2017 HONG KONG CONFERENCE ABSTRACT

April 21-23, 2017

The City View Hotel

Hong Kong

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2017 Hong Kong Conference Introductions

Welcome to 2017 Hong Kong conference. The objective of the Hong Kong conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Biomedical Engineering and Technology, Biometrics Engineering and Application.

2017 7th International Conference on Biomedical Engineering and Technology (ICBET 2017)

Papers will be published in one of the following journals:

International Journal of Pharma Medicine and Biological Sciences (IJPMBS, ISSN: 2278-5221). Included in the Engineering & Technology Digital Library, and indexed by Embase (Under elsevier), ProQuest, Google Scholar, Chemical Abstracts Services (CAS), Indian Science, ICMJE(International Committee Medical Journal Editors), HINARI(World Health Organization), and NYU(Health Sciences Library);
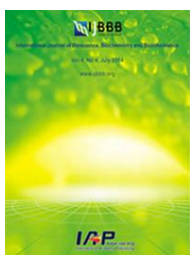
International Journal of Bioscience, Biochemistry and Bioinformatics (IJBBB, ISSN: 2010-3638). Included in the Engineering & Technology Digital Library, and indexed by WorldCat, Google Scholar,Cross ref, ProQuest;

Conference website and email: http://www.icbet.org/; icbet@cbees.org

2017 International Conference on Biometrics Engineering and Application (ICBEA 2017)

Papers will be published in the following conference proceedings:

International Conference Proceedings Series by ACM. Archived in the ACM Digital Library, and indexed by Ei Compendex and submitted to be reviewed by Scopus and Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

Conference website and email: http://www.icbea.org/; icbea@cbees.net

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about **12** Minutes of Presentation and **3** Minutes of Question and Answer
Keynote Speech: about **35** Minutes of Presentation and **5** Minutes of Question and Answer
Plenary Speech: about **25** Minutes of Presentation and **5** Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Oral Presentation will be selected from each presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on April 22, 2017.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Assoc. Prof. Gautam Sethi

Department of Pharmacology, National University of Singapore, Singapore

EDUCATION/TRAINING

B. S. 1998 Banaras Hindu University, Varanasi, India Chemistry (Honours)

M. S. 2000 Banaras Hindu University, Varanasi, India Biochemistry

Ph.D 2004 Banaras Hindu University, Varanasi, India Biotechnology

PDF 2004-07 UTMDACC Houston, Texas, USA. Cancer biology.

Asst Prof. 2008-14 National University of Singapore Pharmacology

Associate Prof. 2014- Now National University of Singapore

POSITIONS AND EMPLOYMENT

Sept. 2000 to Aug. 2002 Junior Research Fellow, School of Biotechnology, Banaras Hindu University, Varanasi, India.

Sept. 2002 to March 2004 Senior Research Fellow, School of Biotechnology, Banaras Hindu University, Varanasi, India

2004-2007 Postdoctoral Fellow, The University of Texas MD Anderson Cancer Center.

2008-2014 Assistant Professor, Dept. of Pharmacology, NUS.

2014-Now Associate Professor with tenure, Dept. of Pharmacology, NUS.

Topic: "*Targeting Transcription Factor STAT3 for Prostate Cancer Therapy*"

Abstract—STATs comprise a family of cytoplasmic transcription factors that transmit signals, mediate intracellular signaling usually generated at cell surface receptors and transmitted to the nucleus. Numerous studies have demonstrated constitutive activation of STAT3 in a wide variety of human tumors, including blood malignancies (leukemias, lymphomas, and multiple myeloma) as well as solid tissues (such as head and neck, breast, lung, gastric, hepatocellular and prostate cancers). There is a strong evidence to suggest that aberrant STAT3 signaling promotes development and progression of prostate cancer by either inhibiting apoptosis or inducing cell proliferation, angiogenesis, invasion, and metastasis. However, the development of novel drugs for the targeting STAT3 that is both safe and efficacious remains an important scientific and clinical challenge. We will present the data that shows that novel small molecule inhibitors of STAT3/JAK2 pathway can suppress the expression of genes involved in prostate cancer initiation, and promotion both *in vitro* and *in vivo*.

