

CONFERENCE ABSTRACTS

**The 10th International Conference on
Signal Processing Systems (ICSPS 2018)**

**The 3rd International Conference on
Biomedical Signal and Bioinformatics (ICBSB 2018)**

Singapore | November 16-18, 2018

Organized by



Published by



Content

November 16-18, 2018

Welcome Address.....	3
Technical Program at a Glance	4
Tips.....	7
Venue.....	8
Introduction of Speakers.....	9
Session Schedule.....	12
Poster Session.....	31
Listeners' List.....	33

Welcome

November 16-18, 2018

We are pleased to welcome you to the 10th International Conference on Signal Processing Systems and the 3rd International Conference on Biomedical Signal and Bioinformatics which will be held in Singapore during November 16-18, 2018.

We wish to express our sincere appreciation to all individuals and organizations who have contributed to ICSPS & ICBSB 2018. Special thanks are extended to our colleagues in 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 keynote speakers as well as all the authors for contributing their latest research to the conference.

This conference program is highlighted by the 3 keynote speakers: Prof. Robert Minasian, IEEE & OSA Fellow, The University of Sydney, Australia; Prof. Mao Kezhi, Nanyang Technological University, Singapore; Prof. Xudong Jiang, Nanyang Technological University, Singapore.

Oral presentations are divided into four parallel sessions, which are in the topics of Medical Image and Biosignal Processing; Bioinformatics and Engineering; Signal Analysis and Processing; Computer Vision and Image Processing.

Besides, in order to enrich the conference and enhance the communication among the participants, a tour in Singapore will be arranged on November 18.

Finally, we wish you to have a pleasant and memorable experience in this conference as well as in Singapore.


ICSPS & ICBSB 2018 Organizing Committee



Agenda


November 16-18, 2018

< November 16, 2018 (Friday) >

 Lobby of Nanyang Executive Centre	
10:00-17:00	Registration & Material Collection

< November 17, 2018 (Saturday) > Morning

Opening Remark & Keynote Speeches





 Lecture Room 1		
09:00-09:10	Opening Remark	Prof. Mao Kezhi Nanyang Technological University, Singapore
09:10-09:50	Keynote Speech I	Prof. Robert Minasian, IEEE & OSA Fellow The University of Sydney, Australia
		<i>Speech Title: Progress in photonic signal processing</i>
09:50-10:30	Group Photo & Coffee Break	
10:30-11:10	Keynote Speech II	Prof. Mao Kezhi Nanyang Technological University, Singapore
		<i>Speech Title: Knowledge-oriented convolutional neural network (K-CNN) and its application in causal relation extraction</i>
11:10-11:50	Keynote Speech III	Prof. Xudong Jiang Nanyang Technological University, Singapore
		<i>Speech Title: The Role of Dimensionality Reduction for Classification</i>



Lunch @ Cosmo <11:50-13:00>

< November 17, 2018 (Saturday) > Afternoon

Parallel Sessions


13:00-15:30	Session I- Medical Image and Biosignal Processing 10 presentations	 Lecture Room 1
	MG203, MG021, MG023, MG024, MG019, MG202, MG3003-A, MG1005, MG1008, MG047	
13:00-15:00	Session II- Bioinformatics and Engineering 8 presentations	 Breakout Room 3
	MG220, MG218, MG219, MG210, MG204-A, MG039, MG049, MG1007	
15:00-15:30	Poster Session MG003, MG013, MG036, MG3001	
15:30-15:45	Coffee Break	
15:45-18:30	Session III- Computer Vision and Image Processing 11 presentations	 Lecture Room 1
	MG005, MG017, MG018, MG020, MG026, MG029, MG022, MG1001, MG048, MG044, MG046	
15:45-18:15	Session IV- Signal Analysis and Processing 10 presentations	 Breakout Room 3
	MG015, MG016, MG032, MG033, MG034, MG030, MG009, MG014, MG037, MG031	



Dinner @ Cosmo <18:30-20:30>

< November 18, 2018 (Sunday) >

One Day Tour

	
Assemble in the lobby of Nanyang Executive Centre	
09:00-17:00	Merlion Park → Gardens by the Bay → St. Andrew's Cathedral → Little India → Chinatown

Notice!

1. Participants must register for one day tour in advance.
2. Please assemble at the designated place before 08:50.
3. The schedule may change due to bad weather or some other inevitable factors.

General tips:

- ✧ Please kindly make your own arrangements for accommodations.
- ✧ Please keep your belongings (laptop and camera etc.) with you in the public places, buses, metro.
- ✧ 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.
- ✧ Your punctual arrival and active involvement in each session will be highly appreciated.
- ✧ Certificate of Participation will be awarded after your presentation.

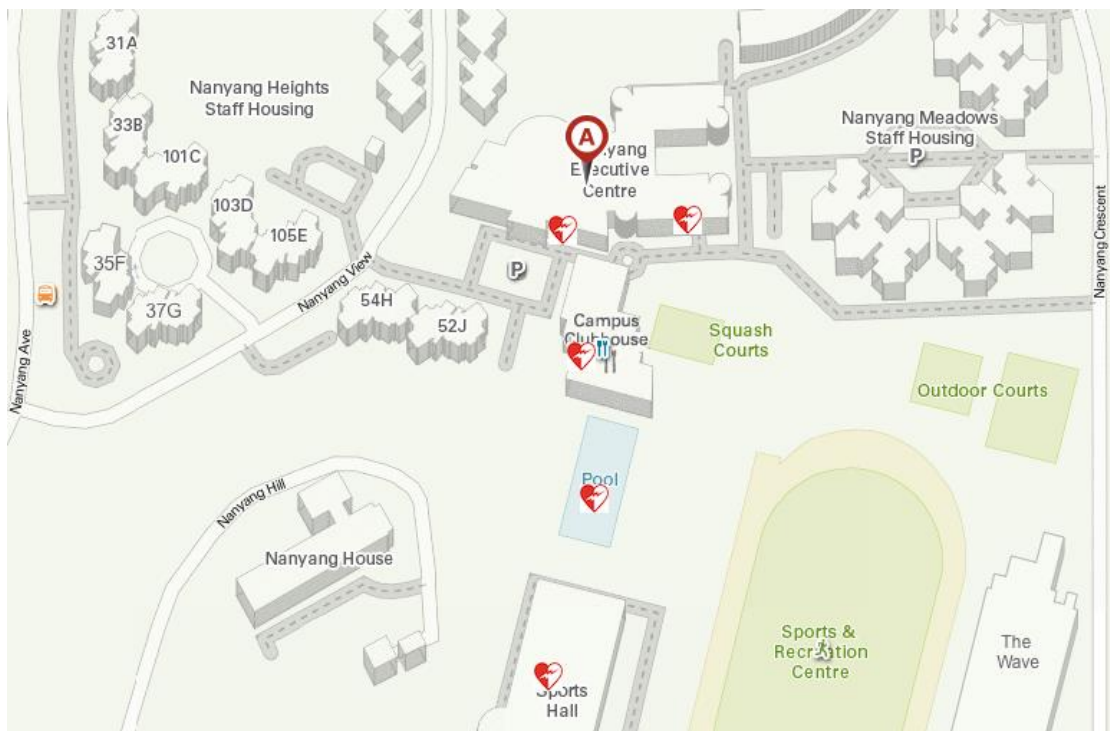
Warm Tips for Oral Presentation:

- ✧ Get your presentation PPT or PDF files prepared.
- ✧ Regular oral presentation: 15 minutes (including Q&A).
- ✧ Keynote speech: 40 minutes (including Q&A).
- ✧ Laptop (with MS-Office & Adobe Reader), projector & screen, laser sticks will be provided by the conference organizer.

