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CONFERENCE ABSTRACTS

**2018 International Conference on Electronics, Communications
and Control Engineering (ICECC 2018)**

Workshop

**2018 2nd International Conference on Automation and Robotics
(ICOAR 2018)**

March 6-8, 2018

Avid College, Maldives

Venue: Avid College

Add: Avid College, G.Jawaahiru Asseyri, Ameenemagu, Male', Maldives

Published by

IOP Conference Series
Proceedings services for science



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WELCOME

Dear professors and distinguished delegates,

Welcome to 2018 International Conference on Electronics, Communications and Control Engineering and 2018 2nd International Conference on Automation and Robotics in Maldives!

We wish to express our sincere appreciation to all individuals and organizations who have contributed to the conference. Special thanks are extended to our colleagues in the technical program committee for their thorough review of all the submissions, which is vital to the success of the conference, and also to the members in the organizing committee who had dedicated their time and efforts in planning, promoting, organizing and helping the conference. Our special thanks also go to the invited speakers as well as all the authors for contributing their latest research to the conference.

This conference program is highlighted by the four speakers: Prof. Chin E. Lin, National Cheng Kung University, Taiwan; Prof. Houssain Kettani, Florida Polytechnic University, USA; Prof. R. Sivakumar, R.M.K. Engineering College, India; Prof. Ming June Tsai, National Cheng Kung University, Taiwan.

Oral presentations are divided into two parallel sessions. One best presentation will be selected from each session, evaluated for: Originality, Applicability, Technical Merit, Visual Aids, and English Delivery. We wish you all the best of luck with your presentations!

We believe that by this excellent conference, you can get more opportunity for further communication with researchers and practitioners with the common interest in Electronics, Communications and Control Engineering, Automation and Robotics.

We wish you a pleasant and memorable experience in this conference as well as in Maldives.



Yours sincerely,

Conference Organizing Committee
Maldives

NOTES & TIPS

Notes:


- ✧ You are welcome to register at any working time during the conference.
- ✧ Please kindly keep your Paper ID in mind so that the staff can quickly locate your registration information onsite.
- ✧ Certificate of Listener can be collected in front of the registration counter. Certificate of Presentation will be awarded after your presentation by the session chair.
- ✧ 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.
- ✧ Your punctual arrival and active involvement in each session will be highly appreciated.
- ✧ Please kindly make your own arrangements for accommodations.
- ✧ Please keep all your belongings (laptop and camera etc.) with you in the public places, buses, metro.

Warm Tips for Oral Presentation:


- ✧ 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 sticks will be provided by the conference organizer.

AGENDA

< March 6, 2018 >

 Lobby	
10:00-17:00	Registration & Materials Collection

Morning <March 7, 2018>

 Meeting Room		
09:00-09:10	Welcome and Opening Remarks	
09:10-09:50	Keynote Speech I	Prof. Chin E. Lin National Cheng Kung University, Taiwan
		Speech Title: <i>Airborne Robotics in Drone Applications</i>
09:50-10:20	Coffee Break & Group Photo	
10:20-11:00	Keynote Speech II	Prof. Houssain Kettani Florida Polytechnic University, USA
		Speech Title: <i>Advances in High Performance Computing and Improvements on Monte Carlo Simulation Techniques</i>
11:00-11:40	Keynote Speech III	Prof. R. Sivakumar R.M.K. Engineering College, India
		Speech Title: <i>Medical Image Fusion using Stationary Wavelet Transform</i>
11:40-12:20	Plenary Speech	Prof. Ming June Tsai National Cheng Kung University, Taiwan
		Speech Title: <i>A Novel Definition of the ZMP via Screw Theory</i>




Lunch Time <12:20-14:00> Location: Restaurant

Note: lunch coupon is needed for entering the restaurant.


AGENDA

Afternoon<March 7, 2018>

14:00-15:15	Session I- System Modeling and Analysis-5 presentations	 Meeting Room
	EC005, EC020, EC029, EC030-A, EC002	



Coffee Break <15:15---15:45>


15:45-17:30	Session II- Electronic Systems and Control Automation-7 presentations	 Meeting Room
	EC010, EC011 EC012, EC018, EC026, MA002, MA009	
17:30-18:00	Poster Session	
	EC017, EC007, EC008, EC021, EC013, EC301, EC024	



Dinner <18:00-20:00> Location: Restaurant

Note: dinner coupon is needed for entering the restaurant.

< March 8, 2018>

 Paradise Island	
08:00-17:00	One Day Tour

The tour is optional and will charge an additional 120 USD. Participants should apply for it in advance.

