaced depending on the traffic change and topology change. This paper proposes a replacement method of virtual service resource for a virtual network with tree structure. In the proposed method, when the amount of traffic changes on any virtual node or the network topology changes, the virtual service resource is replaced in other node for improving the quality of the service. This replacement method can decrease the total amount of traffic based on the tree structure of virtual network after the traffic change and the topology change. We evaluate the performance of our proposed method with simulation. In numerical examples, it is shown that the proposed method can maintain the quality of service.</p>
<p><b>CJ2-087</b> <b>16:45-17:00</b></p>	<p>Classification of Pulmonary Tuberculosis Lesion with Convolutional Neural Networks <b>T Karnkawinpong</b> and Y Limpiyakorn Chulalongkorn University, Bangkok, Thailand</p> <p><b>Abstract</b>— The concept of computer-aided diagnosis (CAD) for chest x-rays (CXR) has been around for the past fifty years. CAD can help in early diagnosis and reduce the deaths caused by late diagnosis and lack of treatment. Applying deep learning techniques for classification of medical images has seen considerable growth in recent years. Convolutional Neural Networks (CNNs) are a class of powerful generative models well known for image classification and segmentation. This paper has studied three deep neural networks: AlexNet, VGG-16 and CapsNet, for classifying tuberculosis in CXR images. The customized models are created using the datasets acquired from National Library of Medicine and private Thai datasets. Data augmentation with shuffle sampling is used to prevent overfitting in the constructed models. The performance of classifiers has been evaluated</p>

# SESSIONS

	<p>with the measures: accuracy, sensitivity and specificity. All model accuracy increases with the augmented dataset. The method of affine transformation has also applied to investigate the model accuracy when predicting the test set contains variant instances unseen in the training CXR images.</p>
<p><b>CJ2-024</b> <b>17:00-17:15</b></p>	<p>On Clustering Algorithms: Applications in Word-Embedding Documents <b>Israel Mendonça*</b>, Antoine Trouvé, Akira Fukuda, Kazuaki Murakami Kyushu University, Japan</p> <p><b>Abstract</b>— In this paper, we study the effectiveness of classical literature clustering algorithms applied to free text documents. We analyze the effects of varying the parameters on their performance and which aspects directly influence in the results. We apply a word-embedding-based technique to represent the document's bag-of-words and therefore be able to compare and study how these algorithms performs in the task of clustering these documents. We use two metrics that captures different aspects of the partitions and analyze those algorithms on the light of it. One of the main findings of this work is that some clustering algorithms are able to have a partition that's up to 91% of the real partition, whilst other performs really poor for the same dataset. We also find limitations on these techniques when trying to cluster hard datasets.</p>
<p><b>CJ2-029</b> <b>17:15-17:30</b></p>	<p>Alphabet Sign Language Recognition Using K-Nearest Neighbor Optimization <b>Fitri Utaminigrum*</b>, I Komang Somawirata, Gilbert Dany Naviri Universitas Brawijaya, Indonesia</p> <p><b>Abstract</b>— Hand gesture recognition is an interesting and challenging study, especially for human interaction with computer. There are many method can used for hand gesture recognizing such as Random K-NN, Tree K-NN, Fuzzy K-NN. K-Nearest Neighbor method is interesting to be examined. While the weighting method Simple Multi Attribute Rating Technique (SMART) can be used to improve classify accuracy result. That method known very simple to use start from determine criteria of weighting, normalization, utility value and recommendation. Thus, in our research, we combine SMART weighting and K-NN classification for alphabet sign language recognition to help disabled to communicate with each other. The simulation result, we have the average accuracy 94%, 95% and 96% for rather dark, normal and rather bright respectively.</p>
<p><b>CJ2-068</b> <b>17:30-17:45</b></p>	<p>Mining on Keywords Extraction from Web News <b>Li-Fu Hsu</b> Hwh Hsia University of Technology, Taiwan</p> <p><b>Abstract</b>— Thousand of news stories are reported each day. How to extract the useful information from the large web news is the important technology today. However, information technology advances have partially automated to processing documents, reducing the amount of text which must be read. In this paper we present a Keywords Search System on Web News, called KSSWN. KSSWN can discover automatically keywords extraction from large corpora of web news stories. In addition, we give concrete examples of how to preprocess texts based on the intended use of the discovered results. We also evaluate the extracted phrases can be used for important tasks</p>

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<p><b>CJ2-100</b> <b>17:45-18:00</b></p>	<p>Evolving and Combining Technical Indicators to Generate Trading Strategies <b>Chawwalit Fajareon</b> and Ohm Sornil National Institute of Development Administration, Bangkok, Thailand</p> <p><b>Abstract</b>—Technical analysis is a widely used approach for trading securities. Various indicators are used, such as moving average, stochastic oscillator and relative strength index. Applications of these indicators are typically based on experiences and rules of thumb which hardly are effective in general. This paper presents a technique for evolving indicator parameters using Non-Dominated Sorting Genetic Algorithm II and combining the indicators to generate a trading strategy. Experiments are conducted using actual stocks from the Stock Exchange of Thailand show that the proposed technique generates trading strategies that outperform other well-known techniques and is applicable to real world security trading.</p>
<p><b>CJ1-0018</b> <b>18:00-18:15</b></p>	<p>An Efficient Neural Network with Performance-Based Switching of Candidate Optimizers for Point Cloud Matching Wen-Chung Chang, <b>Van-Toan Pham</b> Department of Electrical Engineering, National Taipei University of Technology, Taiwan</p> <p><b>Abstract</b>— Typically, Iterative Closet Point approach can be applied to perform point cloud matching tasks as long as the variation between two point clouds is not large. In order to perform such matching tasks robustly and efficiently, an effective neural network structure is presented in the paper. Particularly, the paper resolves the problem of improving convergence rate in training a neural network to estimate a rotation angle between two 2D point clouds. Firstly, in order to shorten the learning process of the neural network, an innovative parameter updating algorithm based on performance of different candidate optimizers is proposed. Secondly, the neural network is trained based on this algorithm to learn from point cloud data sets. Then, the trained neural network can determine the rotation angle between two 2D point clouds effectively. Finally, the performance of the approach developed in this paper is validated by experiments.</p>
<p><b>CJ2-075</b> <b>18:15-18:30</b></p>	<p>Thai Music Emotion Recognition Based on Western Music S Sangnark M Lertwatechakul and <b>C Benjangkprasert</b> King Mongkut's Institute of Technology Ladkrabang, Bangkok, THAILAND</p> <p><b>Abstract</b>— Music emotion recognition is the music emotion detected from people's annotations. In this paper, the Thai music was the evaluated set of a system based on western music training settings. By using valence-arousal values, multiple linear regression, k-nearest neighbours to represent the emotional annotations from the music. We used valence and energy(arousal) from Spotify API to the investigated emotion of Thai music. As a result, the Thai music emotion according to the western music criteria could be understood. The highest f-measure of Thai music from multiple linear regression All feature was 41% and the f-measure of western music from multiple linear regression without tempo feature was 51 %, which are very different because All feature in western music is low efficiency than other models.</p>
<p><b>CJ2-063</b></p>	<p>The Investigation of Icon Concreteness with and without Text Describe for Retirees</p>