Nanyang Executive Centre in NTU

<http://www.ntu.edu.sg/nec/Pages/default.aspx>

Add: 60 Nanyang View, Singapore 639673



Keynote Speaker

November 16-18, 2018



Prof. Robert Minasian, IEEE & OSA Fellow
The University of Sydney, Australia

Professor Minasian is a Chair Professor with the School of Electrical and Information Engineering at the University of Sydney, Australia. He is also the Director of the Fibre-optics and Photonics Laboratory. His research has made key contributions to microwave photonic signal processing. He is recognized as an author of one of the top 1% most highly cited papers in his field worldwide. Professor Minasian has contributed over 360 research publications, including Invited papers in the IEEE Transactions and Journals, and Plenary and Invited papers at leading international conferences. Professor Minasian was the recipient of the ATERB Medal for Outstanding Investigator in Telecommunications, awarded by the Australian Telecommunications and Electronics Research Board. He is a Fellow of the IEEE, and a Fellow of the Optical Society of America.

Keynote Speaker

November 16-18, 2018



Prof. Mao Kezhi

Nanyang Technological University, Singapore

Dr. Mao Kezhi obtained his BEng, MEng and PhD from Jinan University, Northeastern University, and University of Sheffield in 1989, 1992 and 1998 respectively. He joined School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore in 1998, where he is now a tenured Associate Professor. Dr. Mao has over 20 years of research experience in artificial intelligence, machine learning, big data, image processing, natural language processing, and information fusion. He has published over 100 research papers in referred international journals and conferences. He has edited 3 books published by Springer.

Besides academic research, Dr. Mao is also active in development and consulting. He has successfully developed and delivered several intelligent systems and software tools to government agencies, hospitals and industries.

Dr. Mao Kezhi serves on Editorial Board of Computational Intelligence and Neuroscience. He has served as Keynote Speaker/Programme Chair/Organizing Committee Member for multiple international conferences. In addition, he has served as a reviewer for multiple international journals.

Keynote Speaker

November 16-18, 2018



Prof. Xudong Jiang

Nanyang Technological University, Singapore

Prof. Xudong Jiang received the B.Sc. and M.Sc. degree from the University of Electronic Science and Technology of China, in 1983 and 1986, respectively, and received the Ph.D. degree from Helmut Schmidt University Hamburg, Germany in 1997, all in electrical and electronic engineering. From 1986 to 1993, he worked as Lecturer at the University of Electronic Science and Technology of China where he received two Science and Technology Awards from the Ministry for Electronic Industry of China. He was a recipient of the German Konrad-Adenauer Foundation young scientist scholarship. From 1993 to 1997, he was with Helmut Schmidt University Hamburg, Germany as scientific assistant. From 1998 to 2004, He worked with the Institute for Infocomm Research, A*Star, Singapore, as Senior Research Fellow, Lead Scientist and appointed as the Head of Biometrics Laboratory where he developed a fingerprint verification algorithm that achieved the fastest and the second most accurate fingerprint verification in the International Fingerprint Verification Competition (FVC2000). He joined Nanyang Technological University, Singapore as a faculty member in 2004 and served as the Director of the Centre for Information Security from 2005 to 2011. Currently, Dr Jiang is a tenured Associate Professor in School of Electrical and Electronic Engineering, Nanyang Technological University. Dr Jiang has published over hundred research papers in international refereed journals and conferences, some of which are well cited on Web of Science. He is also an inventor of 7 patents (3 US patents), some of which were commercialized. Dr Jiang is a senior member of IEEE and has been serving as Editorial Board Member, Guest Editor and Reviewer of multiple international journals, and serving as Program Committee Chair, Keynote Speaker and Session Chair of multiple international conferences. His research interest includes pattern recognition, computer vision, machine learning, image analysis, signal/image processing, machine learning and biometrics.


Opening Remark & Keynote Speeches

< November 17, 2018 (Saturday)> Morning

Time: 09:00-11:50

Place : Lecture Room 1

※Please kindly participate the whole course of the conference to make sure each item sticks to the agenda and runs smoothly.

<p>09:00-09:10</p>	<p>Opening Remark</p> <p>Prof. Mao Kezhi</p> <p>Nanyang Technological University, Singapore</p>
<p>09:10-09:50 Keynote Speech I</p>	<p>Progress in photonic signal processing</p> <p>Prof. Robert Minasian, IEEE & OSA Fellow</p> <p>The University of Sydney, Australia</p> <p>Abstract: Next generation signal processing systems will require new technologies to address the current limitations for growth in capacity and versatility in areas such as 5G and Internet of Things (IoT). Microwave photonics, which merges the worlds of RF and photonics, shows strong potential as a key enabling technology to enable new paradigms in the processing of high speed signals and in sensing that can overcome inherent electronic limitations. Photonic signal processors are intrinsically compatible with optical-wireless systems, and can provide connectivity with in-built signal conditioning, while also providing important advantages of EMI immunity. Moreover, photonic integration on semiconductor material platforms that co-exist with CMOS electronics enables boosting the performance of future systems performing sensing and communications with the potential for implementing high bandwidth, fast and complex functionalities. Recent photonic signal processing advances will be presented including widely tunable single passband filters, high-speed frequency converters, and a range of novel high-resolution sensors based on microwave photonic techniques.</p>
<div style="text-align: center;">  <p>Group photo & Coffee break</p> <p>09:50-10:30</p> </div>	

Abstract

November 16-18, 2018

<p>10:30-11:10 Keynote Speech II</p>	<p>Knowledge-oriented convolutional neural network (K-CNN) and its application in causal relation extraction</p> <p>Prof. Mao Kezhi Nanyang Technological University, Singapore</p> <p>Abstract: The cause-effect relation plays an important role in human cognition due to its significant impact on reasoning and decision making. However, causal relation extraction is a very challenging task in Natural Language Processing (NLP). There are many existing approaches developed to tackle this task, either rule-based (non-statistical) or machine-learning-based (statistical) method. This talk will present a knowledge-oriented convolutional neural network (K-CNN) approach that integrates knowledge and data. The proposed K-CNN consists of two channels including knowledge-oriented channel and data-oriented channel. The knowledge-oriented channel incorporates human knowledge to capture the linguistic clues of causal relationship, while the data-oriented channel learns important features of causal relation from training data. The convolutional filters in knowledge-oriented channel are automatically generated from open knowledge bases such as WordNet and FrameNet without involving training. In addition, two types of latent semantic features including WordNet categorical features and FrameNet causal scores are proposed to allow the model to capture more useful latent information that cannot be captured from data by CNN itself.</p>
<p>11:10-11:50 Keynote Speech III</p>	<p>The Role of Dimensionality Reduction for Classification</p> <p>Prof. Xudong Jiang Nanyang Technological University, Singapore</p> <p>Abstract: Finding/extracting low-dimensional structures in high-dimensional data is of increasing importance, where data/signals lie in observational spaces of thousands, millions or billions of dimensions. Many biomedical and bioinformatics datasets have very high dimension and low number of samples. The curse of dimensionality is in full play here: We have to conduct inference with a limited or no human knowledge. Machine learning is a solution that becomes hotter and hotter to boiling. This is evidenced by numerous techniques published in the past decade, many of which are in prestige journals. Nevertheless, there are some fundamental concepts and issues still unclear or in paradox. For example, we often need many processing steps in a complex information discovery/recognition system. As the information amount cannot be increased and must be reduced by any processing, why do we need it before the main processing? This seemingly simple question easily answerable if each step uses different prior knowledge is nontrivial in machine learning. People proposed numerous machine learning approaches but seem either unaware of or avoiding this fundamental issue. Although extracting the most discriminative information is indisputably the ultimate objective for pattern recognition, this talk will challenge it as a proper or effective criterion for the machine learning-based dimension reduction or information/feature extraction, despite the fact that it has been employed by almost all researchers.</p>



Lunch @ Cosmo <11:50-13:00>

Please take your lunch coupon with you.

Session I- Medical Image and Biosignal Processing

< November 17, 2018 (Saturday)> Afternoon

Time: 13:00-15:30

Venue: Lecture Room 1

Chair: Prof. Kunbao CAI, Chongqing University, China

※Please kindly participate the whole course of the conference to make sure each item sticks to the agenda and runs smoothly.