General items as below:

1. Meeting at Male International Airport (8:00am / 10:00am, Exact time will be told on March 7)
2. Upon arrive in the Paradise Island, you can begin to enjoy various activities, taking photos, snorkeling (equipment is provided for free) or just relax on the beautiful beach.
3. Lunch Time (12:00-14:00, Enjoying buffet at restaurant)
4. Free time (14:00-17:00)
5. Go back to Male International Airport around 17:00pm.

*Buffet lunch and transportation are included. Except for snorkeling equipment, other activities should be at one's own expense.

KEYNOTE



Prof. Chin E. Lin

National Cheng Kung University, Taiwan

Prof. Lin was born in Chang Hua, Taiwan. He received BS and MS from Department of Electrical Engineering, National Cheng Kung University, Tainan, Taiwan, and Ph. D. of Electrical Engineering from Lamar University, Beaumont, Texas, USA. Since 1984, he has been with Department of Electrical Engineering, and Department of Aeronautics and Astronautics, National Cheng Kung University, from associate professor to full professor. Prof. Lin has wide research involvements on electric power engineering, power system economic dispatch, power electronics (as one of the early founders in Taiwan), new energy system, and then shifting into avionics systems, flight control, magnetic suspension system, and recent mobile communication and its added value applications in data communication and remote control. Prof. Lin has contributed more than 120 IEEE/AIAA/and other journal papers and more than 300 conference papers.

Prof. Lin has been serving academic positions as Dean and Head in National Cheng Kung University, Distinguished Chair Professor from South China University of Technology, Guangzhou, China, and presidents of Chinese Automatic Control Society, Taiwan, and International Association of Science and Technology for Development, IASTED, Swiss, as well as international conference organizing chairman, committee member, keynote speaker and session chair, also serving to many well-known international journals as associate editors and reviewers. Prof. Lin has received outstanding research award and several other awards from government funding.

Prof. Lin has been with very good relationship to industry for the past 35 years, and has established at least hundred cooperation programs to promote industrial research and development in products and manufacturing. Since 2002, Prof. Lin has been inspired with many new research concept and methodology as a member of "International Cooperation Program on Antimatters Search in Space", leading by Samuel Ting under support from NASA and 16 countries.

KEYNOTE



Prof. Houssain Kettani
Florida Polytechnic University, USA

Dr. Houssain Kettani received his Bachelor's degree in Electrical and Electronic Engineering from Eastern Mediterranean University at Famagusta, North Cyprus, in 1998, and Master's and Doctorate degrees both in Electrical Engineering from the University of Wisconsin at Madison, Wis., in 2000 and 2002, respectively.

Prior to coming to Florida Polytechnic University, Dr. Kettani served as a faculty member at: the University of South Alabama in Mobile, Ala., from 2002-2003; Jackson State University in Jackson, Miss. from 2003-2007; Polytechnic University of Puerto Rico in San Juan, Puerto Rico from 2007-2012; and Fort Hays State University at Hays, Kan. from 2012-2016. Dr. Kettani has also served as Staff Research Assistant at Los Alamos National Laboratory in Los Alamos, N.M. over the summer of 2000; Visiting Research Professor at Oak Ridge National Laboratory in Oak Ridge, Tenn. over the summers of 2005-2011; Visiting Research Professor at the Arctic Region Supercomputing Center at the University of Alaska in Fairbanks, Ala. over the summer of 2008; and Visiting Professor at the Joint Institute for Computational Sciences at the University of Tennessee at Knoxville, Tenn. over the summer of 2010.

Dr. Kettani's research interests include computational science and engineering, high performance computing algorithms, information retrieval, network traffic characterization, number theory, robust control and optimization, and Muslim population studies. His research has been presented in over sixty refereed conference and journal publications and his work has received over four hundred citations by researchers all over the world. He chaired over 100 international conferences throughout the world, and has successfully secured external funding in millions of dollars for research and education from US federal agencies including NSF, DOE, DOD, and NRC.

KEYNOTE



Prof. R. Sivakumar

R.M.K. Engineering College, India

Professor Sivakumar is a Professor and Head of Department of Electronics and Communication Engineering at RMK Engineering College, Tamilnadu, India. He has been teaching in the Electronics and Communication field since 1997. He obtained his Master's degree and PhD from College of Engineering Guindy, Anna University, Chennai. His research interests include Bio Signal Processing, Medical Image Processing, wireless body sensor networks and VLSI. He has published over 34 journal and 42 conference papers over the last several years. He has taught a wide variety of Electronics courses including Digital Image Processing, Multimedia Compression Techniques, VLSI Design, Medical Electronics and Electronic Circuits. Dr.Siva is a life member of the Indian Society of Technical Education, a member of IEEE. Dr. Siva has been invited to deliver Keynote Speech and Chair at various International conferences.

