Conference Program

August 26-28, 2019

Vancouver, Canada

ICVISP 2019

2019 3rd International Conference on Vision, Image and Signal Processing

SIUSAI 2019

2019 3rd International Symposium on Intelligent Unmanned Systems and Artificial Intelligence

ISoCC 2019

2019 2nd International Symposium on Computers and Communications

ICoBN 2019

2019 2nd International Conference on Bioinformatics and Neurosciences

Welcome

Dear Distinguished Participants,

Welcome to 2019 3rd International Conference on Vision, Image and Signal Processing(ICVISP 2019), 2019 3rd International Symposium on Intelligent Unmanned Systems and Artificial Intelligence(SIUSAI 2019), 2019 2nd International Symposium on Computers and Communications(ISoCC 2019), 2019 2nd International Conference on Bioinformatics and Neurosciences(ICoBN 2019).

After one-year painstaking preparation, we're delighted to declare that the August conferences organized by IASED will be held in Vancouver, Canada as scheduled.

First of all, we'd like to express our sincere gratitude for your participation, which is the vital note to make the conference a great forum for the collision and fusion of ideas and knowledge. Besides, we'd like to express our sincere gratitude to our local chairs: Frank Zhang, Prof. Harris Sarah, Dr. Grzegorz Chmaj and Prof. Evangelos Yfantis, they offered kind help and great efforts to conference in the past months. Meanwhile, we also would like to say thanks to our conference chair, Prof. Ian Robert McAndrew and co-chair, Prof. Wenbing Zhao, keynote speakers Dr. Chiman Kwan and Prof. Hesham H. Ali, Prof. Ian Robert McAndrew and Prof. Wenbing Zhao, who will share their newest and outstanding research achievements on the conference site.

In this big data age, the ever-changing information technology has updated and revolutionized the structure and content of our knowledge. The aim as well as the objective of ICVISP&SIUSAI&ISoCC&ICoBN 2019 is to present the latest research and results of Vision, Image and Signal Processing, Intelligent Unmanned Systems and Artificial Intelligence, Computers and Communications and Bioinformatics and Neurosciences. By providing opportunities for the delegates to exchange new ideas face-to-face, to establish business or research relations as well as to find global partners for future collaborations, we do hope that the conference will intensify mutual improvement and facilitate academic exchange, as a result that leading to significant contributions to the knowledge in these up-to-date scientific fields.

Finally, we wish ICVISP&SIUSAI&ISoCC&ICoBN 2019 will be held with a complete success. At the same time, we wish you enjoy a very splendid time during the conference days in the impressive city of Vancouver, Canada!

Thank you!

ICVISP&SIUSAI&ISoCC&ICoBN 2019 Committee

❖**Registration**

The registration desk will be situated at **The Ponderosa Studios, The University of British Columbia | Vancouver Campus** during the following time:

9:00-17:00, Monday, August 26th, 2019

❖**Remarks**

Conference will provide free coffee breaks, lunch and dinner on August 27th 2019, beyond the fixed menu will be on personal bill. The conference venue is open to participants only, you are expected to not bring your children with you in conference room.

❖**A Polite Request to All Participants**

Participants are requested to arrive in a timely fashion for all addresses. Presenters are reminded that the time slots should be divided fairly and equally by the number of presentations, and that they should not overrun. The session chair is asked to assume this timekeeping role and to summarize key issues in each topic.

❖**Dress Code:**

Formal or national custom

❖**Certificate**

Certificate of Attendance

A certificate of presentation indicates a presenter's name, affiliation and the paper title that is presented in the scheduled session, certifying the paper has been presented on the conference site.

Certificate of Best Paper & Best Student Paper & Best Poster

Presenters who presents a great oral presentation or poster presentation will be awarded as the Best Paper, the Best Student Paper or the Best Poster. The conference chair or the session chair will awarded a certificate of Best for them in the award ceremony on August 27th, 2019.

Certificate Distribution

Oral presenters will receive a certificate of presentation from the session chair at the end of the presentation. Poster presenters will receive a certificate of presentation from the conference chair at the poster session.

❖**Preparation for Oral Presentations**

All presentation rooms are equipped with a screen, an LCD projector, and a laptop computer installed with Microsoft Power Point. You will be able to insert your USB flash drive into the computer and double check your file in PowerPoint. We recommend you to bring two copies of the file in case that one fails. You may also connect your own laptop to the provided projector; however please ensure you have the requisite connector.

Regular Oral Session: about 15 minutes of Presentation, 2-5 minutes of Q&A.

❖**Preparation for Poster Presentation**

Materials Prepared by the Conference Organizer:

Adhesive tapes

Materials Prepared by the Presenters:

Home-made poster (s)

Material: not limited, can be posted on the canvases.

Recommended poster size: weight*height: A0 (841mm×1189mm).

Venue Information

The University of British Columbia | Vancouver Campus

6445 University Boulevard, Vancouver, BC, V6T 1Z2 Canada

❖**Transportation**

Here is a link to the UBC Map which you may find helpful
(Ponderosa is indicated with a red arrow)
http://maps.ubc.ca/PROD/index_detail.php?show=y,n,n,n,n,y&bldg2Search=&locat1=905

Options	Notes
By Bus	**Bus Route**-99 UBC B-Line: Get off at UBC Exchange. Refer to this link for bus information, https://tripplanning.translink.ca/hiwire. Enter YVR under "Departing From" and UBC Exchange under "Going To".
By Taxi	**Taxi Fare**-Please see attached Zone Fare sheet from YVR (Vancouver International Airport). http://www.iwbdc.org/ueditor/php/upload/file/20190430/1556592787544289.pdf To UBC, it is $36 CAD. Please note that rates are subject to change.

Venue Information

Item	Room
Registration	The Ponderosa Studios, The University of British Columbia | Vancouver Campus
Welcome	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Keynote Session	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Keynote session& Oral Presentation—Session A	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Keynote session& Oral Presentation—Session B	Ponderosa 1001, The University of British Columbia | Vancouver Campus
Coffee Break	Ponderosa Foyer, The University of British Columbia | Vancouver Campus
Poster Presentation	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Award Ceremony & Closing Ceremony	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Lunch	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus
Dinner	Ponderosa Ballroom, The University of British Columbia | Vancouver Campus