MG203 13:00-13:15	<p>BreastNet: Entropy-regularized Transferable Multi-task Learning for Classification with Limited Breast Data</p> <p>Jialin Shi, Ji Wu and Ping Lv Tsinghua University, China</p> <p>Abstract: We describe a framework to automatically separate malignant from benign breast lesions using limited breast ultrasound data. The main uniqueness of this framework includes: (1) in terms of the unique shape features of breast lesions, two types of image patches are designed to fine-tune pre-trained models, aiming to characterize the overall appearance and heterogeneity in shapes of breast lesions. (2) taking the BI-RADS regression task as an auxiliary task, a multi-task architecture is proposed to improve the accuracy of classification. (3) instead of prevalent cross-entropy loss, we introduce training with confusion by means of regularizing prediction entropy to prevent overfitting. Extensive experimental results on small-scale breast ultrasound dataset corroborate that the proposed framework is superior to the state-of-the-art approaches in breast lesions classification with limited data. Besides, we provide detailed analysis of the choice of regularizing parameter and visual evidence that introduction of confusion leads to increase in feature generalization.</p>
MG021 13:15-13:30	<p>Improved Method of Detecting Bowel Sounds For Automatic Long Analysis Under Noisy Environments</p> <p>Yoshiyuki Yamada and Osamu Sakata Tokyo University of Science, Japan</p> <p>Abstract: Humans eat and digest food among different tracts around their body for survival. Once a meal is ingested, it passes through the esophagus, stomach, and small intestine. The</p>

Abstract

November 16-18, 2018

	<p>small intestine absorbs nutrition earnestly. It performs a peristaltic motion to pass down the contents, which are known to produce characteristic sounds, called “bowel sounds.” The frequency of small intestine’s movement correlates to the number of sounds it makes; therefore, the “bowel sounds” in the medical field are mostly used to diagnose intestinal obstruction or to nurse bedridden patients. In today’s medical field, a doctor uses a stethoscope for a period to diagnose patient. However, this method relies much on the experience and intuition, and it is difficult for a long-time testing. It is very important to provide optimum nutritional quantity at the right time to a bedridden patient in the intensive care unit (ICU). This is because providing nutrition very late or even a gram more than required may cause malnutrition or indigestion. Therefore, by using a small microphone, the progression of the number of bowel sounds per unit time can be monitored automatically; this has succeeded in diagnosing the digestive activity of the small intestines. In this research, we propose a new diagnosis method called “two-step template matching,” in which a computer is used for automatically diagnosing bowel sounds stably in real time even under noisy environments like that of an ICU.</p>
<p>MG023 13:30-13:45</p>	<p>Elapsed time analysis of vascular stenosis by shunt sound using Dynamic Time Warping and Self-Organizing Map Yusaku Ando, Osamu Sakata and Yutaka Suzuki Tokyo University of Science, Japan</p> <p>Abstract: At the end of 2014, the number of Japanese dialysis patients was approximately 320,000, which is increasing every year. Chronic renal failure patients require hemodialysis because the workings of the kidney can't fall and take any more out a toxin in extracorporeal. During hemodialysis, vascular access is needed to secure enough blood. However, vascular access encounters the problem of hemadostenosis. Early detection of stenosis may facilitate long-term use of hemodialysis shunts. The stethoscope auscultation of vascular murmurs can be useful in the assessment of access patency; however, the sensitivity of this diagnostic approach is skill dependent. This study proposes a diagnosis system for assessing the progress of hemodialysis shunt stenosis to detect stenosis at its early stage by using vascular murmurs. The system is based on dynamic time warping (DTW), a self-organizing map (SOM), and a short-time maximum entropy method (STMEM) for data analysis. The SOM based on the spectrum of the blood flow sound obtained by STMEM qualitatively judges whether the blood vessel access of the dialysis patient is normal or abnormal. Moreover, by calculating the dissimilarity of spectrum using DTW, the narrowing of the blood vessel due to the time course of the dialysis patient is analyzed quantitatively. As a result, the degree of change in stenosis due to time course of dialysis patients could be confirmed from the qualitative aspect and the quantitative aspect. At the same time, it turned out that the blood vessel was stenotic even in a serious patient even immediately after surgery.</p>
<p>MG024 13:45-14:00</p>	<p>Tumor state evaluation method using texture analysis based on the information theory for PET images Yuki Koike and Osamu Sakata Tokyo University of Science, Japan</p>

Abstract

November 16-18, 2018

	<p>Abstract: Positron emission tomography (PET) images are often used clinically as they can non-invasively show the accumulation of cancer cells. The standardized uptake value (SUV) is the most common semi-quantitative measurement derived from PET images. However, SUV have some limitations, such as the difficulty of expressing temporal change quantitatively and unifying imaging conditions such as uptake time after medicine administration. Also, the textural features obtained from PET images show the presence of tumors represented by a vague shadow. Although feature analysis of tumors by using SUV have been widely studied, numerical information obtained on tumors from PET images is limited, and thus the wealth of information cannot be utilized. So, parameter to evaluate quantitatively the state of tumor within PET images called texture should be more established. Texture analysis involves various mathematical methods that are applied to quantify the relationships between the grey level intensity value of pixels or voxels and their spatial pattern within PET images, and are used for classification and discrimination.</p> <p>In this study, we propose texture analysis statistically, specifically by using Shannon's information entropy and Kullback-Leibler divergence. We verified our method by using a simulation, and quantified the distribution inside a tumor. We also examined clinical data in the same way; however, as no appropriate evaluation result was obtained, there is room for further improvement of this system.</p>
<p>MG019 14:00-14:15</p>	<p style="text-align: center;">Evaluation of Swallowing Capacity Based on Esophageal and Bolus Movements by Ultrasound Video Processing</p> <p style="text-align: center;">Yutaka Suzuki, Osamu Sakata, Morimasa Tanimoto, Kyosuke Hatsushika, Keisuke Masuyama and Masayuki Morisawa University of Yamanashi, Japan</p> <p>Abstract: Thickening agents are commonly used to prevent aspiration, a condition that can prove fatal in the elderly. However, no established indicators exist that show the extent to which sticky food reduces the risk of aspiration. VideoEndoscopy (VE) and VideoFluorography (VF) are the classic inspection methods used for evaluating the function of swallowing, but they are both have limited utility in that they are invasive. In this study, we propose a non-invasive method that exploits esophagus ultrasound videos to estimate the internal flow characteristics of foods, and facilitates quantitative evaluation of the swallowing function. The method combines optical flow with Maximally Stable Extremal Regions (MSER) to extract the movement velocity and position of the esophagus and bolus. The results suggest that movement velocity could be used as an indicator to quantify the internal flow characteristics of foods. The displacement of the esophagus indicates the esophageal opening and could be used as an indicator to evaluate swallowing.</p>
<p>MG202 14:15-14:30</p>	<p style="text-align: center;">A Novel Device for Safe Trocar Insertion in Laparoscopic Surgery Based on the Insertion Force Characteristics</p> <p style="text-align: center;">Junpeng Sun and Kotaro Tadano Tokyo Institute of Technology, Japan</p> <p>Abstract: Overshooting of trocar insertion in laparoscopic surgery has been extensively cited as a major cause of surgical injuries. Besides, the complexity and large insertion force of the current handheld insertion method also increase the risk of overshooting and difficulty for</p>