PLENARY



Prof. Ming June Tsai
National Cheng Kung University, Taiwan

Prof. Tsai was born in Yin-Lin, Taiwan. He received MS from Department of Welding Engineering, and Ph.D. of Mechanical Engineering, both from the Ohio State University, Columbus, Ohio, USA. Since 1986, he has been with Department of Mechanical Engineering, National Cheng Kung University. He has been teaching Machine Design, Mechanical Design of Robotic System, Machine Vision, Screw Theory and Application, and Advanced Computer Graphics, etc. His previous research topics were on the applications of vision based robotic automation which includes robotic design, motion planning, off-line programming, and computer vision for 3D welding, mold polishing, and intelligent reverse engineering systems. The research topic is currently on the 3D body motion process technology. He developed an iBMPS software system that can create a personalized 3D digital body model to animate the body motions captured from this person. The body segment parameters (mass, centroid, and MOI) can be automatic computed and body motion analysis can be conducted very accurately. Now the recent research is focus on automatic body motion retargeting to all kinds of humanoid robots. The robotic systems designed and constructed by the Laboratory includes: (<http://www.bodymotion.myqnapcloud.com>).

1. Dual-mode 3D body scanning/motion capturing systems: D2000, D1680, D1400, D500. (The number after D- is the target height in mm)
2. 3D Body Scanners: AnnA (Anthropometry for numerous applications), projecting AnnA (P1400 for children), Portrator (for head), Peripher (for limbs).
3. Robots: ReapeR (Reverse engineering and automatic processing educable robots): ReapeR, AI-ReapeR, mini-ReapeR, super-ReapeR (all five axes robots), AMPS (automatic mold polishing system), AMRS (automatic mold recognition system), AWRS (automatic welding robotic system), 3 "Sunny" humanoid robots (with 31, 29, 17 axes respectively).

Prof. Tsai has been serving academic positions as Technical Committee of International Federation of Theory of Machines and Mechanisms (IFTToMM) since 1991 as well as many international conference organizing committee member, keynote speaker and session chair. Prof. Tsai also received several awards from many institutions.

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March 7, 2017

Opening & Speeches Time: 09:00-12:20 📍 Meeting Room	
09:00-09:10	Welcome and Opening Remarks
09:10-09:50	<p style="text-align: center;"><i>Airborne Robotics in Drone Applications</i> Prof. Chin E. Lin National Cheng Kung University, Taiwan</p> <p>Abstract: Multi-rotor system is a kind of unmanned aerial vehicle (UAV). It is electrically driving in vertical take-off and landing (VTOL) maneuvering. System design, battery management, flight control, waypoint navigation for higher payload and longer endurance have been focused. Drone applications have been widely studied to fit for various environment and different missions. In the system design, multi-rotors have turned from quad-rotor into hexa-rotor or even octo-rotor as solutions to increase payload and endurance by integration of micro-electro-mechanical systems (MENS). It has become mature for use. This paper presents an airborne robotics in drone delivery for demonstration. A hexa-rotor drone is used by equipping with autopilot with GPS navigation and precision altitude control. In the flight operation, 4G mobile system is selected for communication to build into an embedded system for multiple drone control from ground base station. 4G mobile communication has better bandwidth for video streaming with less the 1.8 seconds lagging. Path planning follows Google map routing to fly over main streets to avoid ground obstacles, such as trees and buildings. An electronic geo-fence is created along flight route to ensure no hazard and collision. In altitude control, a high precision baro-height sensing maintains drones in 30 meters above ground during service. The altitude control also precisely checks vertical height to take-off and landing. Autonomous flight system controls the drone to start, climb, descend to deliver and return to base. The destination uses a QR code printout with assigned GPS for targeting to precise landing. To ensure the delivery being correctly accepted by the customer, a selfie face identification will be checked before releasing package. Mechanism for package releasing is designed and remotely controlled by ground base controller after face selfie. This work presents a full mission process for drone delivery from point to point under multiple drone operation from a ground base station. The autonomous drone delivery is successfully demonstrated from case studies. In this presentation, video recording for drone deliver will be played in real flight operations.</p>