Program

	Monday 26-August	**Tuesday** 27-August				Wednesday 28-August
09:00-09:15		Welcome Address				Free day
09:15-10:00	Registration	Keynote Speech *Prof. Wenbing Zhao*				
10:00-10:30		Group Photo & Coffee Break				
10:30-11:15		Keynote Speech *Prof. Hesham H.Ali*				
11:15-12:00		Keynote Speech *Dr. Chiman Kwan*				
12:00-13:00		Lunch				
13:00-15:00		Oral Session A-1	Keynote Speech *Dr.Chiman Kwan*	Oral Session B-1	Keynote Speech *Prof. Ian Robert McAndrew*	
			P008		U001	
			P005		U009	
			P012		U010	
			P016		U012	
			P020		U014	
15:00-15:30		Coffee Break & Poster Presentation				
15:30-17:00		Oral Session A-2	P021	Oral Session B-2	SO002	
			P023		SO005	
			P025		SO009	
			P026		SO1004	
			P037		SO1005	
			P034		SO1006	
17:00-18:00			P022		U017	
			P017		U1001	
			B001			
			B002			
18:00-18:30		Award Ceremony & Closing Ceremony				
18:30-19:30		Dinner Banquet				

Keynote Session

Keynote Speech 1

09:15-10:00, Tuesday, August 27th, 2019

Ponderosa Ballroom, The University of British Columbia | Vancouver Campus

Title: Complex Human Activity Recognition in Human Patient Simulation

Prof. Wenbing Zhao

Professor, Department of Electrical Engineering and Computer Science

Cleveland State University

Abstract

Human patient simulation (HPS) has been used for over 40 years in medical and nursing education. HPS is a training and feedback method in which learners practice tasks and processes in lifelike circumstances using models. While HPS has been widely adopted in nursing programs gloablly, its effectiveness is severely handicapped by the lack of reliable and efficient methods to provide objective assessment and feedback to students. In this talk, Dr. Zhao will introduce his team's preliminary work on building a system that aims to automatically recognize the complex activities involved in HPS and provide realtime as well as offline on-demand precise feedback regarding the trainee's performance during the HPS.

Introduction to *Prof. Wenbing Zhao*

Prof. Zhao is a Professor at the Department of Electrical Engineering and Computer Science, Cleveland State University. He earned his Ph.D. at University of California, Santa Barbara in 2002. He has over 170 peer-reviewed publications. Dr. Zhao's research spans from dependable distributed systems to human centered smart systems. His research has been funded by the US NSF, US Department of Transportation, Ohio Bureau of Workers' Compensation, Ohio Department of Higher Education, and Ohio Development Services Agency. He has delivered more than 10 keynotes, tutorials, public talks and demonstrations in various conferences, industry and academic venues. Dr. Zhao is an associate editor for IEEE Access, MDPI Computers, and PeerJ Computer Science, and a member of the editorial board of several international journals, including Computers, Applied System Innovation, Internal Journal of Parallel, Emergent and Distributed Systems. He is currently an IEEE Senior Member and serves on the executive committee of the IEEE Cleveland Section.

Coffee Break & Group Photo

Tuesday, August 27th, 2019	10:00-10:30	Ponderosa Foyer

Keynote Session

Keynote Speech 2

10:30-11:15,Tuesday, August 27th, 2019

Ponderosa Ballroom, The University of British Columbia | Vancouver Campus

Title: Innovative Population Based Approaches for Analyzing Big Biological and Mobility Data in Biomedical Informatics

Prof. Hesham H. Ali

University of Nebraska at Omaha Omaha, USA

Abstract

With continuous advancements of biomedical instruments and the associated ability to collect diverse types of valuable biological data, research studies have been recently focused on how to best extract useful information from the “Big Data” currently available. The currently available data is not only massive in size, but it also exhibits all the features of complex big data systems with a high degree of variability, veracity and velocity. In addition, the last several years have witnessed major advancements in the development of sensor technologies and wearable devices with the goal of collecting data to be used in various application domains. Although these developments are certainly welcomed, so much left to be done to take full-advantage of the data gathered by such devices. The most critical missing component is the lack of advanced data analytics. How to leverage this raw data to advance biomedical research and improve health care through personalized and targeted medicine, can be considered one of the most exciting scientific challenges of our generation. In this talk, we propose new big data population-based algorithms and tools to analyze different types of biological and mobility data for the purpose of advancing biomedical research and improving healthcare. We employ a population analysis model to assess health levels of individuals as well as to predict health hazards in various medical applications. We also utilize graph-theoretic mechanisms to zoom in and out of the population networks and extract

different types of information at various granularity levels to help with prevention, early diagnosis and treatment of infectious and neurodegenerative diseases.

Introduction to Prof. Hesham H. Ali

Hesham H. Ali is a Professor of Computer Science and Lee and Wilma Seemann Distinguished Dean of the College of Information Science and Technology at the University of Nebraska at Omaha (UNO). He also serves as the director of the UNO Bioinformatics Core Facility that supports a large number of biomedical research projects in Nebraska. He has published numerous articles in various IT areas including scheduling, distributed systems, data analytics, wireless networks, and Bioinformatics. He has also published two books in scheduling and graph algorithms, and several book chapters in Bioinformatics. He has been serving as the PI or Co-PI of several projects funded by NSF, NIH and Nebraska Research Initiative in the areas of data analytics, wireless networks and Bioinformatics. He has also been leading a Research Group that focuses on developing innovative computational approaches to model complex biomedical systems and analyze big bioinformatics data. The research group is currently developing several next generation big data analytics tools based on the concept of population analysis for mining various types of large-scale biological and medical data. This includes the development of new graph theoretic models for analyzing large heterogeneous biological and health data associated with various biomedical research areas, particularly projects associated with infectious and neurodegenerative diseases, microbiome studies and aging research. He has also been leading two projects for developing secure and energy-aware wireless infrastructure to address tracking and monitoring problems in medical environments, particularly to study mobility profiling for advancing personalized healthcare.

Keynote Speech 3

11:15-12:00, Tuesday, August 27th, 2019

Ponderosa Ballroom, The University of British Columbia | Vancouver Campus

Title: Practical Issues in Contingency Planning for UAVs with Engine Failures

Dr. Chiman Kwan

Signal Processing, Inc., Rockville, Maryland, USA

Abstract

Unmanned Air Vehicles (UAV), also known as Unmanned Air Systems (UAS), are gaining more attention in recent years. Some potential commercial applications may include cargo transfer between major cities, package and food delivery to individual households, etc. However, it is well-known that UAVs are much less reliable and have far more accidents than manned aircraft. This is probably one of the most important reasons that FAA is hesitant to open up the national airspace (NAS) and imposes tight restrictions to UAVs. Reliability of UAVs can be strengthened using durable engines and communication equipment, strong structural materials, advanced

conditioned based maintenance and structural health monitoring procedures, accurate fault diagnostic algorithms, and robust and fault tolerant controllers. Despite the above measures, some equipment failures such as engine and communication equipment failures may still occur. In this talk, we present some recent research results done by our team to deal with engines failures, which are the most challenging contingency in UAVs. There is limited hanging time and the mishap UAV needs to land in an unpopulated area. In particular, some practical issues such as landing site selection, contingency waypoint selection, wind effects, etc. are explicitly addressed in our approach. A contingency planning software prototype has been developed that can deal with engine failures. Architectures of contingency planning software and some exemplar application scenarios will be discussed throughout the talk.