# SESSIONS

<p><b>18:30-18:45</b></p>	<p><b>Kleddao Satcharoen</b> Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang, THAILAND</p> <p><b>Abstract</b>— The purpose of this study was to examine icon design for retirees, focusing on icon concreteness. The study was undertaken because although older adults are increasingly likely to use computers, the Internet, and portable computing devices like smartphones and tablets, they still face usability challenges including cognitive and skill barriers. Previous research has shown that concrete icons increase selection accuracy for inexperienced users. This research was an experiment (n = 30), in which users were asked to identify concrete and abstract icons. Chi-square analysis did not show a significant difference in selection accuracy of abstract and concrete icons in an unprompted trial (<math>\chi^2 = 1.493</math>, df = 5, p = .914) or a text-prompted trial (<math>\chi^2 = .715</math>, df = 3, p = .870). However, results were significantly better for the prompted trial. The implication is that abstract and concrete icons are equally difficult for senior adults to recognize.</p>
<p><b>CJ2-101</b> <b>18:45-19:00</b></p>	<p>Generating Trading Strategies Based on Candlestick Chart Pattern Characteristics <b>Siriporn Thammakesorn</b> and Ohm Sornil National Institute of Development Administration, Bangkok, Thailand.</p> <p><b>Abstract</b>— Candlestick chart patterns are widely used in stock trading decisions. Patterns of candlestick series are found to provide hints for the price of the next one. This research proposes a technique to generate stock trading strategies employing features which are shown to effectively recognize patterns in candlestick charts. The features are combined into a tree-like trading strategy using the Chi-square Automatic Interaction Detector algorithm. The technique is evaluated using actual stocks from Stock Exchange of Thailand. The results show that the generated strategies are more profitable than other popular trading techniques, such as moving average convergence divergence, exponential moving average, relative strength index, stochastic oscillator and average directional index.</p>



**Dinner @ Room 3G @ Level 3**

**[19:00-20:00]**

# SESSIONS

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**October 14, 2018**

## **Session V**

[Electronics and Communication  
Engineering]

**🕒 9:00-12:00**

**📍 ROOM 6G @ Level 6**

Chaired by Prof. Nji Raden Poespawati

Universitas Indonesia, Indonesia

**12 presentations—**

CJ1-0021, CJ1-0028, CJ1-0041, CJ2-017, CJ2-022, CJ2-069, CJ2-081, CJ2-090, CJ2-091,  
CJ2-003, CJ2-098, CJ2-078

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# SESSIONS

<p><b>CJ1-0021</b> <b>9:00-9:15</b></p>	<p>Security Framework for IoT End Nodes with Neural Networks  <b>Jesus Pacheco</b>, Victor H. Benitez, and Zhiwen Pan            University of Sonora, Mexico</p> <p><b>Abstract</b>— The premise of the Internet of Things (IoT) is to connect not only computers and mobile devices, but also interconnect smart buildings, homes, and cities, as well as electrical and water grids, automobiles, and airplanes just to mention some examples. IoT leads to the development of a wide range of advanced information services that are pervasive, cost-effective, and can be accessed from anywhere and at any time. In this paper we present a multilayer architecture to integrate devices to the IoT, making it available from everywhere at any time. However, with the introduction of IoT we will be experiencing grand challenges to secure and protect its advanced information services due to the significant increase of the attack surface, complexity, heterogeneity, and number of interconnected resources. In order to deal with such challenges, we introduce an IoT Framework to build trustworthy and secure IoT applications and services. The framework enables developers to consider security issues at all IoT layers and integrate security algorithms with the functions and services offered in each layer instead of considering security in an ad-hoc and after thought manner. We show the applicability of our methodology to secure and protect IoT end nodes providing them with the capabilities for self-monitoring and self-recovering after an external event has occurred.</p>
<p><b>CJ1-0028</b> <b>9:15-9:30</b></p>	<p>Outdoor Landmark Detection for Real-World Localization using Faster R-CNN  <b>Sivapong Nilwong</b>, Delowar Hossain, Shin-ichiro Kaneko, Genci Capi            Hosei University, Japan</p> <p><b>Abstract</b>— This paper presents a method for outdoor localization using deep learning-based landmark detection. The proposed localization method relies on the Faster Regional Convolutional Neural Network (Faster R-CNN) landmark detector and the feedforward neural network (FFNN) trained with GPS data from geotags in images, retrieve location coordinates and compass orientation of the implemented device based on detected landmarks in the image. Results of the proposed localization method are illustrated with errors from the comparisons between results of the localization and geotags data within the images. The experiment results pointed the proposed method to be the promising alternative to conventional ways of outdoor localization.</p>
<p><b>CJ1-0041</b> <b>9:30-9:45</b></p>	<p>Occupancy Grid Fusion Prototyping Using Automotive Virtual Validation Environment  <b>Paweł Markiewicz</b>, Krzysztof Kogut, Maciej Różewicz, Paweł Skruch, Roman Starosolski            Silesian University of Technology, Faculty of Automatic Control, Electronics and Computer Science, Poland</p> <p><b>Abstract</b>— This paper walks through the occupancy grid fusion algorithm prototyping process. The implementation consists of core fusion algorithms using probability derived from inverse sensor models. Preliminary results are obtained using an automotive virtual validation tool and phenomenological sensor models of radars, lidars and selected functions of vision sensors. The purpose of the developed framework is to perform a relative performance assessment between certain grid computation and fusion methods.</p>

# SESSIONS

	<p>Assessment is carried out by comparing computed results with reference data. Virtual validation is used to enable quick and cost effective reference data generation in comparison to real world testing.</p>
<p><b>CJ2-017</b> <b>9:45-10:00</b></p>	<p>WADA-W: A modified WADA SNR estimator for Audio-Visual Speech Recognition Thum Wei Seong, <b>M. Z. Ibrahim*</b> and D. J. Mulvaney Universiti Malaysia Pahang, Malaysia</p> <p><b>Abstract</b>— One of the main challenges in speech recognition is developing systems that are robust to contamination by intrusive background noise. In audio-visual speech recognition (AVSR), audio information is augmented by visual information in order to help improve the performance of speech recognition, particularly when the audio modality is so significantly corrupted by background noise and it becomes hard to differentiate the original speech signal from the noise. The signal-to-noise ratio (SNR) can be used to identify the level of noise in original speech signal and one widely used method for SNR estimation is waveform amplitude distribution analysis (WADA), which is based on the assumption that the speech and noise signals have Gamma and Gaussian amplitude distributions respectively. Based on previous approaches, this work uses a precomputed look-up table as a reference for SNR estimation. In this study, WADA-white (WADA-W) has been developed, which rebuilds the precomputed look-up table using a white noise profile in combination of our own AVSR database. This new data corpus, namely the Loughborough University Audio-Visual (LUNA-V) dataset that contains recordings of 10 speakers with five sets of samples uttered by each speaker is used for this experimental work. We evaluate the performance of WADA-W on this database when it is corrupted by noise generated from three profiles obtained from the NOISEX-92 database included at varying SNR values. Evaluation of performance using the LUNA-V database shows that WADA-W performs better than the original WADA in terms of SNR estimation.</p>
<p><b>CJ2-022</b> <b>10:00-10:15</b></p>	<p>Robustness based low-energy multiple routing configurations for fast failure recovery <b>T Hatanaka</b> and T Tachibana University of Fukui, Japan</p> <p><b>Abstract</b>— Fast failure recovery and the energy consumption are important issues in communication networks. A low-energy based multiple routing configurations is proposed for realizing both the fast failure recovery and the low energy consumption. However, in this method, the network robustness and the performance of data transmission are degraded regardless of the low energy consumption. In this paper, for turning some link ports off while maintaining network robustness, we propose a robustness and low-energy based MRC by extending low-energy based MRC. Our proposed method utilizes an algorithm that determines some excluded links based on the network robustness. With the proposed method, the energy consumption can be reduced so as not to degrade the network robustness significantly. We evaluate the performance of our proposed method in some network topologies with simulation.</p>
<p><b>CJ2-069</b> <b>10:15-10:30</b></p>	<p>Simplified Automatic VAR/Power Factor Compensator using Fuzzy Logic based on Internet of Things</p>