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Coffee break & group photo

09:50---10:20

<p>10:20-11:00</p>	<p style="text-align: center;"><i>Advances in High Performance Computing and Improvements on Monte Carlo Simulation Techniques</i></p> <p style="text-align: center;">Prof. Houssain Kettani Florida Polytechnic University, USA</p> <p>Abstract: In the past thirty years, advances in high performance computing have increased the performance by million times, and decreased the volume of the machine by similar order. Accordingly, the fastest computer in the world increased its performance from one Gigaflop/s in mid-1980s to a projected one Exaflop/s by 2020. In addition, current hand-held devices such as smartphones have performance that rivals those machines of the 1980s. Due to hardware limitations, parallel computing became an integral part of our lives that it is hard to imagine a device that is not using multiprocessor power, including smartphones. What started as a hardware solution to physical limitation, prompted software engineers to adopt to parallelism, which also motivates the theoretical solution to algorithms design and analysis to provide a solution that is parallel oriented rather than a serial oriented one. This in turn allows the use of more data points and more simulation trials to improve Monte Carlo simulations for better accuracy and smoother results.</p>
<p>11:00-11:40</p>	<p style="text-align: center;"><i>Medical Image Fusion using Stationary Wavelet Transform</i></p> <p style="text-align: center;">Prof. R. Sivakumar R.M.K. Engineering College, India</p> <p>Abstract: Medical image fusion involves combination of multimodal sensor images to obtain both anatomical and functional data to be used by radiologists for the purpose of disease diagnosis, monitoring and research. This presentation provides a comparative analysis of multiple fusion techniques that can be used to obtain accurate information from the intermodal MRI T1 T2 images. The source images are initially decomposed using Stationary Wavelet Transform (SWT) into approximation and detail components while the approximation components are reconstructed by Discrete Curvelet Transform (DCT), the SWT and DCT are good for point and line discontinuities. This paper also provides a comparative study of the different types of image fusion techniques available for MRI image decomposition. These approximation and detail components are fused using the different fusion rules. Final fused image is obtained by inverse SWT transformation. The fused image is used to localize the abnormality of brain images that lead to accurate identification of brain diseases such as 95.7% of brain lesion, 97.3% of Alzheimer's disease and 98% of brain tumor. Various performance parameters are evaluated to compare the fusion techniques and the</p>

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	<p>proposed method which provides better result is analyzed. This comparison is done based on the method which provided the fused image with more Entropy, Average pixel intensity, Standard deviation and Correlation coefficient and Edge strength.</p>
<p>11:40-12:20</p>	<p style="text-align: center;"><i>A Novel Definition of the ZMP via Screw Theory</i> Prof. Ming June Tsai National Cheng Kung University, Taiwan</p> <p>Abstract: A motivation on the fields of biomechanics and humanoid robots is to analyze the dynamic balance. Vukobratovic & Juricic computed the resultant ground reaction force on legged machines with no x- and y-moments, and the point was defined as the zero moment point (ZMP). Since then, ZMP has long been used for checking balance of legged robots.</p> <p>A new screw-based approach has been proposed for calculating the ZMP of body motions. Using screw method, the body wrench screw $\\$_0$ formed by the total body force F_B and the inertial moment M_{in}. A new coordinate system is constructed by locating the origin on the point that the axis of $\\$_0$ passing through the ground (plane $z=0$) and putting the z axis along the axis of $\\$_0$. According to the definition of the screw, only z-moment (no x- and y-moment) exists at any point along the screw axis $\\$_0$. Then the new Origin naturally is the ZMP by the screw definition.</p> <p>However, the conventional definition of ZMP is respect to the world coordinates, whereas the novel definition of the ZMP is according to the new frame with the z-axis align with the axis of $\\$_0$. The validity of the proposed approach is demonstrated by evaluating the whole body dynamics over the course of a 25-second sequence of continuous motions performed by a professional martial arts practitioner. The results demonstrate that the magnitudes (forces/moments) of the body wrench screws are reasonable. Comparing the results obtained from the conventional method and the screw method for the ZMP locations over the 752 timeframes, the differences between two sets are small. Thus, two ZMP tracks nearly overlapped. The conventional ZMP definition is applicable for humanoid robots with big foot-print for stabilizing; whereas our ZMP definition is best suitable for body motion analyzing such as tiptoe contacting during ice skating, or ballet dancing etc. The screw-based ZMP definition would be a better method for tracking or controlling tiptoe dynamic balancing conditions without big foot-print as a conventional humanoid robot does.</p>



Lunch Time <12:20-14:00> Location: Restaurant

Note: lunch coupon is needed for entering the restaurant.