Abstract

November 16-18, 2018

	<p>novices or female operators. Hence, we developed this trocar insertion device to make trocar insertion easier and safer. The device is designed easy to handle and trocar-assembling. And we used negative pressure and pneumatic cylinders to lift the abdominal wall and two motors to drive the trocar insertion. In addition, we interpreted the characteristics of insertion force and proposed an algorithm to detect whether it has penetrated out. With this algorithm the device can stop inserting automatically and immediately. The development of this device realized the automation of trocar insertion. It reduced the demand for operators and improved the safety of this procedure.</p>
MG3003-A 14:30-14:45	<p>A development of the system that has a display to texture of an object for artificial hand user Masayuki Kobayashi and Kazushige Magatani Tokai University, Japan</p> <p>Abstract: The objective of this study is the development of a system that has a display to texture of an object for artificial hand users. Because, in recent years, the number of artificial hand users has increased, while the user do not feel the sense of touch like healthy person using their hand.</p> <p>There are many types of artificial hands which are operated by EMG. Most of them are used some EMG signals that are measured form user's remaining muscle in a forearm. Since there are various muscles for moving the hand and fingers in the forearm, the pattern of EMG generated according to the movement of hand and fingers becomes characteristic with each motion. We have established a method to estimate the movement of the hand and fingers with high accuracy by the EMG obtained from the electrode of 4 channels selected from the multichannel electrode which is attached to the forearm. However, there was a problem that it was impossible to control the force corresponding to motion when executing the operation estimated from EMG patterns. And we have also considered that it is necessary to develop a system which can display the texture of objects for the artificial hand users. Because, it is important for a user of the artificial hand to know the texture of object.</p> <p>In this study, we developed the method that can display texture of an object touched by the user using the vibration in an acoustic speaker. In this method, an infrared LED and a phototransistor are used for sensing the texture of objects. Our developed tactile sensor detects fluctuation of the distance between a phototransistor and a rubber sheet that reflects infrared ray from the LED. This fluctuation of the distance corresponds to the texture of the touched object. Furthermore, output voltage of the tactile sensor is converted to the variation of frequency using a V/F convertor. The developed system is configured to drive an acoustic speaker which is attached on the user's shoulder using this frequency variation. And sense of touching the user is displayed as speaker vibration. From the experiment that used our developed system, we have concluded that our system will be useful for the artificial hand users.</p>
MG1005 14:45-15:00	<p>Investigation of the Effects of Game Difficulty on the Engagement Level of Patient with Brain Injury during Rehabilitation Exercise Chong Li, Tianyu Jia and Linhong Ji Tsinghua University, China</p>

Abstract

November 16-18, 2018

	<p>Abstract: Enhancing engagement of patients with brain injury during rehabilitation exercises are beneficial for recovery. The objective of this paper is to investigate the influence of game difficulty levels of exercise on patient's engagement. Five patients with brain injury were recruited to play a Tetris game using their affected limb in different difficulty levels. During the experiment, the patient's EMG and EEG were monitored to analyze motor and cognitive engagement respectively. The results showed a significant difference in patient's engagement in different difficulty levels. Moreover, a positive correlation was identified between motor engagement and cognitive engagement when the cognitive difficulty of the game increased. The indicators are able to represent the actual engagement level of the patients with brain injury during rehabilitation exercise. Proper difficulty level of the cognitive task is not only beneficial for the patient to engage cognitively but can also promote motor engagement.</p>
<p>MG1008 15:00-15:15</p>	<p style="text-align: center;">Identification of Heroin Addict Pulse Signals Based on Multiwavelet Packet Transform and Support Vector Machine</p> <p style="text-align: center;">Kunbao CAI and Guangtao ZHOU Chongqing University, China</p> <p>Abstract: The multiwavelet packet transform and support vector machine are applied to identifying human pulse signals of heroin addicts. Firstly, using the multiwavelet packet transform based on the multiwavelet and preprocessing presented by pioneers J. S. Geronimo, D. P. Hardin and P. R. Massopust, the pulse signals of 15 heroin addicts and 15 healthy normal subjects are fully decomposed into three levels. Then, using a technique called the coefficient entropy in the feature extraction for pulse signals, two entropy values of selected coefficients on two frequency bands at the third level are calculated for every pulse signal. Every pair of entropy values is then used to form a two-dimensional feature vector. Lastly, applying the technique of support vector machine, 15 heroin addict vectors and 15 healthy subject feature vectors are successfully separated into two classes. The research results show that the method presented in this paper is really effective for identifying the human pulse signals of heroin addicts.</p>
<p>MG047 15:15-15:30</p>	<p style="text-align: center;">Comparing nonlinear features extracted in EEMD for discriminating focal and non-focal EEG signals</p> <p style="text-align: center;">Sedigheh Ghofrani and Hesam Akbari Islamic Azad University, Iran</p> <p>Abstract: Removing the brain part, as the epilepsy source attack, is a surgery solution for those patients who have drug resistant. So, the epilepsy localization area is an essential step before surgery. The Electroencephalogram (EEG) signals of these areas are different and called as focal (F) where the EEG signals of other normal areas are known as non-focal (NF). Visual inspection of multi channels for detecting the F EEG signal is time consuming and along with human error. In this paper, we propose a new method based on ensemble empirical mode decomposition (EEMD) in order to distinguish the F and NF signals. For this purpose, EEG signal is decomposed by EEMD and the corresponding intrinsic mode functions (IMFs) are obtained. Then various nonlinear features including log energy (LE) entropy, Stein's unbiased risk estimate (SURE) entropy, information potential (IP) and centered</p>

Abstract

November 16-18, 2018

	correntropy (CC), are extracted. At the end, the input signal is classified as either F or NF by using support vector machine (SVM). Using nonlinear features, we achieved 89% accuracy in classification with tenfold cross validation strategy.
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Session II- Bioinformatics and Engineering

< November 17, 2018 (Saturday)> Afternoon

Time: 13:00-15:00

Venue: Breakout Room 3

Chair: Dr. Agnieszka Miguel, Seattle University, United States

※Please kindly participate the whole course of the conference to make sure each item sticks to the agenda and runs smoothly.

MG220 13:00-13:15	<p>Quantitative Assessment of Cerebella Ataxia, through Automated Upper Limb functional tests</p> <p>Ragil Krishna, Pubudu N Pathirana, Malcolm Horne, Laura Power and David Szmulewicz Deakin University, Australia</p> <p>Abstract: Neurological disorders typically exhibit movement disabilities and disorders such as cerebellar ataxia (CA) can cause coordination inaccuracies often manifested as disabilities associated with gait, balance and speech. Since the severity assessment of the disorder is based on the expert clinical opinion, it is likely to be subjective. Automated versions of two upper limb tests: Finger to Nose test (FNT) and Diadochokinesia (DDK) test are investigated in this paper. Inertial Measurement Units (IMU) (BioKin™) are employed to capture the disability by measuring limb movements. Translational and rotational accelerations considered as kinematic parameters provided the features relevant to characteristic movements intrinsic to the disability. Principal Component Analysis (PCA) and multi-class Linear Discriminant classifier (LDA) were instrumental in dominant features correlating with the clinical scores. The relationship between clinicians assessment and the objective analysis is examined using Pearson Correlation. This study found that although FNT predominantly consist of translational movements, rotation was the dominant feature while for the case of DDK that predominantly consist of rotational movements, acceleration was the dominant feature. The degree of correlation in each test was also enhanced by combining the features in different tests.</p>
MG218 13:15-13:30	<p>Extraction of Numerical Data from Ophthalmological Images and Building a Glaucoma Prediction Model Based on Machine Learning</p> <p>Insik Jo and Sejong Oh Dankook University, South Korea</p> <p>Abstract: Visual Field (VF), as image data, is the spatial array of visual sensations available to observation in introspectionist psychological experiments. The retina, which surrounds the inner face of the eye, also consists of retinal nerve fiber layer and can be observed with Retina Nerve Fiver Layer (RNFL) Thickness data. They contain data obtained from</p>