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	<p><b>A N Luqman</b>, N S Lestari and I Setiawan Diponegoro University, Indonesia</p> <p><b>Abstract</b>— In AC Power Systems, the compensation of reactive power is very important to support both of load and grid voltage. Generally, the objective of every reactive power compensators is to improve power factor that is the ratio of real power with apparent power to supplied the load. The main aim of this paper is twofold. Firstly, to design and realize a power factor corrector so the system’s power factor is kept high, secondly to monitor energy consumed by the load using IoT technology. The uniqueness of this work is that to improve system power factor, we used capacitor bank which are composed from several capacitor with different values. The software is embedded in a low-cost microcontroller then will activate a unique combination of the capacitor by using successive approximation algorithm such that the power factor compensator more reliable; in this case, the damage of one or several capacitors in bank will not degrade the performance of the power factor compensator too much.</p>
<p><b>CJ2-081</b> <b>10:30-10:45</b></p>	<p>Small displacement Detecting Method Based on Multifrequency Continuous Wave Radar System</p> <p><b>Aloysius Adya Pramudita</b>, Dharu Arseno and Erfansyah Al Telkom University,Bandung, Indonesia</p> <p><b>Abstract</b>— A small displacement becomes important indicator in identifying a problem that may rises in several systems. Non-Contacting sensor is needed for small displacement detection in several field such as structure health monitoring, landslide monitoring and human vital sign detection. Radar system is potentially implemented as non-contacting sensor for previous mention problems. Detection of small displacement on a target using a radar system requires high accuracy and resolution which gives the consequence of a wide bandwidth requirement. The method of multi-frequency continuous wave radar is then investigated and proposed as a method for detection of small displacement with low bandwidth requirements. Cross correlation and IQ demodulation techniques are applied in post processing. Theoretical analysis and simulation were conducted to study the concept of the proposed method. The results show that the proposed method can determine the location and magnitude of small displacement.</p>
<p><b>CJ2-090</b> <b>10:45-11:00</b></p>	<p>Sine-Squared Pulse Approximation Using Generalized Bessel Polynomials</p> <p>Thanavit Anuwongpinit, Vanvisa Chutchavong, Kanok Janchitrapongvej and <b>Chawalit Benjangkprasert*</b> King Mongkut’s Institute of Technology Ladkrabang, Bangkok, THAILAND</p> <p><b>Abstract</b>— This paper presents the approximation of sine-squared pulse based on the Generalized Bessel polynomials. For designing a circuit to synthesize a sine-squared pulse test signal. The Generalized Bessel polynomials have more parameter than classical Bessel polynomials that have alpha and beta parameters for adjusting the dominator of the transfer function to approximate the sine-squared pulse that closes to the ideal pulse. The simulation results show that the Generalized Bessel polynomial can adjust the approximation response close to the ideal response. The orders of the transfer function are</p>

# SESSIONS

	decreased that confirm a better performance than the previous works.
<p><b>CJ2-091</b> <b>11:00-11:15</b></p>	<p>A Study of Network Bandwidth Management By using Queue Tree with Per Connection Queue</p> <p>Charoon Smansub, <b>Boonchana Purahong</b>, Paisan Sithiyopasakul and Chawalit Benjangkaprasert*</p> <p>King Mongkut’s Institute of Technology Ladkrabang, Bangkok, Thailand</p> <p><b>Abstract</b>— This paper presents a study of network bandwidth management by using the queue tree function with per connection queue function (PCQ). To study a bandwidth management by configuring a network system that uses a Mikrotik router and configures IP number in the network system. WinBox software is used for testing network bandwidth management by download file testing from the internet. The results show a performance of queue tree function and PCQ function for bandwidth management. All users in a network have been received an equal bandwidth of utilization network.</p>
<p><b>CJ2-003</b> <b>11:15-11:30</b></p>	<p>A Literature Review on Effects of Time Pressure on Decision Making in a Cyber Security Context</p> <p><b>Geoff Skinner</b>, Brandon Parrey</p> <p>The University of Newcastle, Australia</p> <p><b>Abstract</b>— Shortages of time has become a natural characteristic of the professional environment. Individuals are often pressed to make fast decisions and complete tasks in a timely manner. This element of time pressure is particularly prevalent in the Information Technology (IT) sector due to fast-paced changes in demand, competition, and technology. Reviewing a wide range of journal articles, this paper aims to contribute to a broader discussion on the effects of time pressure on decisions. This paper explores the theoretical and practical considerations of decision-making, considering key decision-making models and the effect of technology on the decision-making process. Subsequently, this paper explores time pressure in a general sense, and then reviews the stress it causes individuals and its presence in technological environments, in particular a cyber-security context. After reviewing both decision-making and time pressure individually, the paper explores the relationship between the two, considering the influence time pressure on decision-making in technological settings. Concluding that time pressure can have an adverse effect on decision-making and hence possibly impacting cyber security services.</p>
<p><b>CJ2-098</b> <b>11:30-11:45</b></p>	<p>A Novel File System Design for Hybrid Nonvolatile Memories</p> <p>Yi-Han Lien, Min-Chun Chen, <b>Po-Chun Huang</b></p> <p>Taipei Tech, Taiwan</p> <p><b>Abstract</b>— Various nonvolatile memories, such as block-based NAND flash memory and byte-addressable phase-change memory, have become strong competitors of mechanical hard disks as the storage medium on personal computers. While a number of excellent proposals on file systems based on nonvolatile memories have been considered, there are still missing pieces in the efficient designs of file systems based on hybrid nonvolatile</p>

# SESSIONS

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	<p>memories with block-based and byte-addressable media. In this work, we propose a novel file system design on hybrid nonvolatile memories to combine the advantages of flash memory and phase-change memory. The design is then verified through evaluation studies, where the results are quite encouraging.</p>
<p><b>CJ2-078</b> <b>11:45-12:00</b></p>	<p>Hybrid Cloud – An Inter-Cloud Communication Mechanism <b>Raghunandan M S</b> Department of Computer Science, PES University, Bangalore, Karnataka, India</p> <p><b>Abstract</b>— Cloud computing has been in existence since the early 2000s and the growth in this domain of Computer Science has been by leaps and bounds. Cloud computing service providers offer suites of services like Software, Platform and Infrastructure Services. Hybrid Cloud Deployment has become commonplace in today’s world. The reason for the rise of hybrid cloud is the advantage of leveraging some high-cost operations onto a public cloud – provisioning and scalability, just to name a few – and at the same time making use of a private cloud for application deployment. In the current market trends, interoperability between Cloud platforms have put immense pressure on vendors to provide suitable features that would enable inter-cloud communication whilst at the same time trying to eliminate problems that plague today’s applications – more notably Vendor Lock-In and Portability. This paper explores the possibility of exchanging data amongst intercloud instances that are constrained by geographical properties.</p>



**Lunch @ 6G @ Level 6**

**[12:00-13:00]**

# SESSIONS

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**October 14, 2018**

## **Session VI**

[Electronic Power Technology and  
Energy]