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<p style="text-align: center;">Session I: System Modeling and Analysis</p> <p style="text-align: center;">Time: 14:00-15:15</p> <p style="text-align: center;">📍 Meeting Room</p> <p style="text-align: center;">Chair: Assoc. Prof. Vincenzo Piemonte, University Campus Biomedico of Rome, Italy</p>	
<p>EC005 14:00-14:15</p>	<p style="text-align: center;">Optimizing and Modeling for Plastic Injection Molding Process using Taguchi Method</p> <p style="text-align: center;">Tossapol Kiatcharoenpol, T Vichiraprasert King Mongkut's Institute of Technology Ladkrabang, Thailand</p> <p>Abstract—The objective of this work is to study process parameters of Plastic injection molding. Taguchi method, an unconventional design of experiment, is used as an approach to optimize the process parameters to improve quality characteristic of work-piece. The two responses of experiment are volume shrinkage and total displacement. Orthogonal array (L16) is used to conduct experiments. The result shows that there are three statistically significant factors out of seven factors or process parameters. Such three factors are Melt temperature, Packing time and Cooling time. Linear equations derived from experimental results are constructed and suitable conditions can be obtained from a computer based response optimizer.</p>
<p>EC020 14:15-14:30</p>	<p style="text-align: center;">A New Model Predictive control for the Artificial Pancreas</p> <p style="text-align: center;">Mauro Capocelli, Luca De Santis and Vincenzo Piemonte University Campus Biomedico of Rome, Italy</p> <p>Abstract—Closed-loop insulin delivery system have led to significant improvement in the quality of life of subject with diabetes and are challenging to overcome the barrier of hypoglycemia, the most frequent complication of insulin therapy. The reliability of the system, composed by a computer algorithm, a glucose sensor and an insulin infusion device, depends on the knowledge and predictor capacity of the physiology of blood glucose regulation. This paper describes the physical-mathematical fundamentals and the most important results of a new three-compartmental model. The model includes exogenous insulin injected in subcutaneous tissue with local degradation, three explicit delays and three influencing physiologically-based parameters controlling the regulatory system. The parameters have been calculated through the simulation of actual clinical data and, therefore, implemented into the mathematical model to successfully simulate the clinical data obtained at Campus Biomedico in the normal-life regulation (1 day and 4 days) of diabetic patients. The estimated model parameters were physiological meaningful and provided insights on the subject's dysfunction.</p>
<p>EC029 14:30-14:45</p>	<p style="text-align: center;">Multi-period data envelopment analysis models and resource allocation: A case study</p> <p style="text-align: center;">Josef Jablonsky, Lubos Marek and Petr Berka University of Economics, Prague, Czech Republic</p>

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	<p>Abstract—Data envelopment analysis is a general tool for efficiency and performance measurement of the set of decision making units based on solving linear optimization problems. The paper deals with using this group of models for resource allocation analysis among Czech economic faculties within 7 years period from 2008 until 2014. The resources in the period t are divided among faculties according to their teaching and research performance in the period $(t - 1)$. The teaching performance is measured by the number of students and number of graduated in the given period. The research performance is defined according to the national rules by the number of so called RIV points. The overall performance level in the given period is estimated using data envelopment analysis model with constant returns to scale assumption. The input in the period t is partly based on the efficiency or super-efficiency scores from the preceding period. Super-efficiency score given by Andersen and Petersen model is used for discrimination among efficient units. The results of the allocation in the last period are compared to the ones calculated to the standard methodology. Numerical experiments are realized using own MS Excel add-ins and LINGO modelling and optimization system.</p>
<p>EC030-A 14:45-15:00</p>	<p style="text-align: center;">Modelling and simulation of wage distributions: A case study of the Czech Republic Petr Berka, Michal Vrabec, Lubos Marek and Josef Jablonsky University of Economics, Prague, Czech Republic</p> <p>Abstract—The problem of the minimum wage has often been discussed recently. On the one hand, there are some politicians who want to raise it, which is not surprising with the elections approaching. On the other hand, economic experts, and especially employers, are reluctant. Let us, for the moment, accept that the minimum wage is to be raised; a question remains by how much, or on which economic variables its increase should be dependent. One possibility is to tie the minimum wage with the average wage. The present paper will try to show that this would be an absurd option. We are going to show on real data what the consequences of the increased minimum wage and, especially, the impact on the wage distribution would be. Further, we will consider different levels of the minimum wage and study several scenarios related to changes in all wages after an increase of the minimum wage limit. Three scenarios, optimistic, most likely and pessimistic, have been proposed based on the data set coming from the current conditions in the Czech Republic. Statistical package SAS was used for simulation experiments. The results confirms our expectations that increasing of the minimum wage increases average wage as well. We are convinced that our conclusions can be generalized for any national economies.</p>
<p>EC002 15:00-15:15</p>	<p style="text-align: center;">Coverage Test Technology Based on ONESPIN Verification Platform Yang Yawen, Zhou Shan and Kong Lu Technology and Engineering Center for Space Utilization Chinese Academy of Sciences, China</p> <p>Abstract—Coverage test technology is a common software testing technology, which is</p>