Introduction to Dr. Chiman Kwan

Chiman Kwan received his BS (honors) with major in electronics and minor in mathematics from the Chinese University of Hong Kong in 1988, and MS and Ph.D. degrees in electrical engineering from the University of Texas at Arlington in 1989 and 1993, respectively. He is the founder and Chief Technology Officer of Signal Processing, Inc. and Applied Research LLC, leading research and development effort in real-time control, chemical agent detection, biometrics, speech processing, image fusion, remote sensing, mission planning for UAVs, and fault diagnostics and prognostics.

From April 1991 to February 1994, he worked in the Beam Instrumentation Department of the SSC (Superconducting Super Collider National Laboratory) in Dallas, Texas, where he was heavily involved in the modeling, simulation and design of modern digital controllers and signal processing algorithms for the beam control and synchronization system. He later joined the Automation and Robotics Research Institute in Fort Worth, where he applied intelligent control methods such as neural networks and fuzzy logic to the control of power systems, robots, and motors. Between July 1995 and April 2006, he was the Vice President of Intelligent Automation, Inc. in Rockville, Maryland.

Over the past 28 years, Dr. Kwan has served as Principal Investigator/Program Manager for more than 115 competitively selected projects with total funding more than 36 million dollars from various government agencies and private companies such as Ford, Motorola, Boeing, Honeywell, and Stanford Telecom. He has 15 issued and pending patents, 55 invention disclosures, 325 journal and conference papers, and 500+ proprietary technical reports. He received numerous awards and recognitions from NASA, US Navy, US Air Force, and IEEE.

Lunch

Tuesday, August 27th, 2019	12:00-13:00	Ponderosa Ballroom

Oral Session A-1

Tuesday, August 27th, 2019	13:00-15:00	Ponderosa Ballroom

Conference Chair: Prof. Wenbing Zhao

Keynote Speech

13:00-13:45, Tuesday, August 27th, 2019

Ponderosa Ballroom, The University of British Columbia | Vancouver Campus

Title: Object tracking and classification in videos using compressive measurements

Dr. Chiman Kwan

Signal Processing, Inc., Rockville, Maryland, USA

Abstract

Multiple object tracking using radar, optical, and infrared sensors have found widespread usage in many applications. In the above applications, the sensor data are normally in their original format. In the past decade, compressive sensing has gained popularity in various applications. Compressive measurements are normally collected by multiplying the original vectorized image with a Gaussian random matrix. Each measurement contains a scalar value and the measurement is repeated M times where M is much fewer than N (the number of pixels). To track an object using compressive measurements, it is normally done by reconstructing the image scene and then conventional trackers are then applied. One problem with the reconstruction-based approach is that it is extremely time consuming to reconstruct the original frames and hence, this may prohibit real-time applications. Moreover, information may be lost in the reconstruction process. In this talk, we will detail an object tracking and classification approach in the compressive measurement domain. First, a deep learning tracker known as You Only Look Once (YOLO) is used for object tracking. The training of YOLO tracker is very simple, which requires image frames with known

target locations. Although YOLO can also perform classification, the performance is not good as we have very limited number of video frames for training. So, in the second step of object classification, we decided to use a residual network (ResNet) for classification. That is, the object locations detected by YOLO are fed into the ResNet for classification. We will present application scenarios using numerous low quality infrared and optical videos to demonstrate that the proposed approach works quite well as compared to conventional methods.

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P008
Dr.Yuseok Ban
Agency for Defense Development,

Detecting Protuberant Saliency from a Depth Image
Yuseok Ban

The visual attention of a human enables quick perception of noticeable regions in an image. The research on the models of visual attention has been actively studied for decades in the computer vision areas. For example, detecting visual saliency in a scene allows to estimate which details humans find interesting in advance to understand the scene. This also forms the important basis of a variety of latter tasks related to visual detection and tracking. By virtue of increasing diffusion of low-cost 3D sensors, many studies have been proposed to examine how to incorporate 3D information into visual attention models. Despite many advantages of depth data, relatively few studies on the visual

South Korea
15 min

attention of a depth image have delved into how to fully exploit the structural information of depth perception based on depth data itself. In this paper, Protuberant saliency is proposed to effectively detect the saliency in a depth image. The proposed approach explores the inherent protuberance information encoded in a depth structure. The fixation of a human eye in a depth scene is directly estimated by Protuberant saliency. It is ro?bust to the isometric deformation and varying orientation of a depth region. The experimental results show that the rotation invariant and flexible architecture of Protuberant saliency produces the effectiveness against those challenging conditions.

P005
Assoc. Prof. Eyad H. R. Fadda
Muscat - Sultanate of Oman
15 min

Using geomatics techniques to produce a geospatial database system for geological hazards in the Al-Salt area, Jordan

Eyad H.R Fadda | Ammar O. Abulibdeh | Ali S. Al Balushi

In the Al-Salt area of Jordan, natural geological hazard events occur frequently because the area northeast of the Dead Sea is recognized as an active seismic zone. Therefore, using the cutting edge technology represented in this study by the geomatics techniques of remote sensing, GPS and GIS were become necessary and sufficient, that because there are many variables a several features to be mapped and store. This study was focused on faults and landslides because these are the dominant events in the study area. Satellite images, geological maps and topographic maps were used to produce GIS layers describing geological hazard elements. The mapped elements included faults, landslides and many other spatial features including lineaments, drainage patterns, road networks, vegetation, contour lines, slopes, aspects and residential areas. Faults, lineaments and landslide maps were extracted from the published geological map of the Al-Salt area (1:50 000 scale). Other features were extracted either from a topographic map or from satellite images of the study area. Digital image-processing techniques were performed on satellite images to enhance the required spatial features (i.e., faults and landslides). Several techniques were applied to the digital images, including false-color composite band ratio analysis, principal-component analysis and high-pass filtering. A Garmin hand-held GPS (model GPSMAP60CSx) was used to track and to map the city's recently constructed main ring road. The hand-held GPS was also used to locate positions of the faults and landslides in the study area. Finally, the produced GIS layers and their attributes were stored in a spatial GIS database using the Arc GIS software package. These layers could be used for retrieving data on the geological hazard elements and for producing a geological hazards map (or any other thematic map) for the Al-Salt area in Jordan.