**🕒 9:00-11:45**

**📍 ROOM 6F @ Level 6**

Chaired by Assoc. Prof. En-Chih Chang

I-Shou University, Taiwan

**11 presentations—**

CJ2-016, CJ2-021, CJ2-049, CJ2-054, CJ2-061, CJ2-066, CJ2-094, CJ2-074, CJ2-079,

CJ2-055, CJ1-0036

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# SESSIONS

<p><b>CJ2-016</b> <b>9:00-9:15</b></p>	<p>Maximum Power Point Tracking for a Battery Based Photovoltaic System with no Converter Adrian Paun, <b>Flaviu M. Frigura-Iliasa</b>, Stefan Novaconi, Mihaela Frigura-Iliasa, Doru Vatau, Sorin Musuroi National Institute for Reserarch and Development in Electrochemistry and Condensed Matter/LERF, Timisoara, ROMANIA</p> <p><b>Abstract</b>— This paper aims to present an off-grid renewable energy system based on a photovoltaic element (PV), or a group of PVs, integrated in a solar battery (SB), directly connected to an electric battery (EB) with no DC-DC adapter (which is the most common solution existing on the market). The SB has to be properly adjusted to the EB, in order to provide the same amount of energy as the system when operating at its classically detected maximum power operating point. This proposed technical solution is more economically justified, compared to the classic one: SB+DC-DC+EB, due to the simple fact that the DC-DC converter is no longer required at all. A simple mathematical model for the current-voltage characteristics is also presented, followed by a comparison between the classic DC-DC converter based solution and the newly proposed one, without DC-DC converter.</p>
<p><b>CJ2-021</b> <b>9:15-9:30</b></p>	<p>CAD Based Design of a High Energy Absorption Metal Oxide Varistor Razvan Petrenci, Mihaela Frigura-Iliasa , <b>Flaviu M. Frigura-Iliasa</b>, Marius Mirica, Lia Dolga, Hannelore E. Filipescu National Institute for Reserarch and Development in Electrochemistry and Condensed Matter/LERF, Timisoara, ROMANIA</p> <p><b>Abstract</b>— Metal Oxide Varistors are a very common power electronic device, applied for efficient overvoltage protection at any voltage level. This piece of equipment has a high non-linear current response function of the applied voltage, and, it provides a relatively high heat absorption capacity in case of accidental overvoltage shocks. The crossing response current is clearly activated by temperature of that device, and, by consequent, overheating could be disastrous. Actual researches must be carried out both for a new more performant material as well as for new technical solutions for the design of all equipment integrating them, by studying heat extraction and heat transfer inside a new complex varistor device. Our article proposes a totally new device, used basically for low voltage applications, having a supplementary metal mass added to the body of that varistor, shaped as small disk. It actions like a heat pump immediately after the voltage shock and as additional radiators at the end of the heating process caused by a transitory overvoltage. A CAD solution combined with a finite element model, followed by some experimental results are also presented, for confirming the performance of that newly design. By placing additional metal alloy masses inside a new varistor structure it will have a higher heat pumping and dissipation capability, in order to reduce temperature stress and all aging effects.</p>
<p><b>CJ2-049</b> <b>9:30-9:45</b></p>	<p>Design Smart Panel to Support Energy Conservation with Active Approach Methods <b>F. Yudi Limpraptono</b> , Eko Nurcahyo and M. Ibrahim Ashari</p>

# SESSIONS

	<p>National Institute Of Technology Malang,Indonesia</p> <p><b>Abstract</b>— Electric energy is a basic human need, various electrical appliances have been used in everyday life, like a lighting system, refrigerator, HVAC (heating ventilation and air conditioning) etc. Currently the price of electric energy is increasingly expensive, which is due to the increasing use of electrical energy and the declining supply of fossil energy. This situation encourages to seek efforts in saving electrical energy. The culture of electricity saving has been promoted by the Indonesian government, by requiring all government agencies to implement electricity-saving programs. From the background that has been described above, it is necessary a system that can support the method of active energy efficiency approach. One system that can support active energy efficiency is an electrical power monitoring system that is connected to an electric load distribution panel system that is able to control load automatically. Modern electrical energy monitoring systems are required to be able to provide some facilities such as the ability to provide reports and data analysis with a very varied communication methods to be able to provide the desired information as part of an active approach. The purpose of this research is to design the prototype of control system and monitoring of electrical power in buildings, which have smart and low cost characteristics to support electrical energy conservation by active method.</p>
<p><b>CJ2-054</b> <b>9:45-10:00</b></p>	<p>High Performance Sine Wave Inverters Using Simulated Annealing Algorithm Tuned Non-Real-Valued Sliding Surface En-Chih Chang, Chun-An Cheng, and Rong-Ching Wu I-Shou University, Taiwan</p> <p><b>Abstract</b>— In this paper, a simulated annealing algorithm tuned non-real-valued sliding surface is developed to enhance the transience and steady-state response of sine wave inverters. Even if the customary sliding surface (CSS) has the insensitivity to system uncertainties, the model of a reduced order exists in sliding action, thus yielding deficient system dynamics. By employing the non-real-valued sliding surface (NRVSS), the entire system dynamics can be established. Unfortunately, the occurrence of the chatter phenomenon is frequent and the harmonic distortion of sine wave inverter output is also high. To effectively reject the effect of the chatter, the NRVSS control gains can be optimally tuned via the simulated annealing algorithm (SAA). The proposed methodology has been implemented for the actual sine wave inverter controlled by a digital signal processor (DSP). Experimental results of the closed-loop system represent that the proposed methodology can provide fast transient response, low total harmonic distortion (THD) and the attenuation of steady-state error and chatter.</p>
<p><b>CJ2-061</b> <b>10:00-10:15</b></p>	<p>Optimization of rotation speed for CuSCN hole transport layer in perovskite solar cell using spin coating <b>J Sulistianto</b>, R W Purnamaningsih, and N R Poespawati* Universitas Indonesia, Indonesia</p> <p><b>Abstract</b>— Organometal lead halide has gained immense popularity as solar cell active layer due to their unique optical characteristic, low cost, and simple fabrication technique.</p>

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	<p>Transport layer is important component to maximize overall performance of perovskite solar cell. Inorganic CuSCN have good transparency and high hole mobility as p-type transport layer for perovskite solar cell. In this work, we investigated the effect of rotational speed on spin coating to grow CuSCN thin film. Rotational speed is ranging from 1000 rpm to 4000 rpm. The best performing devices is when CuSCN layer deposited at 2000 rpm with VOC 0.96 V, ISC 5.29 mA, and FF 0.48.</p>
<p><b>CJ2-066</b> <b>10:15-10:30</b></p>	<p>High Step-Up DC-DC Converter with Switched Multi-Inductor Technique <b>Lung-Sheng Yang</b> and Jing-Han Cai Far East University, Tainan City, Taiwan</p> <p><b>Abstract</b>— This paper presents a single-switch high step-up DC-DC converter. The pulse-width modulation is used to control the switch. The switched multi-inductor technique is adopted for achieving high step-up voltage gain. Three inductors with same level of inductance are employed for the proposed converter. When the switch is turned on, these three inductors store their energies by parallel connection. While the switch is turned off, the energies stored in the three inductors are released by serial connection. The switched-inductor technique can be extended to multi-inductor for providing higher voltage gain. In order to show the performance of the proposed converter, a prototype hardware circuit is implemented.</p>
<p><b>CJ2-094</b> <b>10:30-10:45</b></p>	<p>Fuzzy Tuning and Power Reaching Law-Based Discrete Sliding Mode Control for Solar Photovoltaic Inverters <b>En-Chih Chang</b>, Hung-Liang Cheng and Chun-An Cheng I-Shou University, Taiwan</p> <p><b>Abstract</b>— This paper develops a digital signal processor (DSP)-controlled solar photovoltaic inverter that is well realized to prove the proposed controller. The discrete sliding mode control (DSMC) with power reaching law (PRL) not only suits for digital implementation because of its finite sampling frequency but permits faster convergence speed. However, the chattering around PRL-based DSMC exists and may cause excessive power losses. A fuzzy tuning technology is employed to handle the problem of the chattering so that the robustness of the system can be increased. Simulation results display that the proposed solar photovoltaic inverter can generate low total harmonic distortion (THD) under rectifier-type load circumstances and fast transient response under step load changes. Experimental results on a solar photovoltaic inverter laboratory prototype controlled by a digital controller are provided to substantiate both theoretical analysis and simulation results.</p>
<p><b>CJ2-074</b> <b>10:45-11:00</b></p>	<p>Integration of Multilayered Context-Aware Control System for Ubiquitous Computing Environment <b>Khamla Non Alinsavath*</b>, Lukito Edi Nugroho and Widyawan Universitas Gadjah Mada, Yogyakarta, Indonesia</p> <p><b>Abstract</b>— In response to recent demand, context-aware application performs significantly in the field of pervasive computing and smart environment. Many approaches have been proposed to provide functionalities and implementation using context information to</p>