Keynote Speaker II

Prof. Chiharu Ishii
Hosei University, Japan

Prof. Chiharu Ishii received his PhD in Mechanical Engineering from Sophia University, Japan in 1997. From 2002 to 2009, he was an Assistant Professor with Kogakuin University. Currently, he is a Professor at the Department of Mechanical Engineering, Hosei University, Japan. His research interests are in medical robotics, assistive technology and robust control. He is a member of JSME, SICE, RSJ, IEEJ and IEEE.

Topic: "*Medical and Assistive Devices Developed for Aging Society*"

Abstract—Japan is going towards unprecedented ageing society, and facing a serious problem of population aging. The percentage of elderly people of age 65 years or over (aging ratio) is 26.0% in 2015, and it is forecasted that the aging ratio becomes 33.4% in 2035. In this way, Japan has reached a super-aged society which no country in the world has experienced. Becoming the super-aged society, it is necessary to respond to the demand of medical care and nursing of elderly people. One of the solutions to this problem is an application of the Robot Technology (RT). In this talk, some medical and assistive devices developed in my laboratory with application of RT are mentioned.

The robotic surgical system for single-port-surgery "HASROSS", the lightweight power assist suit "Cool Vest" to reduce care giver's burden in transfer work, control system of the electric wheelchair based on user's biosignals, such as EMG, EOG and EEG, and sensory feedback device for myoelectric prosthetic hand, are introduced.

Keynote Speaker III

Prof. Yuan-Ting Zhang
The Key Lab for Health Informatics of Chinese Academy of Sciences, China

Prof. Yuan-Ting Zhang is the Director of Joint Research Center for Biomedical Engineering, Founding Head of the Division of Biomedical Engineering, and Professor of Department of Electronic Engineering at the Chinese University of Hong Kong. Dr. Zhang serves concurrently the Director of the Key Lab for Health Informatics of the Chinese Academy of Sciences (HICAS). His research spans several fields including wearable medical devices, body sensor networks, bio-THz technologies, bio-modeling, neural engineering, cardiovascular health informatics, and e-p-m-Heath and telemedicine technologies, and is closely tied up to his teaching and publishing activities. He has authored/co-authored over 400 scientific publications and 11 book chapters, and filed 31 patents. His research work has won him a number of Awards including the best journal paper awards from IEEE-EMBS and the Asia Pacific ICTA e-Health Award. Dr. Zhang provided extensively professional services of significant value to the local industries and global academic communities. He served as Associate Editor of IEEE Transactions on Biomedical Engineering, founding Associate Editor of IEEE Transactions on Mobile Computing, Guest Editor for IEEE Transactions on Information Technology in Biomedicine, and Guest Editor for IEEE Communication Magazine. He was previously the Vice-President of the IEEE-EMBS. He served as the Technical Program Chair and the General Conference Chair of the 20th and 27th IEEE-EMBS Annual International Conferences in 1998 and 2005, respectively. He was a member of IEEE Fellow Elevation Committee and the Award Committee for IEEE Medal on Innovations in Healthcare Technology.

Topic: "*Cardiovascular Health Informatics: Wearable MINDS*"

Abstract—This talk will discuss the miniaturization, intelligence, network, digitization, and standardization (MINDS) design of wearable devices. The focus will be placed on its convergence with unobtrusive sensing and imaging for cardiovascular health informatics in general and for the prediction of acute cardiovascular diseases in particular. Using the atherosclerotic plaque assessment and wearable cuffless blood pressure estimation as application examples, this talk will attempt to illustrate that the health informatics approaches should allow the practice of 8-Ps health that is precise, pervasive, predictive, preventive, personalized, participatory, preemptive, and patient-centralized.