P012
Md Tanzil Hoque Chowdhury (Stuent)
Computational Science
Middle Tennessee State University
Murfreesboro Tennessee, 37132, USA
15 min

Automatic Phonocardiography Analysis using Discrete Wavelet Transform

Md Tanzil Hoque Chowdhury | Khem Narayan poudel | Yating Hu

This paper presents an intelligent algorithm for analyzing the heart sound signal using multi-resolution analysis based on discrete wavelet transform (DWT). This signal processing technique can not only compress and encrypt the phonocardiogram (PCG) signal but also reduces the noises and the murmurs from the PCG signal. This information can assist the cardiologists for taking appropriate actions to diagnosis for the initial stage of the cardiovascular disorder. We have presented an efficient data compression algorithm based on DWT, energy packing efficiency (EPE), and run-length encoding (RLE) that can compress the signal about 93 . 70% without losing any pathological information. Further, this paper explores an end-to-end encryption technique using the compression algorithm to maintain patient confidentiality. After the compression of the PCG signal, the noises and the murmurs are effectively separated from the signal by reusing DWT. The performance of this algorithm has been evaluated by using 5 normal and 18 abnormal PCG signals available in the University of Michigan Heart Sound and Murmur Library. This method can be used in real time for the remote monitoring of the heart sound.

P016
Dr. Mohamed El-Desoky Hereher
Geography Department, College of Arts and Social Sciences, Sultan Qaboos University, Sultanate of Oman
15 min

Remote sensing of coastal ecosystems using spectral indices

Mohamed E. Hereher | Talal Al-Awadhi

Spectral indices are algorithms performed to improve the signal of certain features, such as vegetation, water and soil in satellite images. The objective of this work was to utilize the normalized difference vegetation index (NDVI), the modified normalized difference water index (MNDWI) and the ratio index for bright soil (RIBS) along with band compositing techniques in order to map and delineate the extent of the coastal ecosystems along the coasts of Oman, in terms of mangrove vegetation, wetlands, sabkhas and coral reefs, respectively. Satellite data were acquired from the Landsat-8 Operational Land Imager (OLI) during 2018. Some oceanographic characteristics: tidal range, sea surface temperatures (SST) and the depth of the sea floor of Oman off-shore region were also utilized to interpret the spatial extent of these coastal ecosystems. Results showed that the applied indices were efficient to highlight 14 locations of mangroves, 19 locations of wetlands, 2 locations of sabkha and 15 locations of coral reefs. It is observed that mangroves and wetlands are much related to high tidal range coasts, whereas coral reefs are contingent to shallow off-shores with SST of 22-30C. These corals occur either along the main coast or adjacent to the islands of the country. Sabkha and salt marshes occur along extended coastal flats of low-lying sandy coasts. The present study proved that

	the spectral indices are good surrogates to map coastal ecosystems.
 **P020** **Prof.Ching Y. Suen** Concordia University, Montreal QC Canada **15 min**	**Impact of Font on Computer Recognition of License Plates on Automobiles** Rabiah Al-qudah | **Ching Y. Suen** The chosen font type in the license plate (LP) plays a vital role in the recognition phase in computer-based operations. Some fonts are challenging for humans to read; however, other fonts are challenging for computer systems to recognize. Here, we present two sets of results for font evaluation: font anatomy results, and recognition results for commercial products. For anatomy results, two typical LP fonts are considered: Mandatory, and Driver Gothic. Moreover, we evaluate the effect of these fonts in context for two datasets using two commercial products: OpenALPR and Plate Recognizer. The font anatomy results revealed some important confusion cases and some quality features of both fonts. The obtained results show that the Driver font has less severe confusion cases than the Mandatory font.

Coffee Break & Poster Session

Tuesday, August 27th, 2019	**15:00-15:30**	**Ponderosa Foyer**
		Poster

Oral Session A-2

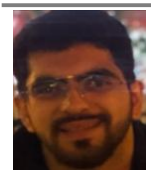
Tuesday, August 27th, 2019	15:30-18:00	Ponderosa Ballroom

Conference Chair: Prof. Wenbing Zhao

P021
Assoc. Prof. Shane Cotter
Union College, USA
15 min

Low Complexity Deep Learning for Mobile Face Expression Recognition
Shane Cotter

The problem of Face Expression Recognition (FER) remains a challenging one due to variations in illumination and pose as well as partial occlusion of the face. Deep neural networks have been increasingly applied to this problem and have achieved excellent recognition results, especially on challenging datasets such as FER2013. However, the trend has been towards more complex networks to increase performance. In this paper, we develop a low complexity model, and we experiment with a variety of parameters to determine the performance of these models on the FER2013 dataset relative to the complexity of the models. We show that we are able to obtain an accuracy of 70.86% on the test FER images which approximately matches the winning entry to the FER2013 competition but our model is 5 times smaller in size. We show that we are able to reduce the model size 5 times more, resulting in a model with fewer than 500,000 parameters, and still maintain an excellent accuracy of 68.43% which would make this model ideal for resource constrained environments.



P023
Aaklit Taneja
Dhirubhai Ambani Institute of Information and Communication Technology, India
15 min

Parallelizing Techniques in Image Processing Application for Higher Efficiency
Aaklit Taneja | Manish Khare

This paper focuses on using parallelization techniques for image processing, particularly focusing on Median Filtering. Parallelization is different from simple scheduling because unlike working on scheduling which works discretely, here we focus on simultaneous operations based on multi-threaded processors. For doing this we rely on the multiple cores and their ability to divide algorithms such as median filter into different processes which work simultaneously.

P025
Seongkyun Han
Kwangwoon University, Seoul, Republic of Korea
15 min

Real-time Small Object Detection Model in the Bird-view UAV Imagery
Seongkyun Han | Juwon Kwon | Soonchul Kwon

Object detection is one of the most important parts of UAV applications. UAV imagery has object distortion and small-sized objects peculiarities. In this paper, we propose a D-RFB module which can enhancethe expressive power of thefeaturemap, and D-RFBNet300 attached D-RFB module so that detect small objects in the UAV imagery more accurately. And we propose the UAV-cars dataset including peculiarities of UAV imagery. Our D-RFBNet300trained on MSCOCO achieved 21%mAPwith45FPS speed, which is the highest score among the other SSD type object detectors. In addition, our D-RFBNet300 trained on UAV-cars dataset achieved 99.24% AP at 10m altitude and highest AP at every validation set altitude from 15m to 30m with 57FPS speed.

P026
Asst. Prof. Dr. Masahiro Suzuki
Tokiwa University, Japan
15 min

Depth Perception of Virtual Objects Presented With Optical See-Through Head-Mounted Displays and Individual Differences
Masahiro Suzuki | Yasunaga Monno | Kazutake Uehira

We examined depth perception in mixed reality that uses optical see-through head-mounted displays (OST-HMD). The problem with depth perception in mixed reality is that virtual objects positioned behind real opaque objects remain visible. We measured the perceived depths of virtual objects behind real opaque objects. A virtual object was presented for an OST-HMD, and the perceived depth was measured with a reference marker. The real object was presented closer than the depth calculated from the binocular disparity given to the virtual object. The results indicate that there were large individual differences in depth perception of virtual objects. These findings suggest that addressing large individual differences of control depth perceptions in OST-HMD-using mixed reality is necessary.