# SESSIONS

	<p>observe the environment. Developing context-awareness system becomes more essential issue in order to support into the real situation and system deals with many components and complexity. There are many hardware with different platforms that make them have difficulty to communicate to each other with different layers processing in the system of context such as physical, middleware and application layers. Services in each layer need to adapt the way they behave according to the current context information. This research introduces the development of context-aware system and middleware developments that support the creation of smart application with the purpose of providing the framework of the system and deploy middleware as being the bridge to integrate physical layer and application layer seamlessly to support monitoring ubiquity environment. The system controls multi sensors to monitor the real environment from raw data through prototype platforms for managing, sensing, computing and user interacting as the outcome of the system's performance. Implementation and experiment have been performed where user moves in / moves out from the sensor range. The proposed middleware is able to handle the complicated system and fulfill its requirement such as heterogeneity, scalability and mobility, the system and complicated components are integrated to be a completed system that operate, interpret and representation context entities to an end users. Having this control system makes a lot of benefits such as real time information access, become intermediary between layers and support to control energy system with the purpose of reducing the energy consumption, rapid communication to the users.</p>
<p><b>CJ2-079</b> <b>11:00-11:15</b></p>	<p>Intelligence insomnia detection system based on single channel EEG analysis  <b>Chih-En Kuo</b>  Feng Chia University, Taiwan</p> <p><b>Abstract—</b> For the diagnosis of sleep issues, all night polysomnographic (PSG) recordings are usually taken from the patients and the recordings are scored by a well-trained expert. However, visual sleep scoring and diagnosis was a time consuming and subjective process. Recently, actigraphy was taken as a valid and convenient way to assess sleep-wake patterns in patients suspected of certain sleep disorders, such as insomnia. Nevertheless, this way needs a two-week continuous measurement for insomnia screening process in the home environment. In this study, we proposed an intelligence insomnia detection system based on the multiscale entropy analytical method for single-channel EEG, and to assess the performance of the method comparatively with manual scoring based on full polysomnograms. Multiscale entropy is a powerful tool for complexity analysis and it had successfully applied on automatic sleep stage scoring for single-channel EEG and other bio-signal analysis. In order to develop and evaluate the proposed method, all night polysomnograms from 16 healthy individuals and 16 patients with insomnia were used. The developed method only analyzed the single EEG signals of C3-A2 for home healthcare application. The results of our proposed system and manual scoring were compared on the subject is a healthy individual or insomnia patient. The overall agreement, sensitivity, specificity and kappa coefficient of our proposed system applied to PSG data from 8 healthy individuals with good sleep efficiency, and 8 patients with insomnia (average sleep efficiency is 74.35%) were 93.75%, 100%, 87.5% and 0.875, respectively. Our results show</p>

# SESSIONS

	<p>that multiscale entropy is a useful and representative feature for rapid insomnia detection. It has high accuracy and good homecare applicability because a single EEG channel is used. In future, we can integrate the proposed system with portable PSG system for sleep quality assessment or insomnia screening at-home environment.</p>
<p><b>CJ2-055</b> <b>11:15-11:30</b></p>	<p>Diversification and coarse-grained metaheuristics <b>Nadia Abd-Alsabour</b> Cairo University Cairo, Egypt</p> <p><b>Abstract</b>—The metaheuristics have to explore the search space successfully i.e., their search process has to explore distinctive areas of the search space and to move to unexplored parts of the search space. There are numerous factors that affect this important feature of the metaheuristics that lead to getting high quality solutions. Recently, it has been shown that the performance of the coarse-grained algorithms outperforms many other parallel algorithms. This work experimentally investigates the impact of the key parameters of the coarse-grained algorithms such as migration on the diversification (creating various solutions in order to investigate the search space on the global level) of these algorithms and subsequently their ability to find high quality solutions. The observed results show comparable recommendations.</p>
<p><b>CJ1-0036</b> <b>11:30-11:45</b></p>	<p>Path Planning Methodology Using sEMG Signals for Tracking Finger Motions <b>Victor H. Benitez</b>, Jesus Pacheco Department of Industrial Engineering, Mechatronics Area, Universidad de Sonora. Blvd. Luis Encinas y Rosales S/N, Hermosillo, SON, C.P.</p> <p><b>Abstract</b>— This paper presents the research advances in the development of a novel methodology for tracking finger motions using superficial electromyographic signals captured from the forearm of healthy subjects. Electromyographic data is recorded while the hand of subjects is constricted to grasps a set of spheres with a small variation in diameter. Five muscles are monitored with non-invasive electrodes placed on the skin of volunteers while a set of grasp-hold-relax tasks are carried out randomly. A preprocess stage is performed to extract time domain features from data, with the purpose of address both the curse of dimensionality and the issues related to the nonstationary behavior of electromyographic signals. A pattern recognition module is used to classify data and to assign the position of the fingers with each sphere grasped. Finally, a neuronal model predictive controller is designed which is able to control the position of the fingers using predefined trajectories. The applicability of the methodology is presented via simulations of a servo system that models one joint angle motion of the thumb.</p>



**Lunch @ 6G @ Level 6**

**[12:00-13:00]**

# SESSIONS

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**October 14, 2018**

## **Session VII**

[Image Analysis and Processing  
Technology]

**🕒 13:00-14:45**

**📍 ROOM 6G @ Level 6**

Chaired by TBA

**7 presentations—**

CJ1-0023, CJ1-2001, CJ2-015, CJ2-040, CJ2-086, CJ2-1003, CJ1-0033

**\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

# SESSIONS

<p><b>CJ1-0023</b> <b>13:00-13:15</b></p>	<p>Research on Visual Saliency Model Based on CovSal Algorithm and Histogram Contrast  <b>Guoan Yang</b>, Xinyu Zhang, Zhengzhi Lu, Yuhao Wang, Junjie Yang            Xi'an Jiaotong University, China</p> <p><b>Abstract</b>— This paper proposes a novel visual saliency model based on the CovSal algorithm of the region covariance matrices (VCR) and histogram contrast (HC) method. First, we give a new CovSal algorithm of the local saliency contrast by improving the center-surrounder segmentation method. Second, we add the HC algorithm of the global saliency contrast, and then we sparsify the global saliency map using the low-rank matrix. Finally, we integrate the local and global saliency maps through combining both the VCR and HC contrast. Present paper proposes a new visual saliency model that combines the local and global saliency contrast algorithms, simultaneously retaining their advantages and eliminating their drawbacks. For example, the proposed model reduces the influence of background and texture details. The experimental results show that the performance of the visual saliency model proposed in this paper has been improved compared to the CovSal algorithm presented by Erdem and Erdem.</p>
<p><b>CJ1-2001</b> <b>13:15-13:30</b></p>	<p>A mosaic tile puzzle machine  <b>Xiaojie Wang</b>, Chun-Ching Hsiao, Chih-Haw Liang, Xiaojun Lin            Department of Mechanical Design Engineering, National Formosa University, No. 64, Wunhua Rd., Huwei Township, Yunlin County, Taiwan</p> <p><b>Abstract</b>— Tiles are sintered by using ceramic clay, feldspar, pottery and quartz. Blank bodies of tiles are glazed are glazed tiles with various colors. Materials of tiles can be discriminated among pottery, stone and porcelain. Porcelain tiles possess a lower water absorption rate and a higher hardness. Tiles are building materials for possessing permanent and effective properties to embellish the environment. Mosaic tiles are one part of tiles production, and they usually have an area low than 40 mm<sup>2</sup>. Moreover, mosaic tiles are used to form low-grade pictures by using a cotton thread net to fix these tiles at the back side, and an area of 30cm × 30cm is a fundamental unit to assemble tiles for facilitating mosaic tiles to plaster on the walls of buildings. The industry of mosaic tiles faces some predicaments due to rising labor costs. In order to reduce human resources, a mosaic tile puzzle machine is designed and fabricated to decrease labor costs by an automatic production. An integrated machine consists of two sets of automatic storage system, a mosaic tile puzzle machine and a belt conveyor. The automatic storage system is used to supply and store the trays for the mosaic tile puzzle machine to produce a larger area picture composed by mosaic tiles. The belt conveyor is used to connect the mosaic tile puzzle machine with two sets of automatic storage system. Moreover, the mosaic tile puzzle machine consists of a pneumatic system, an apparatus of rotating multiple vacuum chucks, mosaic tile feeding devices and a two-axis slider. The apparatus of rotating multiple vacuum chucks can reduce the working time for sucking and putting mosaic tiles. The control system is constructed with LabVIEW program, human-computer interfaces and hardware (NI PXIe-7350 and NI PXIe-6368 DAQ). The working time is nearly to 8 minutes for assembling 196 mosaic tiles in a tray of 30cm × 30cm.</p>