Abstract

November 16-18, 2018

	<p>Ophthalmologic diagnostic equipment. VF data is generally used to diagnose disease that occurs symptoms in the optic nerve and retina, such as glaucoma or macular degeneration etc. We should put the image data manually to develop a machine learning based diagnostic model so far. In this paper, we introduce how to extract numerical data we need automatically from images by using Optical Character recognizer(OCR) technology. Furthermore, we increased the recognition rates in this study, adding a function which detects errors on recognized numbers and corrects them. Based on this accumulated data, we built a glaucoma diagnostic model.</p>
<p>MG219 13:30-13:45</p>	<p>Prediction of Autism Spectrum Disorder Based on Imbalanced Resting-state fMRI Data Using Clustering Oversampling Dan Yuan and Huifang Huang Beijing Jiaotong University, China</p> <p>Abstract: Recently resting-state functional magnetic resonance imaging (R-fMRI) has been applied as a powerful tool to explore potential biomarkers of autism spectrum disorder (ASD). However, in clinical data, the number of ASD patients is significantly less than that of typical development (TD) subjects, which causes the production of imbalanced data. When the imbalanced data are used to predict ASD, the prediction results are not satisfactory. To improve the ASD prediction performance of imbalanced data, this paper adopts the clustering oversampling method to enhance the representation for minority class (ASD), expecting to obtain the balanced data distribution. For the imbalanced data after feature selection, the clustering algorithm is used to form a few clusters in the ASD group and in the TD group, respectively, and then new samples for each cluster are generated by synthetic minority oversampling technique (SMOTE) to make the imbalanced data convert into the balanced data. Finally, we construct the linear support vector machine (SVM) classification model for ASD prediction. The prediction accuracy of multi-center imbalanced R-fMRI data increased from 59.70% to 66.62% using hierarchical clustering oversampling. The results of experiment show that the clustering oversampling method can effectively improve the prediction performance of imbalanced R-fMRI data.</p>
<p>MG210 13:45-14:00</p>	<p>Molecular Docking Studies of Arbutin Derivatives as Tyrosinase Inhibitor Yusnita Rifai and Ayu Masyita Hasanuddin University, Indonesia</p> <p>Abstract: Arbutin is a natural skin-whitening agent as a tyrosinase inhibitor. In the development of drugs, such as arbutin derivatives, a simulation of interactions between tyrosinase enzymes as the target proteins with ligands (arbutin derivatives) is required, by using molecular docking simulation method. Preparation of ligands and proteins was performed using AutoDock 4.2. The results show that α-arbutin derivatives (α-arbutin-undecylinate ester and deoxy-α-arbutin) is able to inhibit a tyrosinase.</p>
<p>MG204-A 14:00-14:15</p>	<p>Analysis of lysosomal biological network in mental illness Sheng-An Lee and Kuo-Chuan Huang Kainan University, Taiwan</p> <p>Abstract: Mental illness is a disease of abnormal brain function. The brain area is composed</p>

Abstract

November 16-18, 2018

	<p>of different neurons and is responsible for different functions such as exercising, handling messages, making judgments, and so on. Neurodegenerative diseases, such as dementia and Parkinson's disease, often show neurological symptoms after the patient's nervous system has been extensively damaged. The brain cells do not easily proliferate in large amounts, and if they are damaged, they may cause permanent functional damage. And often delay the golden period of treatment. Mental illness contains many neurodegenerative diseases.</p> <p>The candidate gene databases including SZGene, SZGR2, NeuroDNet Parkinson, PDGene 2012, PDGene 2014, SZDB, and BDGene, as well as Phenopedia database which collect disease genes such as schizophrenia, bipolar disorder and depression match with disease genes in hLGDB database. The result will reveal those genes which the lysosome-related genes interact with mental illness. A total of 9 genes appeared most frequently including CCKAR, GRN, NSF, HLA-DRB1, TSPAN8, PSEN2, PSEN1, HLA-DQB1 and ADRB2. There are a large number of published literature published which were related to mental illness corresponding to the HUGE Phenopedia database. It is intriguing that these selected genes did not found in the SZGR2 database, but there were more publications related to Parkinson's disease. However, lysosome-related literature are reported to be associated with mental disorders in Phenopedia. There might be depicted mechanisms and relationship between lysosomes metabolism and the cause of mental illness. SZGene were published in 2012 when few lysosome genes is reported to be associated with mental illness. Recently, lysosome genes are not quite clearly illustrated when related to mental illness. They deserve more attention for future research.</p> <p>Although the schizophrenic candidate genes in SZGR2 were not included, it is intriguing that there may be the potential relationship between SZGR2 genes and lysosome-related genes. Total 441 proteins of lysosomes are used as the starting protein for the query, then construct the first degree layer of protein interaction networks to find out the linkage between the lysosomal gene and the disease genes collected by SZGR2 in order to illustrate the protein interaction network generated by SZGR2 and lysosomal genes. Most of the candidate genes in SZGR2 are reported as mediators. GNAS, SLC25A11, S100A10, and GNG7 are important intermediate proteins. GNAS has been reported as an important candidate gene for schizophrenia. SLC25A11 in the SLC25 family plays an important role in Italian literature to carry mitochondria to lysosomes. It has shown to be associated with mental illness. It seem that the relationship between lysosomes and mental illness were not revealed yet, however, through the analysis of protein interaction networks, they may depict important regulatory correlations. Further analysis of the various genetic databases will provide more comprehensive and global view in the description of disease mechanism in mental illness, alone with the importance of lysosome metabolism. They could result in detailed illustration and significant revelation of network biology.</p>
MG039 14:15-14:30	<p>What and where you have seen? Bag of Words based Local Feature Pooling for Visual Event Detection</p> <p>Naresh Kumar and Nagarajan Sukavanam Indian Institute of Technology Roorkee, India</p> <p>Abstract: The security analysis of sensitive issues and medical diagnosis are immensely focused to determine exact location of event happening regions. In this paper we propose a</p>

Abstract

November 16-18, 2018

	<p>model of clustering and pooling techniques to local features using Bag-of-Words (BoW) descriptor in SVM framework for event detection in video sequences. The proposed model extracts local features from six categories of Columbia Consumer Video (CCV) event detection benchmark. We developed the clusters of these features using KD-search tree and Lloyds algorithm. The clusters of features is pooled to vectors by using bag of words model. Introducing the inferring temporal instance labelling, the model performed fast for event detection. The significant performance of the research problem can thrilled out the social media by retrieving the best possible content. The proposed model can efficiently perform the experiments of event detection related to big data problem in visual media. Furthermore, the proposed approach in the model is invariant to rotation, translation and scale changes in the video sequence and robust to the illumination and viewpoints.</p>
MG049 14:30-14:45	<p>Improving Performance of Secret Key Generation from Wireless Channel Using Filtering Techniques Mike Yuliana, Wirawan and Suwadi Institut Teknologi Sepuluh Nopember, Indonesia</p> <p>Abstract: Secure communication in a wireless environment is very vital, and cryptographic schemes are usually used to ensure it. Secret keys that are unknown to the tappers are needed by cryptographic schemes to secure communication between two legitimate users. In recent years the secret key generation scheme that utilizes a wireless channel as a secret key generation source has become a very interesting and promising topic. The main problem of this scheme is the high wireless channel mismatch between two users due to nonsimultaneous measurements and noise from the device. In this paper, we proposed a secret key generation scheme that uses the Savitzky-Golay filter method to reduce the high mismatch wireless channel. The scheme that was built was also equipped with a multibit quantization method to increase the speed of generation of secret keys. The results of our tests show a decrease in wireless channel mismatch between two users and an increase in the speed of generation of secret keys.</p>
MG1007 14:45-15:00	<p>Design of Flexible and Wearable Antenna for Wireless and Satellite Based IoT Applications Shahab H. Khan, Liu Tong, Zhang Linbo, Asghar. A. Razzaqi and Bilal A. Khawaja Harbin Engineering University, China</p> <p>Abstract: This paper focuses on the design of flexible and wearable antennas using textile substrates for wireless/satellite based communication and control systems supporting Internet of Things (IoT). The same are based on on-body communication in Wireless body area network (WBANs). The antennas are designed using two different textile substrates i.e. Jeans and Polyester with ϵ_r of 1.7 and 2.8 respectively. The substrates are selected for the ease of wearability and the compact size of the designed antennas. The antennas are designed to operate in the C-Band (4-8 GHz) which is popular for satellite communications. The reason that a higher frequency band is selected is to overcome the congestion issues in the lower satellite frequency bands. Various simulation parameters like bandwidth, reflection coefficient (S11), 2D and 3D radiation patterns, directivity, gain and efficiency of both the antennas are compared and analysed. The maximum achieved gain, bandwidth and</p>

Abstract

November 16-18, 2018

	efficiency are 3.8dBi, 9.8GHz and 88.4 % for jeans substrate antenna and 3.1dBi, 6.7GHz and 77.5% for polyester substrate antenna respectively. The antennas are designed using Agilent Advance Design System simulator.
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Coffee Break <15:30-15:45>

Session III - Computer Vision and Image Processing

< November 17, 2018 (Saturday) > Afternoon

Time: 15:45-18:30

Venue: Lecture Room 1

Chair: Dr. Evelyn Kurniawati, Merry Electronics, Singapore

※Please kindly participate the whole course of the conference to make sure each item sticks to the agenda and runs smoothly.