P037
Assoc. Prof.Md. Khayrul Bashar
Ochanomizu

Automated Classification of Malaria Parasite Stages Using Convolutional Neural Network
Md. Khayrul Bashar

Malarial is a mosquito born deadly disease that quickly grows from person to person because of the infectious mosquito bite. Knowing accurately the life-cycle stages of malaria parasite is critical for accurate drag selection for early recovery. When the infected mosquito bites the host, cell morphology and appearance greatly change through four major developmental stages namely ring, trophozoite, schizont, and gametocytes in the host's liver and later in the red blood cells (RBCs). Microscopy images carry the signatures of the above changes. However, widely used image analysis based computational techniques require expertise in analyzing morphological, texture, and color

University, Tokyo, Japan; Bangladesh **15 min**	variations in the images. In this study, we investigate the strength of convolutional neural network (CNN) towards effective classification of malaria parasite stages. We design a customized CNN model to discriminate five classes including the control and four malaria parasite stages as mentioned above. With an unbalanced dataset having 46,973 single-cell thin blood smear images, the proposed method achieved 97.7% average accuracy, which is about 8 ~10% higher, when compared with a pre-trained CNN model and a widely used hand crafted feature based model using support vector machine (SVM) classifier.
 **P034** **Juwon Kwon (Student)** Kwangwoon University, Republic of Korea **15 min**	**A Study on the Improvement of Korean Recognition Based on Tesseract-OCR in the Scanned Documents** **Juwon Kwon** | Seongkyun Han | Soonchul Kwon In this paper, we proposed a method to improve the recognition rate of Korean text based on Tesseract-OCR in a scanned document of a fixed form. The Optical Character Recognition (OCR) process introduced in this paper is divided into a pre-processing process, a recognition process, and a post-processing process. In the pre-processing process, rotation, binarization, region of image (ROI) extraction and cropping are performed on the incoming scanned document, and resize and padding are performed on the cropped image. The image obtained through the pre-processing process is subjected to a recognition process. Recognition process recognizes characters using Tesseract-OCR, a free OCR engine. In the post-processing process, the incorrect result of the OCR result is corrected using the dictionary function and the result is stored. The proposed simple dictionary function compares incorrect results with previously registered words through Jaccard Similarity Check. In order to evaluate the performance of the proposed scheme, the DB was collected and evaluated on the standardized scanned documents, and the improved results were obtained by using only the Tesseract-OCR engine.
 **P022** **Dr.Joon-Young Park** KEPCO Research Institute,	**Automatic Inspection Drone with Deep Learning-based Auto-tracking Camera Gimbal to Detect Defects in Power Lines** **Joon-Young Park** | Seok-Tae Kim | Jae-Kyung Lee | Ji-Wan Ham | Ki-Yong Oh The traditional drone inspection performed by human operators is unsuited for the purpose of inspecting power transmission lines, because steel towers and their spans are too high and wide to be inspected with a 250 m line of sight. For this reason, the KEPCO Research Institute developed a new inspection drone system that can automatically fly a predetermined flight path based on the GPS coordinates of steel towers, filming a video of power transmission lines with a high definition camera and a thermal imaging camera. In this system, a camera gimbal with the cameras was still controlled by a human operator from a long

Republic of Korea **15 min**	distance away. When the drone approached close to a steel tower, however, the camera gimbal was often unable to be controlled and real-time video transmission for the gimbal operator was sometimes interrupted due to radio-frequency interference from steel structure and energized power conductors. To solve such a control problem in the field, we also developed an auto-tracking camera gimbal that can automatically track and photograph power facilities on the basis of Deep Learning. With the automatic gimbal, the entire inspection process can be fully automated. The effectiveness of the developed overall system was confirmed through field tests.
 **P017** **Manzar Ali Khan** Abasyn University, Pakistan **15 min**	**New Image Encryption Scheme Using Chaotic Maps** **Manzar Ali Khan** Data on the Internet is always vulnerable to different types of attacks due to the public nature of the Internet, which is the only source of communication all over the world. To protect sensitive information, many encryption techniques like Gingerbreadman chaotic map and S8 permutationbased image encryption scheme are proposed.However, due to security issues in these techniques, 3D Logistic map based confusion and diffusion processes are employedwhich solve those security problems.3D Logistic map was used to eliminatethe strong correlation between the plain text image pixels.A random matrix is created in diffusion stage via 3D Logistic map and XORed with the scrambled image. The final cipher text image is extracted using existing Gingerbread-man chaotic map based S-Box. The proposed scheme is analyzed experimentally and statistically using key space analysis, information entropy analysis and differential analysis. Results are also validated via Number of Pixel Rate Change (NPRC) to ensure the security and robustness of the proposed scheme.
 **B001** **Wenchao Li and Jianming Zhang** Insititute of Cyber-System and Control of Zhejiang	**ICGNI: ICA-based Clustering with GBDT Network Inference using single-cell expression data** **Wenchao Li** | Wei Zhang | **Jianming Zhang** Biological network inference has always been one of the central topics in systems biology. Network inference can be regarded as a process of determining relations between nodes with efficient measurements. For gene regulatory networks, transcriptomic data such as single cell RNA sequencing (sc RNA-seq) have increasingly act as the main information source in reconstructing network structures. Although many methods have been proposed towards this challenge, most of them do not focus on sing-cell data and omit the characteristics of gene regulatory networks. Here, we present a new method names IGBNI to solve these problems about gene functional clustering, network inference with single-cell data and hub genes finding. Three single cell datasets are used to evaluate the performance of our method with

University, China **15 min**	satisfying results.
 **B002** **Roderick Melnik** MS2Discovery IRI, Wilfrid Laurier University, Waterloo, Canada **15 min**	**Effects of Heterogeneous Surroundings on the Efficacy of Continuous Radiofrequency for Pain Relief** Sundeep Singh	**Roderick Melnik** This numerical study highlights the deviation between the predicted lesion volume of the homogeneous and heterogeneous models of the continuous radiofrequency (RF) procedure for pain relief. A three-dimensional computational domain comprising of a realistic anatomy of the target tissue has been considered in the present study. A comparative analysis has been conducted for three different scenarios: (a) completely homogenous domain comprising of only muscle tissue, (b) heterogeneous domain comprising of nerve and muscle tissues, and (c) heterogeneous domain comprising of bone, nerve and muscle tissues. Finiteelement-based simulations have been performed for computing the temperature and electrical field distributions during the continuous RF procedures for treating chronic pain. The predicted results reveal that the consideration of heterogeneity within the computational domain results in distorted electric field distribution and leads to the significant reduction in the attained lesion volume during the continuous RF application for pain relief.