# SESSIONS

<p><b>CJ2-015</b> <b>13:30-13:45</b></p>	<p>Bag-of-Words and Region-Based Feature Representations in Object Categorization: A Comparative Study <b>Chih-Fong Tsai</b>, Ya-Han Hu, Ming-Chang Wang, and Kang Ernest Liu National Central University, Taiwan</p> <p><b>Abstract</b>— The aim of object categorization is to find a given object in an image and the performance of object categorization heavily depends on the extracted features as the image descriptor. In the literature, feature representation can be broadly classified into block/region-based and bag-of-words (BoW) features. However, there is no a comparative study of using these different feature representations over different datasets and different image scales since the image sizes for object recognition are varying from different datasets. Our experimental results using the Corel and PASCAL datasets show that when images contain more complex scenes like Corel images, the block-based feature is a better choice. In addition, the larger the image scales, the better the recognition performance. On the contrary, when images contain fewer objects like PASCAL images, it is better to consider the region-based feature representation. Particularly, reducing the image scale does not degrade the recognition performance; it even shows some level of improvement. On the other hand, although the BoW feature does not perform better than the block/region based features, it shows stable performances over different datasets and different image scales. This indicates that when the chosen dataset contains a large amount of images having various types of contents, which is difficult to decide what features to be extracted, the BoW feature can be extracted as the baseline feature representation.</p>
<p><b>CJ2-040</b> <b>13:45-14:00</b></p>	<p>HSV Color Space Based Lighting Detection for Brake Lamps of Daytime Vehicle Images Yuki Omori*, <b>Yoshihiro Shima</b> Meisei University, Japan</p> <p><b>Abstract</b>— We propose a method for detecting the lit portion of brake lamps from rear images of vehicles. Its effectiveness was confirmed for 526 rear images. We used 526 Caltech Cars 2001 (Rear) images published by the California Institute of Technology as input images. These images were photographed in the daytime by the in-vehicle camera. The rear image of the car in front was captured. When the brake lamps were lit, the color was red, and the brightness was high. By determining this color from the image, the lighting of the brake lamps could be detected.</p>
<p><b>CJ2-086</b> <b>14:00-14:15</b></p>	<p>Defect Detection in Textile Fabrics with Snake Active contour and Support Vector Machines <b>Prachya Bumrungkun</b> URajamangala University of Technology Isan Surin Campus Surin, Thailand</p> <p><b>Abstract</b>— This paper presents the automatic fabric defect detection in the textile manufacturing industry. The method utilizes edge detection via Snake active contour models to extract the fabric feature. The two-dimensional principal component analysis is employed for data reduction. Then, the outcome of the data reduction passes through the support vector machine as the classifier for classification. The performance of the method is evaluated with the 900 – fabric images for efficiency and effectiveness. The experimental results show that the method is able to detect the defection on the textile with the average</p>

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	<p>accuracy of 98.77 %. The results indicate that the proposed method is outstanding on the defect detection of the textile.</p>
<p><b>CJ2-1003</b> <b>14:15-14:30</b></p>	<p>Combination of Multiple Instance Selection Results  <b>Tzu-Ming Yen*</b>, <b>Jun-Juh Yan</b>          Department of Computer and Communication, Shu-Te University, Kaohsiung, Taiwan</p> <p><b>Abstract—</b> Data pre-processing in data mining is an important step. An effective pre-processing method can make the accuracy of prediction models higher than the ones without data pre-processing. In this study, we focus on examining the prediction performances of combining multiple instance selection results. Since a given dataset is usually likely to possess some proportions of outliers or unrepresentative data, they can influence the model performance if this type of data is used during the model training stage. Instance selection aims to filter unrepresentative data from the training data, which has shown its applicability to construct better prediction models. That is, the reduced training set containing fewer outliers usually can allow the prediction model to outperform the ones trained without performing instance selection. In literature, there are various instance selection algorithms, whose criteria to select representative training data are different. It is usually the fact that the performances of different algorithms are dataset dependent. Therefore, the results by using different instance selection algorithms can be different. In order to maximize the performance of different instance selection algorithms, the aim of this paper is to employ three well-known algorithms, i.e. IB3, DROP3, and GA for a specific dataset, and the three selection results are then combined via the union and intersection methods. The two combinations of multiple instance selection results are compared with single instance selection results in terms of prediction accuracy. Particularly, several UCI datasets are used for the experiments.</p>
<p><b>CJ1-0033</b> <b>14:30-14:45</b></p>	<p>Comparison of Random Circle Detection and Hough Transform Method in Detecting Obstructed Circle Object  <b>Rahmadi Kurnia</b>, Tesi D Aufia, Fitrilina          Andalas University, Indonesia</p> <p><b>Abstract—</b> Detection of circles in digital imagery is important in object recognition. In real life, there are many circular objects are imperfect and are blocked by other objects. In this study, the randomized circle detection method is used to detect unobstructed circle objects in a digital image. If the Hough transform method uses an accumulator to store parameter information, then randomized circle detection does not need to use accumulator. An initial stage of preprocessing is applied to reduce noise and obtain the edge of object in the image. Each object's pixel edge will be stored which will then be recognized by the randomized circle detection method and the Hough transform method. The results of these two methods are compared each other to according to three parameters: accuracy, processing time and memory storage. In this research, 110 sample images order to analyze the performance of both methods. The results showed that randomized circle detection method was more effective and efficient than Hough transform method. The randomized circle detection method can detect the circle until 20% degree of visibility. Hough transform</p>

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	method can detect a circle is only 40% degree of visibility. Computation time of randomized circle detection method is faster than Hough transform method and 2, 18659 seconds. The memory used randomized circle detection method smaller than HT method 128,494, 2 Kb
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# SESSIONS

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**October 14, 2018**

## **Session VIII**

[Vehicle Control and Mechanical  
Engineering]

**🕒 13:00-14:45**

**📍 ROOM 6F @ Level 6**

Chaired by TBA

**7 presentations—**

CJ1-0045, CJ2-001, CJ1-0007, CJ1-0014, CJ1-0019, CJ1-0025, CJ2-1007

**\*Note:**

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
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# SESSIONS