MG005 15:45-16:00	<p>Digitizing Physical Documents Using Optical Character Recognition Abhinav Kaushal Keshari, Rajat Sharma and Madhav J. Nigam Indian Institute of Technology Roorkee, India</p> <p>Abstract: The need to convert printed text into a computer documented form which can be edited has increased rapidly in recent years which is fulfilled by using Optical Character Recognition (OCR). The challenge is to develop a character recognition mechanism which can convert these scanned images to an electronic mode which will provide the feature to reuse this text, access to every line and word of the document. This paper analyzes the architecture and method used for text recognition in OCR performed by Tesseract and extend this to an application which can transform sources of large number of paper printed documents like magazines, books, newspapers, etc. to an editable electronic format. This paper hence provides an application system that can make digitization of the physical documents faster and better with more accuracy.</p>
MG017 16:00-16:15	<p>Pixel-Level Image Fusion Technique for Multi-Camera Car-Body Painting Defect Images Prapassorn Tantiphanwadi and Prapaisri Sudasna Na Ayudhya Suvarnabhumi Institute of Technology, Thailand</p> <p>Abstract: In automated visual inspection of car-body painting defects, the information quality of defect image is difficult to acquire because of light properties, interference and diffraction. The research, with experimental setup imitating automotive painting production line, acquires some of one light source images taken by 24.2 million pixels digital camera. All images are fused by two pixel-by-pixel fusion methods. Maximum fusion method concerns every pixel in which the pixel, with maximum intensity, is selected.</p>

Abstract

November 16-18, 2018

	<p>Wavelet fusion method, we merge the two images at decomposition level 1, using db2, taking the maximum for approximation and the maximum for detail. The resulted fusion images of both methods are able to provide some painting defects, such as dust, sagging and peel-off, with useful information of shapes and dimensions.</p>
<p>MG018 16:15-16:30</p>	<p>A Comprehensive Study in Ensembling Deep Convolutional Neural Networks for Image Classification Rom Uddamvathanak and Feng Yang Coventry University, Singapore</p> <p>Abstract: Ensemble methods have been broadly used in many applications to integrate individual models for achieving better performance like accuracy and robustness. This paper focuses on using deep Convolutional Neural Networks (CNNs) models and ensembling them for image classification. To have a comprehensive and comparative study, five ensemble techniques are explored and their combinations were applied in a two-stage ensemble process. In detail, multiple basic CNN models (structures) are first pre-defined to increase model variety for the ensemble, from which each basic CNN model is trained multiple rounds based on sub-sampling on the training dataset. In the first stage of ensemble, multiple predictions (through sub-sampling) from each basic CNN structure are combined. This is followed by the second stage of ensemble to integrate the outputs from all basic CNN structures. Experiments were conducted using Kaggle's 'Statoil/C-CORE Iceberg Classifier Challenge' image data for iceberg and ship classification. The experimental results showed that the ensembling CNN models could improve classification accuracy in the image classification problem.</p>
<p>MG020 16:30-16:45</p>	<p>Quantifying peristaltic activity of a small intestine based on tracking of digests in an abdominal B-mode movie Yuichiro Iida, Osama Sakata and Yutaka Suzuki Tokyo University of Science, Japan</p> <p>Abstract: This paper proposes a new food-evaluation technique based on biological information of the human body. Innovating a new food evaluation technique based on biological information can allow us to develop high-valued food products on the occasion of food design. We particularly focus on a small intestine and assume that the digestive activity varies depending on an individual constitution, health condition and compatibility between an individual and a food. This method can track digests in a small intestine and determine their status by using an ultrasound B-mode movie. We acquire peristaltic activity of a small intestine using frame subtraction method and determine their status using optical flow. This allows quantifying peristaltic activity of a small intestine based on tracking of digests in an abdominal B-mode movie.</p>
<p>MG026 16:45-17:00</p>	<p>Identifying Individual Snow Leopards from Camera Trap Images Agnieszka Miguel, Rana Bayrakçismith, Eddy Ferre, Chleo Bales-Heisterkamp, Joshua Beard, Matt Dioso, David Grob, Ross Hartley, Tim Nguyen and Noah Weller Seattle University, United States</p> <p>Abstract: Conservation biologists use camera traps to study snow leopards. In this research,</p>

Abstract

November 16-18, 2018

	<p>we introduce a method that streamlines the process of recognizing individual snow leopards in a large camera trap study. The proposed solution is based on an open-source software called HotSpotter, which was originally developed to identify uniquely patterned animals, such as Grevy's zebras. The legacy HotSpotter involves time-consuming tasks such as manual selection of a region of interest (ROI) within each image, manual querying of each individual image against a database, and manual interpretation of results of each query to arrive at an estimate of a population count in a camera trap study. We introduce autonomous selection of multiple ROIs in motion templates corresponding to camera trap images, automate the query process, and propose a method to build associations between individual ROIs based on clustering of similarity scores using Markov Clustering Algorithm. The proposed technique with its promising results of correctly recognizing individual snow leopards has the potential to save conservation biologists thousands of hours of manual labor.</p>
<p>MG029 17:00-17:15</p>	<p style="text-align: center;">An Improvement Approach for Pixel-based Illumination Estimation Algorithms Chunxiao Li and Jiangming Kan Beijing Forestry University, China</p> <p>Abstract: Illumination estimation algorithms are aimed to estimate the scene illumination color when the image was taken, which is a significant way to achieve color constancy. They can be divided into three categories: pixel-based algorithms, learning-based algorithms and combination algorithms. Compared with other two kinds of illumination estimation algorithms, pixel-based algorithms are relatively poorly performing. In this paper, we add a L0-norm smoothing preprocessing to pixel-based algorithms to improve the performance. The L0-norm smoothing can suppress insignificant details and maintain major edges of an image. Experimental results show that our optimization approach is effective to enhance the performance of pixel-based algorithms.</p>
<p>MG022 17:15-17:30</p>	<p style="text-align: center;">Development of tracking system of moving specific person - Following welfare assist robot production - Shuhei Takiguchi and Osamu Sakata Tokyo University of Science, Japan</p> <p>Abstract: Recently, the robot industry has seen considerable amount of development in a wide range of robots, including pet robots and nursing care robots. However, robots that track and support specific people under all circumstances have not yet been developed. This paper proposes to create a welfare robot that tracks a specific person and provides him/her with personal care. In this research, we treated tracking systems to recognize and follow the targeted person. And compared with two trackers, KCF was more versatile than particle filter. However, since KCF also weakens the precision with shielding objects, we try to combine the detection equation of the particle filter, and try to take measures such as expanding the detection area when the target person is lost.</p>
<p>MG1001 17:30-17:45</p>	<p style="text-align: center;">Standardization of the central console in Police vehicles Piotr ŁUKA and Andrzej URBAN Police Academy in Szczytno, Poland</p> <p>Abstract: The article was written in the framework of the project entitled "Development of</p>