Oral Session B-1

Tuesday, August 27th, 2019	**13:00-15:00**	**Ponderosa 1001**

Conference Chair: Prof. Ian Robert McAndrew

Keynote Speech

13:00-13:45, Tuesday, August 27th, 2019

Ponderosa 1001, The University of British Columbia | Vancouver Campus

Title: Aviation Cybersecurity Issues for Unmanned Vehicles to fly Beyond the Visual Line of Sight

Prof. Ian Robert McAndrew

Capitol Technology University, Maryland, USA

Abstract

Aviation is now remote in real terms with unmanned vehicles in the air, land and sea. It is now more critical that the Cybersecurity issues have implications for safety, reliability and efficient operations. This research discusses how and why data transfer within these vehicles and with those around now with ever more invasive hacking what practical solutions are available for all ends of the economic market. In particular, the advancements in cyber programming that can be integrated to ensure unmanned vehicles are safe from external hacking. This one issue is the single most items needing solutions before legislation will support their use beyond the visual line of sight.

Introduction to Prof. Ian Robert McAndrew

Prof. Ian R. McAndrew PhD is a Mechanical Engineer that has worked in education for over 27 years. His teaching and research has been globally, starting in London and now with Capitol Technology University where he is the Dean of Doctoral Programs. He has taught in over 20 countries and published with many academics from all over the world. He has 6 degrees, also a qualified Electrical Engineer and FRAeS. He has supervised over 50 PhDs and has almost 60 peer reviewed publications. His current research is in aerodynamics and low speed flight. He is a keen supporter of conferences as this is where junior researchers can develop their skills for a life in research. He is frequently invited to deliver Keynote speeches and is the Chair of several International Conferences. Additionally, he is the editor or assistant editor in chief of several International Journals.

U001
Asst. Prof.Alireza Bahiraie
Semnan University & Keykam Risk Lab, Iran
15 min

Stock Pricing with New Dynamic Fractal Analysis Approach

Alireza Bahiraie | Rehan Sadiq | Mohammad Alipour

Fractal analyzing of continuous processes have recently emerged in literatures in vadomains. Existence of long memory in many processes including financial time series has evidenced via different methodologies in many literatures in the past decade. This has insmany recent literatures on quantifying the fractional Brownian motion (fBm) characteristfinancial time series. This paper questions the accuracy of the new developed dynamic fractal analyzing methodon explaining persistent or anti-persistent behavior of time series understudy. Rescaled range (R/S) and power spectrum techniques produce fractal dimensions for returns of twelve hundred S&P100 stocks from the most well performed firms are estimatedZipf's law generates linear and logarithmic power-law distribution plots to evaluate the vaof estimated fractal dimensions on prescribing persistent and anti-persistent characteristics less ambiguity. Findings of this study recommend a more thoughtful approach on classifying persistent and persistent behaviors of financial time series by utilizing existing fractal analyzing method.

U009
Asst.Prof. Fereidoun Habibian Dehkordi
Department Of Mathematics, Semnan University, Iran
15 min

Multi-objective duality for convex semidefinite programming problems
Fereidoun Habibian | Mohammadreza Safi

In this research, the novel dual theory for multi-objective convex semi-definite programming (CSDP) problem in finance is studied. For this purpose, the conjugate approach is employed, first the dual for single objective CSDP have recalled. Then, the dual for multi-objective ones with a similar idea is defined.
In order to study on duality assertion between the primal and dual problems, to review and develop the mathematical duality properties and the optimality condition of the scalar problem are needed which all are presented and developed in this paper. Also, some special case such as linear case just in the objective functions and linear case just in the constraints are considered. The illustrative results and discussion are presented respectively.

U010
Prof.Gang Du
College of Management and Economics, Tianjin University, China
15 min

Hierarchical Joint Optimization for Design and Implementation of Internet Software Products
DU Gang | WANG Huanhuan

The scale of the application of software products in the internet context has an increasing growth in the recent years. There is an important issue regarding the internet software products has been raised that challenges modern organisations, which is the hierarchical joint optimisation of the design and implementation. This article thus focuses on the above-mentioned issue to establish a nonlinear, bi-level programming model with product design as the leader and its implementation as the follower. The model also considers the complex interaction between the processes of both design and implementation. The upper level of the model determines the software product design scheme and optimizes the ratio between the comprehensive product evaluation and the total cost of R&D; while the lower level determines the software product implementation scheme and optimizes the selection with the best price ratio of software developers, component suppliers, and equipment suppliers etc. Following the model establishment, a nested genetic algorithm is constructed to solve the bi-level programming. The research also applies the model on a case study of an online car-hailing platform in China. The calculated result is then compared with the decision scheme generated from other optimization methods.

U012
Dr. Fred Dilkes
Defense Research and Development Canada, Canada
15 min

Target Detection and Location using an UAV-borne Sensor
Jing Du | **Fred Dilkes**

The detection and location of uncooperative Radio Frequency (RF) emitters are both important capabilities for Electronic Surveillance (ES) of adversarial assets for national security and defense purposes. In this paper, we present a concept for an application of Unmanned Aerial Vehicles (UAVs) with an on-board ES payload/sensors to conduct tactical surveillance, target detection and location. This UAV-borne sensor configuration can be operated in cooperation with surface-based systems/platforms (ship- or ground-based systems). By collaborating, the spatially separated UAV-borne sensor and surface-based sensors/systems can provide better geometry and diversification in time and space to increase coverage and improve detection and location of any RF targets.

U014
Prof. Mansoureh Jeihani
Morgan State University, USA
15 min

A Machine Learning Distracted Driving Prediction Model
Samira Ahangari | **Mansoureh Jeihani** | Abdollah Dehzangi

Distracted driving is known to be one of the core contributors to crashes in the U.S., accounting for about 40% of all crashes. Drivers' situational awareness, decision-making and driving performance are impaired due to temporarily diverting their attention from the primary task of driving to other tasks not related to driving. Detecting driver distraction would help in adapting the most effective countermeasures. To find the best strategies to overcome this problem, we developed a Bayesian Network (BN) distracted driving prediction model using a driving simulator. In this study we use a Baysian Network classifier as a powerful machine learning algorithm on our trained data (80%) and tested (20%) with the data collected from a driving simulator, in which the 92 participants drove six scenarios of hand-held calling, hands-free calling, texting, voice command, clothing, and eating/drinking on four different road classes (rural collector, freeway, urban arterial, and local road in a school zone). Various driving performances such as speed, acceleration, throttle, lane changing, brake, collision, and offset from the lane center were investigated.
Here we investigated different optimization models to build the best BN in which a Genetic Search Algorithm obtained the best performance. As a result, we achieved 67.8% prediction accuracy using our model to predict driver distraction. We also achieved 62.6% true positive rate, which demonstrates the ability of our model to correctly predict distractions.