<p><b>CJ1-0045</b> <b>13:00-13:15</b></p>	<p>Gain-Scheduled <math>H^\infty</math> for Vehicle High-Level Motion Control <b>Moad Kissai</b>, Bruno Monsuez, Adriana Tapus, Xavier Mouton, Didier Martinez</p> <p><b>Abstract</b>— Vehicle motion control has many challenges to overcome. One of the main problems is robustness against not only environmental changes but also uncertainties about the vehicle itself. This paper focuses on this problem using robust control design at the control architecture's high level. Researches tend to decentralize the control to treat longitudinal and lateral dynamics separately. Here, an overall vehicle model is first proposed and studied to justify the structure that the high-level controller should embrace. Co-simulation results of different combinations showed promising performances to face uncertainties and couplings. Therefore, robust techniques combined with control allocation techniques may enhance autonomous vehicles reliability.</p>
<p><b>CJ2-001</b> <b>13:15-13:30</b></p>	<p>Study and simulation of neuro-fuzzy controller for turbo generator control <b>Babacar KEBE</b>; Lamine Thiaw; Oumar Ba Ecole Supérieure Polytechnique de Dakar, Université Cheikh Anta Diop de Dakar, Dakar, Senegal</p> <p><b>Abstract</b>— This document focuses on the development of a learning tools for the dynamic model of a steam turbine 20MW capacity type able to accommodate the different variations of the machine's operating parameters.</p> <p>Considering all the advantages and disadvantages of the optimization methods that we have studied (genetic algorithm and neural networks), the neuro-fuzzy option was remarkable in view of the results obtained in the modeling of the systems. The ANFIS model (Adaptive Neuro-Fuzzy Inference System), known for its performance in the learning domain of complex non-linear systems, is chosen for a better approximation of functions for modeling.</p> <p>The active power depending on the high-pressure steam flow inlet turbine and the low-pressure steam flow extraction as well as the voltage across the generator depending on the power factor and the active power shall be controlled from 2 ANFIS models mounted in parallel from learning the input linguistic values of the system to model. Their outputs acting respectively on the control of the HP (High Pressure) steam inlet valve opening for the variation of the HP steam flow inlet and the rotor excitation current for the variation of the voltage across the alternator.</p> <p>The dynamic model thus obtained from the adjustment of the parameters of the membership functions describes the behavior of the turbine to stabilize its operating point for any disturbance.</p>
<p><b>CJ1-0007</b> <b>13:30-13:45</b></p>	<p>Experimental study on the effect of rubber isolator on the vibration of piston pump <b>Huawei Wang</b>, Shuping Cao, Xiaohui Luo, Zuti Zhang, QinJin Wu School of Mechanical Science and Engineering, Huazhong University of Science and Technology, China</p> <p><b>Abstract</b>— Rubber isolator commonly used as support of piston pump, and the stiffness and damping nonlinearity of rubber isolator will significantly affect the vibration characteristics of piston pump. In this paper, two kinds of rubber isolators were selected, and the effect of</p>

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	<p>pressure excitation amplitude on the vibration isolation effect of rubber isolator under different pressure conditions is studied. The vibration of piston pump and the base with different rubber isolators are further measured, and the vibration isolation effect of rubber isolators under different discharge pressure of piston pump is calculated. Experimental results show that: with the increase of pressure, the vibration of the piston pump and the base increases, on the contrary, the vibration isolation effect decreases. The vibration of the pump and the base with rubber isolator BE400 is lower than that of BH400. This study can contribute to the vibration and noise control of piston pump in engineering.</p>
<p><b>CJ1-0014</b> <b>13:45-14:00</b></p>	<p>Performance Comparison of the PID-AFCCA and PID-AFCFL Controllers in Reducing the Vibration of the Suspended Handle  <b>Ahmad Zhafran Ahmad Mazlan</b>, Haziq Jamaludin  The Vibration Lab, School of Mechanical Engineering, Universiti Sains Malaysia, MALAYSIA</p> <p><b>Abstract</b>— This study aims to suppress the vibration produced by power tool to the suspended handle model using Active Force Control (AFC) method with embedded of an intelligent control method. Prolonged use of power tool with the high level of vibration can lead to the Hand-arm Vibration syndrome (HAVs). Due to this, a dynamic analysis of the power tool-suspended handle model is necessary to reduce the vibration of the whole system. The suspended handle is modelled as a single-degree-of-freedom (SDOF) system and power tool disturbance is applied to the system. In this simulation, four systems are investigated and compared which are passive system, AVC with proportional-integration-derivative (PID), AVC with PID-AFC-Crude Approximation (CA) and AVC with PID-AFC-Fuzzy Logic (FL) controllers. The intelligent method of FL used to determine the AFC controller parameter which is the estimated mass (EM). From this study, the optimum EM values obtained from CA method is 0.04 kg while for the FL method is 0.04223 kg. This value produced by the triangular-shaped membership function in the FL controller. In addition, the overall performances are also compared by changing the target input value and the AFC-FL can still produce the best result to the system.</p>
<p><b>CJ1-0019</b> <b>14:00-14:15</b></p>	<p>Design of Computer Integrated Assembly Line  <b>Tanika Sofianti</b>, Setijo Awibowo, Toha Zen, Triarti Saraswati, Aditya R Fedriansyah, Rihan Mustafa and Ivan Kurniawan  Swiss German University, Indonesia</p> <p><b>Abstract</b>— Lean manufacturing is one of the most used methodologies in the society to winning today's competition. Many techniques and concepts of Lean technologies represent one way in industry that is changing their culture towards efficiency and continuous improvement. Utilizing computer technology for collecting data directly from labors at the shop floor and transferring the information to ERP system at the business layer can eliminate many unnecessary activities and lead the process to Lean condition. Having the wireless connection in between the shop floor to the office also can increase the efficiency of work. As the start of a system development that will support the information system of shop floor and office, this paper will promote the design of a system that utilize computer for managing data and information from assembly line to warehouse. Data collected from</p>

# SESSIONS

	<p>each workstation entered by the labors in the shop floor will be stored in the server to enable the data accessibility from warehouse and other departments at the business layer i.e. purchasing and finance.</p>
<p><b>CJ1-0025</b> <b>14:15-14:30</b></p>	<p>Valve shifting time in a digital fluid power system - Energy efficiency versus fatigue loading <b>Anders Hedegaard Hansen</b>, Magnus F. Asmussen, Torben O. Andersen Aalborg University, Denmark</p> <p><b>Abstract</b>— A discrete fluid power force system has been proposed as a possible technology for improvement of the energy production of wave energy converters. Discrete force changes may however increase the fatigue loading experienced in the wave energy converter. Various research projects have studied how force oscillations in discrete fluid power systems may be avoided however some system limits sets bounds for the effectiveness of the developed algorithms. In the current study the correlation between force shifting time and fatigue loading is investigated by simulating a discrete fluid power take-off (PTO) system. The force applied by the PTO system is measured during 100 wave periods and transformed to an equivalent load force. This equivalent load force is compared for various valve shifting times and compared to the energy production. The study shows a request for a trade-off between energy production and the equivalent load.</p>
<p><b>CJ2-1007</b> <b>14:30-14:45</b></p>	<p>Static Voltage Stability Evaluation Using A Power Flow Model Incorporating Generation Controls and Load Characteristics <b>Abraham Lomi</b> Department of Electrical Engineering, National Institute of Technology, Malang, Indonesia</p> <p><b>Abstract</b>— Power systems are steadily growing and have become larger as well as more complex with interconnections to neighboring systems for reliable and economic operation under dynamic as well as steady state operating conditions. With the increased loading of existing power transmission systems, the problem of voltage stability and voltage collapse, has become a major concern in power system planning and operation. Voltage stability (also known as load stability) of the system refers to the performance of the system during its normal quasi-steady state operation. The primary concern in this type of stability is the ability of the system to meet the consumer demand at acceptable voltage levels when subjected to more slow dynamics of the loads and reactive power controllers. This paper presents an evaluation of the static voltage stability using a power flow model incorporating, generation controls, load characteristics and also the effects of the tie-line controls. Results on a modified IEEE 30-Bus system is presented for illustration of the analysis.</p>