Abstract

November 16-18, 2018

	<p>Police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT system and control devices of special purpose signals” DOB-BIO7/04/02/2015 with the value of PLN 4 058 789, co-funded by the National Centre for Research and Development under the contest 7/2015.</p>
<p>MG048 17:45-18:00</p>	<p style="text-align: center;">Local Binary Pattern Based on Image Gradient for Bark Image Classification Tuan Le-Viet and Vinh Truong Hoang Ho Chi Minh City Open University, Vietnam</p> <p>Abstract: In this work, we present a discriminative and effective local texture descriptor for bark image classification. The proposed descriptor is based on three factors, namely, pixel, magnitude and direction value. Unlike most other descriptors based on original local binary pattern, the proposed descriptor is conducted the changing of local texture of bark image. The performance of the proposed descriptor is evaluated on three benchmark datasets. The experimental results show that our approach is highly effective.</p>
<p>MG044 18:00-18:15</p>	<p style="text-align: center;">Generation method of 3D Terrain Object with VWorld data Ahyun Lee and In Sung Jang Electronics and Telecommunications Research Institute, South Korea</p> <p>Abstract: The VWorld Data Center of South Korea provides the latest high-definition 3D national spatial information. In this paper, we propose a 3D terrain object generation method using VWorld data. A tile-based 3D map has gap problems when elevation change is large like mountainous terrain. Since different level tiles are adjacent to each other, the elevation of boundary of tiles does not match, resulting in empty space or the border area are exposed between tiles. Our proposed method considering the characteristics of tiles provided by VWorld Data Center enable to minimize gaps between tiles. We enable to minimize gap problems by making the size of the outer cell equal to the adjacent high-level tile. We describe the 3D terrain generation method and experimental results. The proposed method could be used on other tile-based 3D map platforms.</p>
<p>MG046 18:15-18:30</p>	<p style="text-align: center;">Rate Allocation with Near-optimal Rate-distortion Performance for JPEG-LS Shigao Li Wuhan Polytechnic University, China</p> <p>Abstract: Due to performance and low complexity, JPEG-LS become the standard of lossless and near-lossless image compression. However, it can't accurately control code rate when it is applied in near-lossless compression. This paper is thus devoted to rate control for near-lossless image compression with JPEG-LS. A model of coding bit-rate under a high bit-rate with respect to mean absolute difference (MAD) and coding quantization parameters for prediction coding is first proposed. Then a rate control method for near-lossless compression is designed based on the model for JPEG-LS. In the process of a specific image coding, to control the bit-rate, quantitative parameters are adjusted piecewise based on the model. Experiments show that the proposed method can make final code rate close to a preset rate. It's different from other methods that quantitative parameter fluctuating within a wide range can be avoided because of the accurate model of bit-rate. As a result, the proposed control method can achieve approximate optimal rate-distortion performance.</p>

Session IV- Signal Analysis and Processing

< November 17, 2018 (Saturday)> Afternoon

Time: 15:45-18:15

Venue: Breakout Room 3

Chair: Prof. Robert Minasian, The University of Sydney, Australia

※Please kindly participate the whole course of the conference to make sure each item sticks to the agenda and runs smoothly.

<p>MG015 15:45-16:00</p>	<p>Joint Code Acquisition and Doppler Shift Estimation Method for DSSS-MSK Signal Xie Renhong, Wang Bingxiu and Qiu Wen Nanjing University of Science and Technology, China</p> <p>Abstract: Acquisition of Direct Sequence Spread Spectrum-Minimum Shift Keying (DSSS-MSK) signal in low signal to noise (SNR) and high dynamic environment will impact the overall performance of the receiving system seriously. The proposed all-digital IF receiver has a serial structure, transforming the DSSS-MSK signal into approximating DSSS-BPSK signal using the matched filter. The matched filter is designed according to the known frequency response based on convex optimization. Then, the signals are regrouped by spreading code period. Finally, combining Doppler frequency shift compensation with the parallel code acquisition algorithm based on FFT, the PN code phase difference and Doppler frequency shift are captured simultaneously. Simulation results show that the proposed algorithm has 7dB and 8dB SNR improvement than delay correlation method and ML-FFT method respectively. Furthermore, the proposed algorithm has quick acquisition rate, wide acquisition range, high acquisition accuracy, low complexity and is suitable for low SNR environment.</p>
<p>MG016 16:00-16:15</p>	<p>Interception of LFM Signal Based on Analog-to-Information Conversion Zeng Xiaodong The 10th Research Institute of China Electronics Technology Group, China</p> <p>Abstract: Compressive sensing (CS) theory enables direct analog-to-information conversion (AIC) of wideband analog signals at sub Nyquist sampling rates. In many applications, sampling at the Nyquist rate is inefficient because the signal may be sparse. The sparse signal contains only a few significant components. This paper describes a type of analog-to-information scheme which consists of demodulation, filtering and uniform sampling. Based on the scheme, the sine and linear frequency modulation (LFM) signals can be rebuilt and the results show that the AIC scheme would alleviate the problem of high sampling rate. The signal can accurately be rebuilt when it is sampled at a 0.2 sub-sampling factor.</p>

Abstract

November 16-18, 2018

<p>MG032 16:15-16:30</p>	<p>Bayesian parameter estimation of Euler-Bernoulli beams Iman Tabatabaei Ardekani, Hamid Sharifzadeh, Jari Kaipio and Neda Sakhaee The University of Auckland, Auckland, New Zealand</p> <p>Abstract: This paper develops a statistical signal processing algorithm for parameter estimation of Euler-Bernoulli beams from limited and noisy measurement. The original problem is split into two reduced-order sub-problems coupled by a linear equation. The first sub-problem is cast as an inverse problem and solved by using Bayesian approximation error analysis. The second sub-problem is cast as a forward problem and solved by using the finite element technique. An optimal solution to the original problem is then obtained by coupling the solutions to the two sub-problems. Finally, a statistical signal processing algorithm for adaptive estimation of the optimal solution is developed. Computer simulation shows the effectiveness of the proposed algorithm.</p>
<p>MG033 16:30-16:45</p>	<p>Frequency-doubling microwave signal generation with tunable phase shift based on DP-QPSK modulator Conghui Zhang, Xinjing Qiu, Caili Gong, Yongfeng Wei and Xinlu Gao Inner Mongolia University, China</p> <p>Abstract: A novel system for frequency-doubling microwave signal generation with tunable phase shift based on a dual-polarization quadrature phase shift keying (DP-QPSK) modulator which includes two dual-parallel Mach-Zehnder modulators (DPMZM) is proposed and demonstrated. The radio frequency (RF) signals drive the top DPMZM for generating a negative first-order RF sideband on the X-polarization state and drive the bottom DPMZM to obtain a positive first-order RF sideband on the Y-polarization state. After that, the two first-order sidebands enter a three wave-plates polarization controller (PC) of half-quarter-quarter (HQQ) wave plate type and then their phases are controlled. After a polarizer and a photodiode (PD), a frequency-doubling microwave or millimeter-wave signal with tunable phase shift is produced. The results indicate a full 360-degree phase shift is realized, in the meantime, the phase deviation is less than 1-degree and amplitude deviation is no more than 0.3dB.</p>
<p>MG034 16:45-17:00</p>	<p>A novel adaptive active noise control algorithm based on Tikhonov regularisation Iman Ardekani, Neda Sakhaee, Hamid Sharifzadeh, Bashar Barmada and Gerard Lovell The University of Auckland, Auckland, New Zealand</p> <p>Abstract: This paper proposes a novel adaptive active noise control algorithm based on Tikhonov regularization theory. A regularized cost function consisting of the weighted sum of the most recent samples of the residual noise and its derivative is defined. By setting the gradient vector of the cost function to zero, an optimal solution for the control parameters is obtained. Based on the proposed optimal solution, a computationally efficient algorithm for adaptive adjustment of the control parameters is developed. It is shown that the regularized affine projection algorithm can be considered as a very special case of the proposed algorithm. Different computer simulation experiments show the validity and efficiency of the proposed algorithm.</p>