Coffee Break & Poster Session

Tuesday, August 27th, 2019	15:00-15:30	Ponderosa Foyer

Poster

Oral Session B-2

Tuesday, August 27th, 2019	15:30-18:00	Ponderosa 1001

Conference Chair: Prof. Ian Robert McAndrew

SO002
Wilson Igbasi
Nwafor Orizu College of Education Nsugbe.
Nigeria
15 min

The Role of ICT in Poverty Reduction in Anambra State.
Wilson Igbasi

The research work is on the role of ICT in poverty reduction in Onitsha L.G.A of Anambra state. A survey research design was adopted for the study. The population consists of the entire indigenes of Onitsha North L.G. A of Anambra state. Stratified sampling technique was used to sample fifty respondents in the area. The questionnaire was the major instrument for data collection and it was validated by an expert in Computer education at Nwafor Orizu College of Education, Nsugbe and expert in Measurement and evaluation at Nnamdi Azikiwe University, Awka both in Anambra State. The mean statistics was used to analyse the data collected. The findings of the study showed that ICT can enhance poverty reduction through provision of employment opportunity, capacity building, elearning among others. However the major challenges for adopting ICT for poverty reduction include high rate of illiteracy, poor infrastructural facilities, inadequate human resources etc. the paper concluded that government should formulate good ICT policy and subsidize the cost of ICT

SO005

Parameter Analysis of an existing copper Access Network for the Optimization of VDSL Service in Rural Areas
Rommel Antonio Carpio Cordero | **Juan Diego Jara Saltos** | Pablo Márquez | Esteban Mendieta | Juan Inga Ortega

In this paper, we present a modeling of transmission lines performed under real-world conditions to compare them with a theoretical transfer function. This model is based on the practical case of implementation for access networks

JUAN DIEGO JARA SALTOS Universidad Politécnica Salesiana - Ecuador **15 min**	"last mile" in rural areas, designed and implemented by National Telecommunication Corporation (CNT-Ecuador) at Azuay-Ecuador. In this sense, we review some theoretical concepts on evolution over time in xDSL technologies implemented by the company CNT-Ecuador. Then, we perform several field data analyses using measuring instruments, where electrical parameters were obtained with which we perform the modeling. In addition, it was realized an analysis and comparison of the obtained real capacities of transmission lines, against the theoretical ones by means of the Theorem of Shannon-Hertly for lines with VDSL technology. Into the outdoor tests and simulations, the data obtained allowed us to drastically correct the transfer functions of the lines in poor condition, through varying the most impacting electrical parameters. We present the results in a table with the ranges of the parameters that can be taken as reference so that a pair of copper wires operating in poor condition in rural areas, can work correctly with VDSL technology.
 **SO009** **Jagdeep Singh** CALORX TEACHERS' UNIVERSITY, AHMEDABAD, GUJARAT, INDIA **15 min**	**Proposal to Enhance the Proportional Scheduling in LTE Using Resource Block Allocation Technique** **Jagdeep Singh** | Ashish Chaturwedi LTE (Long Term Evolution) is a standard for 4G remote broadband innovation that offers enhanced network capacity and speed to mobile device users. LTE provides high data transmission rate approximately 100 Mbps for downstream and 30 Mbps for upstream. The technology offers less latency, high scalable bandwidth capacity and backward-compatibility with existing GSM and UMTS technology. Future developments could yield peak throughput on the order of 300 Mbps. LTE system allocates radio resources for different type of services such as real time (RT) services, non-real time (NRT) services, control signaling through a radio resource manager, and these services require dynamic resource allocation for transmitting corresponding data packets. A scheduler in radio resource manager needs to fulfill request of these administrations with constrained radio resources. In this manner, scheduler ought to be proficient in performing radio resource allocation in such dynamic condition. In this paper we are working on resource block scheduling in LTE system and proposed an algorithm to allocate resource blocks so that user's rate requirement can be fulfilled optimally and throughput of the system can be improved. The overall performance of proposed technique is better and it enhances the network throughput up to 9.5.

SO1004
Ming Jiang
Sun Yat-sen University, China
15 min

Genetically-enhanced Multi-dimensional Constellation Design for Wireless Systems

Zefeng Lin | Songkang Huang | **Ming Jiang**

In wireless communications, the design of digital constellations and the associated bit labeling methods have a large impact on the robustness of transmissions. With the aid of increased minimum Euclidean distance (MED), high-dimension constellations have shown notable performance improvements against their conventional two-dimensional (2-D) counterparts, such as conventional quadrature amplitude modulation (QAM). In this paper, we propose a new method that exploits genetic algorithm (GA) to construct multi-dimensional constellations with optimized MED and bit labeling. More specifically, the GA-based design method is capable of producing both new constellations that have greater MED values and near-optimum labeling that yields improved performance, when compared with conventional schemes. A few design examples and simulation results are provided to demonstrate the benefits of the proposed constellation and labeling design method.

SO1005
JUAN DIEGO JARA SALTOS
Universidad Politécnica Salesiana - Ecuador
15 min

Development and Design of a Unified Remote Video Surveillance System for Homes, using Free Software Tools

Bryam Genaro Abril Sarmiento | Patricio Xavier Cuzco | **Juan Diego Jara Saltos** | Pablo Gallegos

In this article we present the design and implementation of a prototype for video surveillance that allows to manage IP cameras from different manufacturers through a single application implemented with free software tools and free hardware. Several currently existing applications work with proprietary applications and IP cameras from the same manufacturer, however, in this article we demonstrate that management is more efficient through our unique system that allows generating remote alerts through SMS messages and notifications by electronic mail after the activation of a sensor. Our article describes the existing problems in residential security systems, applied to the case of the City of Cuenca-Ecuador, as well as the technical development of the system in relation to server configuration, client equipment and an Android application developed in IONIC Framework. Finally, we describe the results of the different connectivity tests of the system generating events through the internet cloud, to determine performance and connectivity times in a real operating environment.

SO1006
DIEGO P. CHACON TROYA
Universidad Politécnica Salesiana - Ecuador
15 min

Design of a Mobile Panic Button for Older Adults for Monitoring through the ECU911 System

Juan Diego Jara Saltos | John Armando Lima Leon | Cristian Patricio Valdez Bermejo | **Diego P. Chacón Troya** | Marcelo Barbecho | Juan Pablo Bermeo

In this article we present the design and implementation of an adaptive panic button prototype to the needs of older adults, and monitored through an Integrated Security Service System called ECU911-Ecuador. We carry out a detailed analysis of older adults who suffer from diseases such as Alzheimer's and require the panic button service, in order to generate a warning to immediately find the location of the older adult who has been lost. The prototype uses a NEO-6M module to receive geolocation data and, as a processing unit, a Raspberry PI Zero that allows the user's location data to be sent through a VPN to an ECU-911 management system that interprets the Contact- ID protocol. Finally, we present an analysis of the technical tests performed with older adults in terms of message arrival times, bandwidth and system stability

U017
Stephen Dankwa (Student)
University of Electronic Science and Technology of China, China
15 min

DDPG: A Deep Reinforcement Learning Technique to Model a Continuous Movement of an Intelligent Robot Agent