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	<p>the basic requirement of software testing. The coverage analysis can quantify the completeness of the test vector. This paper introduces and compares two kinds of mainstream coverage analysis techniques, code coverage and functional coverage. On the basis of existing theories, the working principle of ONESPIN verification platform for VHDL/Verilog/System Verilog language coverage is studied in this paper and the specific testing procedures with a practical example are presented. At last, the covered code, uncovered code and the software defect in the test results are analyzed.</p>
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Coffee Break <15:15---15:45>


<p>Session II: Electronic Systems and Control Automation Time: 15:45-17:30  Meeting Room Chair: Prof. Hiroyuki Yamauchi, Fukuoka Institute of Technology, Japan</p>	
<p>EC010 15:45-16:00</p>	<p>Contributions from the drone delivery system in Thailand to environmental pollution Jarotwan Koiwanit King Mongkut's Institute of Technology Ladkrabang, Thailand</p> <p>Abstract—In recent years, the great development of science and technology together with social movements and commerce has shaped the design and use of commercial drones. This particular emerging technology has boosted the speed and ability of online shopping systems to provide customers ever faster delivery. In addition, Global Warming Potential (GWP) is the most serious impact to people and environment. Carbon dioxide (CO₂) from transportation is one of the main contributors contributing to GHG emissions which result in higher number of GWP. Drones should have a reduced GWP impact and other environmental impacts in which these help reduce the number of delivery trucks or other transportation options traveling on roads. In addition, as road infrastructure challenges especially in rural areas, drone delivery systems are able to transport freight across remote supply chain. The use of drones appears to be an important approach because they are not only inexpensive and easily available but can also travel on individual direct routes. In this study by establishing a life cycle assessment (LCA) framework, all emissions from a drone delivery system in rural areas in Chiang Mai, Thailand will be evaluated. The results show that the drone's part production is the main contributor of all impact categories.</p>
<p>EC011 16:00-16:15</p>	<p>A Segmentation Kernel Fitting Technique to Circumvent Extreme Deviation from Exponentially Descent Tail Distribution Hiroyuki Yamauchi and Worawit Sohma</p>

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	<p style="text-align: center;">Fukuoka Institute of Technology, Japan</p> <p>Abstract—A segmentation kernel fitting technique has been proposed to circumvent an extreme deviation from the exponentially steeping descent tail distribution in the deconvolution. The proposed technique regenerates each segmented distribution line by finding the minimum of unconstrained multivariable function using derivative-free method. We decomposed the convolution effects of the two types of the minimum operating voltage variations caused by the spatially random threshold variation (VDDSPAT) and the temporally random threshold variation (VDDTIME), respectively. We discussed the VDDSPAT and VDDTIME effects on the SRAM fail-bit count (FBC) based on the decomposing results. It is found that the FBC estimation error for the proposed one can be reduced to almost 14-orders of magnitude smaller than that for the off-the-shell functions.</p>
<p>EC012 16:15-16:30</p>	<p style="text-align: center;">A survey on multipliers, adders and adiabatic logic styles suitable for power reduction S Jagadeesh Babu and R Sivakumar R.M.K. Engineering College, India</p> <p>Abstract—Low power circuits and designs are the need of the hour as they find applications in electronic components which have power efficient processing capabilities. High speed processors are power consuming and multipliers contribute to a maximum extent for this power consumption. Thus, to achieve low power designs, adiabatic logic is one of the noted technologies in this regard. Adiabatic logic can be implemented for different types of circuit designs and this paper concentrates on a survey of various multipliers and adders that can be modified into a low power multiplier using adiabatic logic.</p>
<p>EC018 16:30-16:45</p>	<p style="text-align: center;">A Sitting Posture Surveillance System Based on Kinect Si He Wuhan University of Technology, China</p> <p>Abstract—Modern life has made more and more people become sedentary, and long periods of unhealthy posture can lead to myopia, cervical spine and lumbar disease. Therefore, this paper presents a sitting posture surveillance system based on Microsoft Kinect. By getting joints' three-dimensional position information from Kinect's real-time skeleton tracking technology, and input the data into computer. After processing the joints' location information with posture recognition algorithm, computer recognizes the user's sitting posture, and warns the incorrect postures.</p>
<p>EC026 16:45-17:00</p>	<p style="text-align: center;">Efficient block cipher mode for NVM Akmal Khodjanov, Fayozbek Rustamov and Joobeom Yun Sejong University, South Korea</p> <p>Abstract—The usage of non-volatile memory (NVM) storage devices is rapidly increasing in consumer and enterprise systems, providing high performance and low</p>