Abstract

November 16-18, 2018

<p>MG030 17:00-17:15</p>	<p style="text-align: center;">Combination of GMM-UBM and DTW for Voice Command Authentication System Evelyn Kurniawati and Sasiraj Somarajan Merry Electronics, Singapore</p> <p>Abstract: In this paper, we present a combination of statistical and template based pattern matching to solve the problem of authentication with very short command words. Same features are used in both methods to reduce the computational weight. The first method uses GMM-UBM (Gaussian Mixture Model with Universal Background Model) which is well known in speaker recognition field, but lacks the ability to model the temporal aspect of speech. The second method provides a remedy for this, with the classical DTW (Dynamic Time Warping) on the cepstrum features. Two scheme of combining the model is explored; firstly with layer design when DTW distance is calculated only if GMM-UBM accepts the speaker, and secondly by weighting the DTW distance using the confidence of GMM-UBM result. With this combination, a 23% and 17% improvement in EER was observed respectively, each with differing characteristics on 3 different error types that is investigated. The experiment was conducted on evaluation set of RSR2015 database part 2, which contains short words meant for command and control task. Performance analysis is done using Detection Error Tradeoff curve (DET) and Equal Error Rate (EER).</p>
<p>MG009 17:15-17:30</p>	<p style="text-align: center;">Design of Ultra-low Sidelobe Pulse Compression Filter for LFM Signal Xie Renhong and Qiao Shuai Nanjing University of Science and Technology, China</p> <p>Abstract: In this paper, a newly-designed method of ultra-low sidelobe pulse compression filter for linear frequency modulation (LFM) signal is proposed. In the conventional processing of pulse compression, there exists the problem that the ratio of mainlobe to sidelobe is too low. In order to solve this problem, the convex optimization method is used to design the coefficient of the pulse compression filter, and the ratio of mainlobe to sidelobe of the pulse compression output could achieve 60dB or more to be applied in specific engineering applications.</p>
<p>MG014 17:30-17:45</p>	<p style="text-align: center;">Effect of Channel Mismatch on the Performance of the Space-Time-Polarization Array Processing for GNSS Receivers Haiyang Wang, Zhiliang Fan and Zhicheng Yao Xi'an Institute of High Technology, China</p> <p>Abstract: Under the situation of ideal channel characteristics, the space-time-polarization processing (STPAP) technique can mitigate interferences effectively in the space domain, time domain and polarization domain. However, channel mismatch is inevitable in practice, which will cause the amplitude and phase error. In the current work, the effect of channel mismatch on the performance of the STPAP is investigated. Firstly, the STPAP architecture and the channel mismatch model are established. Then, the received signal model under the situation of no channel mismatch is put forward. After that, a novel channel mismatch model for GNSS signals is proposed, based on which the received signal model under the situation of channel mismatch is presented. Furthermore, the effect of channel mismatch on the performance of the STPAP is analyzed in theory. Finally, simulation results indicate that</p>

Abstract

November 16-18, 2018

	channel mismatch can greatly degrade the performance of the STPAP.
MG037 17:45-18:00	<p>Is Combining Efficiency a proper Performance Evaluation Criterion for Antenna Arraying? Chaowei Duan, Yafeng Zhan and Qian Kong Tsinghua University, China</p> <p>Abstract: Antenna arraying is widely implemented for deep space applications currently. A number of combining algorithms have been proposed for antenna array systems, where the difference of carrier frequency, delay and carrier phase between the received signals from different antennas, are estimated and compensated. The performance of these combining algorithms is evaluated using combining efficiency which is directly related to the signal-to-noise ratio (SNR) of the received signal from each antenna and the combined signal. However, the ultimate goal of antenna arraying is to obtain a better bit error rate (BER) performance. In this paper, the impact of signal alignment error, i.e. carrier frequency estimation error, delay estimation error and carrier phase estimation error, on the combining efficiency and the BER of the combined signal are analyzed. Computer simulations proved that positive combining efficiency doesn't guarantee better BER performance. As a result, combining efficiency may not be a proper performance evaluation criterion for antenna arraying.</p>
MG031 18:00-18:15	<p>Deception jamming against Bi-ISAR imaging with VFM waveform via sub-Nyquist sampling Jiyuan Chen, Xiaoyi Pan, Zhaoyu Gu, Qianpeng Xie and Shunping Xiao National University of Defense Technology, China</p> <p>Abstract: Sub-Nyquist sampling jamming has become a common means in ISAR countermeasure to generate multi- false target images. In this paper, sub-Nyquist sampling jamming against bistatic ISAR with V-style modulation (V-FM) signal imaging is presented. The jamming signals, which are formed by the intercepted radar signals under the sub-Nyquist sampling theorem and scattered by moving targets, are collected to achieve high resolution range profile (HRRP) by dual-channel dechirping and take Fourier transform to obtain final false target images, analyze the influence of imaging results by sub-Nyquist sampling rate and bistatic angle. Simulated trails are used to validate the correctness of the analyses and the finally well-focused false-target images greatly support the effectiveness of the sub-Nyquist sampling idea in the countermeasures of VFM Bi-ISAR.</p>



Dinner @ Cosmo <18:30-20:30>

Please take your dinner coupon with you.

<h2>Poster Session</h2> <p>< November 17, 2018 (Saturday) > afternoon Time: 15:00-15:30 Place : Breakout Room 3</p>	
MG003	<p style="text-align: center;">Radio Individual Identification Based on Semi-Supervised Rectangular Network Yingke Lei National University of Defense Technology, China</p> <p>Abstract: Small sample condition of communication radio signal caused the poorness of individual recognition on radios. To solve this problem, a method about communication radio individual identification based on semi-supervised rectangular network was proposed innovatively. Firstly, the square integral bispectrum feature was extracted from radio signal and then was artificially injected Gaussian noise to be corrupted. The corrupted sample was passed to the encoder of semi-supervised rectangular network for supervised training. The trained parameterization was then mirrored to decoder through the lateral connection across the model. And the output was forced by decoder through unsupervised learning to be closely to the clean input. While the optimal parameters was obtained by minimizing cost function of full network, the essential feature extracted was referred as the individual feature of radio signals. Individual recognition was finally accomplished by a softmax classifier. The robustness of the method proposed was verified on several radio datasets collected in actual environment. And experiment results indicated that the method has superior performance on identifying radio individuals with the same types under small sample condition.</p>
MG013	<p style="text-align: center;">Applications of the human-computer interaction interface to MOBA mobile games Tao Ding and Duanzhen Zhu Huazhong University of Science and Technology, China</p> <p>Abstract: The purpose of this research is to explore interactive design approaches for MOBA (multiplayer online battle arena) mobile games based on user experience. Interactive design cases of MOBA games are adopted as the basic information. The close connection between the flow theory and the game motivation is combined to study specific needs of MOBA mobile game players. According to the design principle of the mobile terminal and the characteristics of MOBA games, four interactive design approaches, including improvement of the gesture operation efficiency, strengthening of the process experience, emotional arousal, and objective orientation and flexible feedback, are proposed. By providing players with the optimal user experience, this research attempts to come up interactive design approaches which can improve user experience of MOBA mobile games.</p>
MG036	<p style="text-align: center;">Principal Polynomial Features Based Broad Learning System Fan Yang Taiyuan University of Science and Technology, China</p> <p>Abstract: Broad Learning System (BLS) offers an alternative way of machine learning in deep</p>

Abstract

November 16-18, 2018

	<p>structure. BLS is established based on the idea of the random vector function-link neural network (RVFLNN) which eliminates the drawback of long training process and also provides the generalization capability in function approximation. In this paper, a principal polynomial features based broad learning system (PPFBS) is proposed. In this method, the principal component analysis (PCA) is used for feature dimensionality reduction. The candidate features of degree d are constructed by the principal features of degree one and the principal features of degree $d-1$. The enhancement features of degree d is extracted by applying PCA on the candidate features of degree d. Ridge regression learning using the concatenated features of each degree are applied for pattern classification. Parameters in the feature extraction stage are optimized by PCA which is different with randomly initialization adopted by BLS and RVFLNN. Experimental results on the MNIST handwritten digits recognition data set and the NYU NORB object recognition data set demonstrate the effectiveness of the proposed method.</p>
<p>MG3001</p>	<p style="text-align: center;">Comparative Study on Does Energy Drink and Smoking effects on the Reaction time Mashal Fatima, Aimen Malik, Seerat Fatima, Muhammad Shafique Riphah International University, I-14 campus, Islamabad, Pakistan</p> <p>Abstract: Reaction time is the time delay between the sensory stimulus and initiation of a motor response to a stimulus. Reaction time provides the information about the cognitive performance under certain conditions .In this paper energy drink and nicotine effects on the reaction time are investigated. This study is designed to acquire reaction/ response time from young adults whom consumes energy drinks and smokes frequently. Chemicals like nicotine, caffeine, taurine and glucose affects our brain in the way that these chemicals act to decrease the reaction time and improve cognitive performance and motor response. Using means of Delta Time as features and through statistical analysis it is concluded that there is difference in response time but not significant enough ($p > 0.05$). After consumption the reaction time decreases slightly which cannot be considered significant to influence brain activity.</p>

Listeners

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