Stephen Dankwa | Wenfeng Zheng

In this current research, Twin-Delayed DDPG (TD3) algorithm has been used to solve the most challenging virtual Artificial Intelligence application by training a 4-ant-legged robot as an Intelligent Agent to run across a field. Twin-Delayed DDPG (TD3) is an incredibly smart AI model of a Deep Reinforcement Learning which combines the state-of-the-art techniques in Artificial Intelligence, which includes continuous Double Deep Q-Learning, Policy Gradient and Actor-Critic. These Deep Reinforcement Learning approaches trained an Intelligent agent to interact with an environment with automatic feature engineering, that is, necessitating minimal domain knowledge. During the implementation of the DDPG, we used a two-layer feedforward neural network of 400 and 300 hidden nodes respectively, with Rectified Linear Units (ReLU) as an activation function between each layer for both the Actor and Critics, and then a final tanh unit following the output of the Actor. The Critic receives both the state and action as input to the first layer. Both the network parameters were updated using Adam optimizer. The idea behind the Twin-Delayed DDPG (TD3) is to reduce overestimation bias in Deep Q-Learning with discrete actions which are ineffective in an Actor-Critic domain setting. Based on the Maximum Average Reward over the evaluation time-step, our model achieved an approximate maximum of 2364. Therefore, we can truly say that, Twin-Delayed Deep Deterministic Policy Gradient (TD3) has prominently improved both the learning speed and performance of the

Deep Deterministic Policy Gradient (DDPG) in a challenging task in a continuous control setting.

U1001
Zhong Li(Student)
College of Intelligence Science and Engineering
National University of Defense Technology
Changsha, China
15 min

Gait Energy Image Based on Static Region Alignment for Pedestrian Gait Recognition

Zhong Li | Jiulong Xiong | Xiangbin Ye

The Gait Energy Image (GEI) spatially aligns, accumulates, and averages all the frames of a gait cycle, so there is a very high requirement for the registration of moving targets. Accurate registration of moving targets is important for the synthesis of Gait Energy Image (GEI). In this paper, we propose a new Gait Energy Image to improve the registration effect: Gait Energy Image based on static region alignment (SRA-GEI). Firstly, we select the minimum circumscribed rectangle containing the moving human body from the gait sequence. Secondly, we scale the minimum circumscribed rectangle to the specified height and calculate the gait cycle by analyzing the distance between the two feet. Finally, we propose a new registration method to generate Gait Energy Image by calculating and aligning the centroid of the static region of the gait image. This paper explores the performance of SRA-GEI with KNN based on the CASIA Dataset B. The experimental results have shown that the proposed method achieves better recognition rate compared with GEI which aligned by overall centroid.

Poster Session

Tuesday, August 27th, 2019 **15:00-15:30** **Ponderosa Ballroom**

P013
Dr. DAY-FANN SHEN

3D Position Estimation of Endoscopic Surgical Instruments – A Comparison of Monocular and Binocular Algorithms Using on IR Markers

Pin-Hsun Chiu | Huan-Ran Lin | Atul Kumar | **Day-Fann Shen**

This paper develops a 3D positioning system for endoscopic surgical instruments Combining 3D virtual and augmented Reality, presents a wealth of opportunities in the field of medical science, especially where complex microsurgery is concerned. This paperdevelops 3D position reference coordinates between endoscopy instruments and the miniaturized camerarequired to perform surgery. The camera and markers used are infrared based which avoids confounding factors such as background

National Yunlin University of Science and Technology, TAIWAN	colorings and light refractions. A comparison is made of monocularPnP and two different stereoscopic 3D attitude estimation methods for binocular stereo vision. It was found that monocular PnP is more accurate in stereo vision is generally more accurate. Inclusion of 3D modeling software.Unity to map the visualized surgical instrument, doctor could conceivably gain improved understanding of the surgicalenvironment. This research is an initial effort at establishing Taiwan’s MIS 3D attitude estimation processes, and it is hoped that it will eventually compete with the global brands such as NDI.
 **U004** **Assoc. Prof. Kyoung-Kyu Choi** Soongsil University, Korea	**Fuzzy theory-based Shear Strength Prediction of Concrete Infra-Structures** **Kyoung-Kyu Choi** | Dongjak-gu An analysis method based on fuzzy theory was developed for accurate evaluation of the shear strength of concrete members in infra structures. Extensive existing test datasets of shear tests concrete beams were used for training and validation of the proposed fuzzy-based model. The total dataset was divided into two separate groups for training and testing: the fuzzy model was developed using the training dataset only and was verified using the testing dataset only. Since fuzzy models might be affected by the selected training datasets and their predictions are highly dependent on the data distribution of the training dataset. In this study, a data distribution index (DI) was developed to evaluate the evenness of the data distribution and an evaluation of the DI based on random data division. In addition, based on analytical techniques using Bayesian modelling with the aid of Markov chain Monte Carlo methods, the significance of all potential parameters affecting the shear failure phenomenon were examined for various parameters: concrete compressive strength, effective depth, span length, shear span to depth ratio, beam size, compression and tension reinforcement ratios, and shear reinforcement ratio. In fuzzifications, the type and number of the membership function for each input parameter are determined. To evaluate the shear strength of concrete beams, adaptive neuro-fuzzy techniques were used by combining neural network and fuzzy inference system. The fuzzy rule-base was made to explain the shear strength as output using each fuzzy set. The results showed that fuzzy set theory can properly predicted shear strength of concrete infra-structures.

Listener

Tuesday, August 27th, 2019

U1001-1

Jiulong Xiong

College of Intelligence Science and Engineering National University of Defense Technology Changsha, China

U01

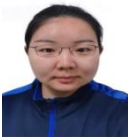
Assoc. Prof. Xu Li

Beijing Research Institute of Telemetry, China

U02

Assoc. Prof.YAN Chaoxing

Beijing Research Institute of Telemetry, China



U03

Assoc. Prof.YU Xiaoli

Beijing Research Institute of Telemetry, China

B001-1

Jianming Zhang

Insititute of Cyber-System and Control of Zhejiang University, China

B01

Sung Soo Kim

Busan Bohun Hospital, South Korea

Local Chair

Tuesday, August 27th, 2019

Frank Zhang

University of the Fraser Valley, Canada

Prof.Harris, Sarah

University of Nevada, Las Vegas,USA

Dr. Grzegorz Chmaj

UNLV University of Nevada, Las Vegas

Prof.Evangelos Yfantis

University of Nevada, Las Vegas

Award Ceremony & Closing Ceremony

Tuesday, August 27th, 2019	**18:00-18:30**	**Ponderosa Ballroom**

Dinner Banquet

Tuesday, August 27th, 2019	**18:30-19:30**	**Ponderosa Ballroom**

Free day

Wednesday, August 28th, 2019

Hope you'll enjoy your journey!

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