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	<p>energy consumption compared to hard disk drives. Lately it is observed that NVM storage devices are widely used in cloud computing as well. However, existing disk encryption methods are designed for hard disk devices and an efficient block cipher mode of operation for NVM storage devices has not yet been studied in detail. In this work we have analyzed and evaluated performance of CBC, CTR and XTS-AES block cipher modes for whole disk encryption solutions and found that CTR and XTS-AES modes outperform CBC mode under the same scenarios.</p>
<p>MA002 17:00-17:15</p>	<p style="text-align: center;">Emerging Medical Ethical Issues in Healthcare and Medical Robotics A. S. Weber Weill Cornell Medicine, Qatar</p> <p>Abstract—Due to the increasing sophistication and complexity of autonomous machines, Artificial Intelligence, Computerized Decision Support Systems (CDSS), natural language question-answering robots, and social / emotive medical robots, new medical ethics conundrums are arising. Unresolved questions revolve around autonomy, responsibility, empathy, trust, moral agency and the social and economic impacts of medical robots.</p>
<p>MA009 17:15-17:30</p>	<p style="text-align: center;">Increasing productivity in assembly automation through the utilization of continuous processes Robert J. M. Mooy, Muhammed Aydemir and Arne Glodde Technical University Berlin, Germany</p> <p>Abstract—Assembly processes can be realized to be manual, hybrid or fully automated. In hybrid or fully automated assembly processes, the material flow is often disrupted through the utilization of sequential handling operations. As industry often aims to decrease manufacturing costs through an increased degree of automation, thus increasing the overall manufacturing productivity, handling processes need to be improved in terms of e.g. actuation times of grippers and reduced inertia of handling systems. This paper discusses the limitations in productivity of sequential handling tasks and the opportunities of significantly increasing manufacturing productivity through the utilization of continuous assembly procedure, instantiating it within the lithium-ion-battery production.</p>

<p>Poster Session Time: 17:30-18:00  Meeting Room</p>	
<p>EC017</p>	<p style="text-align: center;">Novel Vulnerability Metrics for Interdependent System based on System Controllability Luca Faramondi, Gabriele Oliva and Vincenzo Piemonte University Campus Biomedico of Rome, Italy</p>

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	<p>Abstract—In this paper we develop novel vulnerability metrics for interdependent critical infrastructures or economic sectors based on the concept of controllability. Specifically, we consider the Input-Output Inoperability Model, that represents the dynamics of the dependencies and interdependencies among infrastructures or sectors during an adverse event or malicious attack, and we argue that the more the system iscontrollable via an external perturbation that represents the fault or attack, the more the system is vulnerable. Therefore, we analyze the vulnerability of the system in terms of the magnitude of the associated controllability matrix. Moreover, based on the proposed index, we develop a simple defensive strategy to reduce the effect of an attack. A validation of the approach with respect to real data concludes the paper.</p>
EC007	<p style="text-align: center;">A High-efficiency FPGA-based Accelerator for Convolutional Neural Networks using Winograd Algorithm You Huang, Junzhong Shen, Zelong Wang, Mei Wen, Chunyuan Zhang National University of Defence Technology, China</p> <p>Abstract—Convolutional neural networks (CNNs) are widely used in many computer vision applications. Previous FPGA implementations of CNNs are mainly based on the conventional convolutional algorithm. However, the high arithmetic complexity of conventional convolution algorithm for CNNs restricts the performance of accelerators and significantly increases the challenges of design. It has been proved that the Winograd algorithm for CNNs can effectively reduce the computational complexity. Although a few FPGA approaches based on the Winograd algorithm have been implemented, their works are lake of evaluation on the performance for different tile sizes of the Winograd algorithm. In this work, we focus on exploring the possibility of using the Winograd algorithm to accelerate CNNs on FPGA. First, we propose an accelerator architecture applying to both convolutional layers and fully connected layers. Second, we use high level synthesis tool to expediently implement our design. Finally, we evaluate our accelerator with different tile sizes in terms of resource utilization, performance and efficiency. On VUS440 platform, we achieve an average 943 GOPS for overall VGG16 under low resource utilization, which reaches higher efficiency than the state-of-the-art works on FPGAs.</p>
EC008	<p style="text-align: center;">A Compression Instruction Set Design based on RISC-V for Network Packet Forwarding Zhuang Cao, Qianru Lv, Yanpeng Wang, Mei Wen, Nan Wu, Chunyuan Zhang National University of Defence Technology, China</p> <p>Abstract—The multi-core processor of RISC for network packet forwarding has been limited by the on-chip storage space. As more and more cores are implemented in one chip, the storage resources allocated by each core on the chip become less and less, as well as the conflict of visiting RAM has become more prominent. Therefore, the use of more compact instruction size will reduce the number of visits, and get a higher instruction cache hit rate, thereby improving the performance of the application and</p>