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CJ1-0011	<p>A Virtual Model of Manufacturing System Based on Hybrid Automata          Jiang Danding, Zhou Jingtao, Zhao Ying, Li Enming          Northwestern Polytechnical University, China</p> <p><b>Abstract</b>— In view of the current virtual manufacturing system models lack the expression of the static structure affected by dynamic manufacturing process, which leads to the virtual model cannot express the change of the physical manufacturing system accurately, then affects real-time analysis of manufacturing system adversely. A fusion model combines the static structure and dynamic manufacturing process is established based on hybrid automata, which describe the manufacturing system static structure by hybrid automata state and the dynamic process by hybrid automata state transition event, then describe how the dynamic process acts on the static structure of the system by different event-driven state transition. In the end, by the implementation of the former work to modeling a manufacturing system from task assignment to exception handling.</p>
CJ1-0013	<p>Sensor Fault-tolerant Control for Gear-shifting Engaging Process of Electric-drive Mechanical Transmission          Xin Ren, Ziwang Lu, Guangyu Tian          The State Key Laboratory of Automotive Safety and Energy, Tsinghua University, China</p> <p><b>Abstract</b>— The angular displacement sensor and hall sensors of gear-shifting actuator play a crucial role in gear-shifting engaging control of electric-drive mechanical transmission. However, sensor faults might occur and result in serious consequences. In order to solve the problem, a novel sensor fault-tolerant control method for gear-shifting engaging process of EMT is proposed. When there is no sensor fault, the gear-shifting load force is observed and a table of load force with respect to rotor position is built and updated. Once the sensor fault is detected, either direct estimation method based on the load force table or line back-EMF based method will be used to estimate brushless direct current rotor speed and position to implement sensorless control. The main contribution of this paper is to offer a practical and innovative sensor fault-tolerant control method for improving gear-shifting reliability of EMT. With the proposed method, the maximal position control error under different sensor fault situations is limited within 1.4%.</p>
CJ1-0035	<p>Research and Implementation of Landfill Leachate Control System          Jin Li, Xueren Dong, Fengnan          University of Jinan, Jinan, Shandong, China</p> <p><b>Abstract</b>— Domestic waste is mainly treated by sanitary landfill. Leachate will be produced during sanitary landfill. The main characteristics of landfill leachate are high concentration of COD and BOD, high ammonia nitrogen content, high levels of refractory organics, heavy metal ions, unstable water quality and so on. With the increasing difficulty of leachate treatment, traditional manual or semi-automatic treatment methods can not meet the requirements. In order to ensure the water quality, the requirement of the leachate treatment to automation is increasing. According to the actual operation of sewage treatment plant, a set of treatment processes has been worked out. According to the characteristics and control requirements of landfill leachate processing technology, a landfill</p>

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	<p>leachate processing control system is designed, which is controlled by PLC automatic control, realtime monitoring of Kingview and communication network to realize data exchange. Due to the wide range of leachate water quality changes, the traditional PID control method has poor control precision and the parameters are difficult to adjust online. Therefore, a PID control method based on adaptive control strategy has been proposed and designed. By using the nonlinear mapping ability and learning ability of neural network, the PID parameters can be adjusted online, and the final effluent quality can meet the discharge standard.</p>
CJ1-0044	<p>Cross-Gramian Based Lower-Order Controller Design          Muhammad Raees Furquan Azhar, Umair Zulfiqar, Muwahida Liaquat          Department of Electrical Engineering, College of Electrical and Mechanical Engineering, National University of Sciences and Technology (NUST), Islamabad, Pakistan</p> <p><b>Abstract—</b> The controller designed for practical systems require less computational complexity and saving the hardware resources, for implementation. Model order reduction techniques play a vital role in achieving these requirements by deriving a reduced order model that accurately approximates the original system. Since the operating frequency range of the plant or controller are critical, therefore, the response of the reduced model should be similar to the original system in the emphasized frequency region. In this paper, we propose a cross-gramian based frequency-weighted model order reduction technique for plant-compensator reduction. The Proposed algorithm does not impose the minimality condition on the original system and produces better results with reduced computational effort as compared to the existing algorithm. The significance of the Proposed technique is shown by numerical examples.</p>
CJ1-0048	<p>Output Regulation of n-Link Robotic Manipulator Using Feedback Linearizable Systems under the Approach of Cascade High Gain Observers          Muhammad Saad, Muwahida Liaquat, Rida Abbas Shirazi          College of Electrical and Mechanical Engineering, National University of Sciences and Technology, Pakistan</p> <p><b>Abstract—</b> The High gain observer (HGO) is found to be a very effective tool against output feedback control. However, this observer faces the numerical challenge of having peaking phenomena for high order systems. A new class of observer named Cascade high gain observer (CHGO), is manipulated for high order systems. CHGO is a useful technique for accurate estimation of the higher unknown dimensions of the plant. The observers having lower dimension have saturation function in between them in CHGO. Let the plant has dimension “<math>p</math>” and parameter of high gain “<math>K</math>”, then the gain for the CHGO is limited to an order of “<math>K</math>” in contrast to the gain of the HGO having “<math>K^{(p-1)}</math>”. In this research, output regulation of a feedback linearizable system was achieved under a CHGO approach and results are compared with the high gain observer results. It is worthy to mention here that while using CHGO the peaking was limited to the order of <math>(1/\epsilon)</math> for plants of higher dimension.</p>
CJ1-1003	<p>Mechanism Design and Simulation Analysis of a New Baggage Diversion Lifting Mechanism</p>

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	<p>Mingqian Du, Xiuqing Yang, Wei He, Dongfei Zhao Civil Aviation Logistics Technology Company Limited, Chengdu, China</p> <p><b>Abstract</b>— A new type of baggage diversion lifting mechanism is proposed which is driven by an electronic cylinder and designed to realize lifting and resetting function. The mechanism we designed can meet the requirements of lifting stroke in small working space and has the feature of simple structure. The parameter design of the mechanism is done, and the dynamics and kinematics analysis of the mechanism are carried out. In order to verify the feasibility of the lifting mechanism, the driving force and the joint forces are obtained, which can also provide the basis for the selection of the driving element and the optimization of the mechanism.</p>
CJ2-041	<p>A mission oriented reconfiguration technology for Spaceborne FPGA J X Qin, J Yang, Z Qu and Y X Wang College of Artificial Intelligence at National University of Defense Technology, Changsha, Hunan, China.</p> <p><b>Abstract</b>— Reconfigurable technology based on FPGA is increasingly used in satellites to meet the demand of the increasing missions that satellites need to complete in recent years. In this paper, a mission oriented reconfiguration technology for spaceborne FPGA is introduced to address the problem that how to meet the demand of satellite reconfiguration mission to orbit, execution time and FPGA resource requirements. Satellite reconfiguration system is divided into three parts, that is, mission management module, reconfiguration management module and reconfigurable FPGA. Firstly, a mission list is set up to record the mission's execution time and space attributes, hardware space attributes and priority attributes. The mission is allocated to the FPGA resource area correspondingly based on the flexible region model. According to the time attribute and priority attribute of the mission, the reconfiguration management module carries out the reconfiguration action. And the reconfiguration management module mainly deals with reconfiguration library management and the entire or partial reconfiguration according to the configuration file. After the reconfigurable bit files are loaded to FPGA, the transformation and execution of the hardware resources from the mission to the hardware are completed. Finally, an evaluation of the real-time performance, reliability and security of the design is carried out. Experiments that based on a verification system composed of raspberry/PI and ZYNQ are conducted and results fully prove that the design in this paper can support mission oriented spaceborne FPGA reconfiguration.</p>
CJ2-045	<p>Ensemble learning based Architecture Vulnerability Factor calculation using partial feature set in processors Jiabin Wang, Jiajia Jiao*, Yuzhuo Fu Shanghai Maritime University, China</p> <p><b>Abstract</b>— With the scaling technology, soft error induced bit upsets are increasingly threatening the processor reliability. Processor designers require effective tools or methodologies to estimate the often-used metric Architectural Vulnerability Factor (AVF). This paper presents an ensemble learning based AVF calculation methodology for fast</p>

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	<p>reliability assessment. Instead of the entire feature set, only partial non-critical attributes are selected to build the predictive model so that many performance counters can be removed or shut down for saving memory space and power consumption. Millions of data collected from a cycle-accurate simulator sim-SODA, are trained by the latest learning methods in Tensorflow. The SPEC2000 results demonstrate the instanced ensemble learning-random forest and Ada-boost perform nearly perfect accuracy, better than linear regression, and neural network.</p>
CJ2-104	<p>Object-oriented Implementation of Chess Game in C++ Yiran Zhong Chongqing Foreign Language School, China</p> <p><b>Abstract—</b> In this paper, we implement the standard chess game using C++, a popular object-oriented programming language. Our program is developed and fully tested on Mac OS X system. It can be run in terminal and allows two players to compete together. The object-oriented characteristics of C++, namely, abstraction, inheritance, encapsulation and polymorphism, highly facilitates the development. At the end of the paper, we also points out some aspects that can be further improved.</p>