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	<p>energy efficiency. Based on the open source instruction set RISC-V, this paper proposes a compressed ISA for the network packet forwarding. It is proved by experiment that the new instruction set which customized by this method has higher compression efficiency and better system performance for the network packet forwarding applications.</p>
EC021	<p style="text-align: center;">Design and fabrication of a non-invasive, wireless system for monitoring needle insertion during epidural puncture</p> <p style="text-align: center;">Emiliano Schena, Carlo Massaroni, Domenico Formica, Alessia Mattei, Vincenzo Piemonte, Paola Saccomandi, Roberto Setola and Massimiliano Carassiti</p> <p style="text-align: center;">University Campus Biomedico of Rome, Italy</p> <p>Abstract—Over the last decades epidural analgesia has gathered research interest and broad clinical acceptance. In this procedure, the detection of the epidural space is pivotal to avoid major complications. Although, some systems for supporting the anaesthetist in the epidural space detection are commercially available, this difficult procedure is often performed without any support. In previous articles, our research group described a new approach for a non-invasive detection of the epidural space; the assessment of the system was also performed both on a spinal column simulator and in ex vivo animal model (small pig). The mentioned system is based on a Force Sensing Resistor (FSR) that monitors the load exerted by the anaesthesiologist on the syringe plunger during the procedure. The resistance of the sensor is transduced into a voltage by means of a Wheatstone bridge (WB), then it is amplified, finally it is collected by a remote laptop. When the needle reaches the epidural space, the load applied by the anaesthesiologist decreases, so the consequent change of the system output may be used for the detection of the entrance within this space. The previous version of the system communicates to the laptop via USB. In this article, we described a new version of the system which communicates to the laptop via wireless. This solution aims at facilitating the use of the system in clinical settings. After the description of the measuring system, its preliminary assessment in patients undergoing epidural puncture will be reported.</p>
EC013	<p style="text-align: center;">Design of a noninvasive diabetes detector based on acetone recognition</p> <p style="text-align: center;">Yuchen Jiang, Mingjing Sun and Ruijing Xiong</p> <p style="text-align: center;">Northwestern Polytechnical University, China</p> <p>Abstract—This paper presents the design project of a new type of diabetes detector system, consisting the unique gas sensor, the container, the conditioning circuit as well as the computer GUI developed by CVI. Noninvasiveness and the basis on acetone recognition are the most apparent characteristics of the system. The gas sample of the patients are collected and led to the gas container before reacting with the sensor and finally put out data on the screen at regular intervals. A controlled experiment is conducted to verify the precision of the PID sensor compared with the existing GC-MS method in the process of determining acetone concentration. The experiment shows</p>

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	<p>that the system is effective and convenient in detecting low concentrated acetone exhaled by the patients, and an innovative product inspired by this may be prospective to be put into use in certain areas.</p>
EC301	<p>The analysis of IEEE 802.11 DCF protocol based on LEO satellite Wi-Fi network Wen He, Xiaofeng Tao, Defeng Ren China Academy of Space Technology (Xi'an), China</p> <p>Abstract—Aiming at the problems of traditional IEEE 802.11 DCF protocol applied to LEO satellite Wi-Fi network, the influence of propagation delay, hidden terminal and user collision on the throughput of MAC layer is fully analysed, and a specific scheme is proposed to adjust the ACK Timeout and the minimum contention window value. The improved two-dimensional Markov model has been used to analyse the DCF protocol throughput theoretically. By using MATLAB simulation, it is verified that the throughput performance is directly related to the transmission probability, and throughput performance is negative correlated with the number of nodes and transmission distance.</p>
EC024	<p>Grasp control of a prosthetic hand through peripheral neural signals Emiliano Noce, Cosimo Gentile, Francesca Cordella, Anna Lisa Ciancio, Vincenzo Piemonte and Loredana Zollo University Campus Biomedico of Rome, Italy</p> <p>Abstract—The use of neural electrodes to stimulate the Peripheral Nervous System (PNS) of upper limb amputees is giving promising results in restoring tactile feedback. The same interfaces could be used to record the motor activity originated from the brain and transferred to the muscles. In this paper, the possibility to control a prosthetic hand by means of neural signals acquired through tf-LIFE4 electrodes implanted in a human subject was investigated. A Support Vector Machine (SVM) algorithm was adopted to classify two common demanded grasps. The obtained classes were converted into reference positions for a position-and-slippage control strategy that guarantees to perform stable grasps with a prosthetic hand avoiding slippage events. The achieved results showed an accuracy of the classifier higher than 90% and a success rate of the control strategy equal to 100%.</p>



Dinner <18:00-20:00> Location: Restaurant

Note: dinner coupon is needed for entering the restaurant.