Plenary Speaker I

Prof. Yasushi Yagi
Osaka University, Japan

Yasushi Yagi is the Executive Vice President of Osaka University in 2015. He received his Ph.D. degree from Osaka University in 1991. In 1985, he joined the Product Development Laboratory, Mitsubishi Electric Corporation, where he worked on robotics and inspections. He became a research associate at Osaka University in 1990, a lecturer in 1993, an associate professor in 1996, and a professor in 2003. He was the director of the Institute of Scientific and Industrial Research at Osaka University from 2012 to 2015.

The studies in his laboratory focus on computer vision and media processing including basic technologies such as sensor design, and applications such as an intelligent system with visual processing functions. Some of our major research projects are: the development of a novel vision sensors such as an omnidirectional catadioptric system; biomedical image processing such as endoscope and microscope images; person authentication, intention, and emotion estimation from human gait, and its applications to forensic and medical fields; photometry analysis and its application to computer graphics; an anticrime system using a wearable camera; and 3D shape and human measurement using infrared light.

He is a member of the Editorial Board of the International Journal of Computer Vision, the Editor-in-Chief of IPSJ Transactions on Computer Vision & Applications and the Vice-President of the Asian Federation of Computer Vision Societies. He is a fellow of IPSJ and a member of IEICE, RSJ, and IEEE.

Topic: "*Gait Video Analysis for Criminal Investigation*"

Abstract—We have been studying human gait analysis for more than 10 years. Because everyone's walking style is unique, human gait is a prime candidate for person authentication tasks. Our gait analysis technologies are now being used in real criminal investigations. We have constructed a large-scale gait database, and proposed several methods of gait analysis. The appearances of gait patterns are influenced by changes in viewpoint, walking direction, speed, clothes, and shoes. To overcome these problems, we have proposed several approaches using a part-based method, an appearance-based view transformation model, a periodic temporal super resolution method, a manifold-based method and score-level fusion. We show the efficiency of our approaches by evaluating them with our large gait database.

Plenary Speaker II

Prof. Raymond Veldhuis
University of Twente, The Netherlands

Prof. Raymond Veldhuis graduated from The University of Twente, The Netherlands in 1981. From 1982 until 1992 he worked as a researcher at Philips Research Laboratories in Eindhoven in various areas of digital signal processing. In 1988, he received the PhD degree from Nijmegen University on a thesis entitled Adaptive Restoration of Lost Samples in Discrete-Time Signals and Digital Images. From 1992 until 2001 he worked at the IPO (Institute of Perception Research) Eindhoven in the field of speech processing. Raymond Veldhuis is now a full professor in Biometric Pattern recognition at The University of Twente, where he is leading a research group in this field. The main research topics are face recognition (2D and 3D), fingerprint recognition, vascular pattern recognition, multibiometric fusion, and biometric template protection. The research is both applied and fundamental.

Topic: "*Advances in Face-Recognition at a Distance*"

Abstract—During the past decade, automatic facial recognition has become an established biometric recognition technology with applications in, for instance, mobile banking, automatic border control as well as in social media applications. Also in the field of forensic search automatic and semi-automatic face recognition is starting to play an increasingly significant role. However, in this field there are still some challenges due to variations of pose, illumination, and facial expressions as well occlusion, image quality and low resolution. In this presentation, I want to address the challenge of facial recognition for surveillance applications. The typical problem here is the comparison of a high-resolution reference image, for example a mugshot, with a low-resolution trace image taken at some distance, for example found on a surveillance video. I will demonstrate that realistic low-resolution images that are taken at a distance, are not equivalent to low-resolution images obtained by down-sampling higher-resolution images. This implies that in order to improve the recognition performance specific training of classifiers is required, but also that a proper evaluation on realistic low-resolution images is crucial. In the presentation, I will discuss the implications the on design, training and testing of face recognition systems for surveillance applications and propose a mixed-resolution classifier for this purpose. Attention will be paid to the deployment of convolutional neural net based facial recognition systems for mixed-resolutions.

Brief Schedule for Conference

Day 1	**April 21, 2017 (Friday)** **Venue: Hotel Lobby (ground floor)** Arrival Registration 10:00~17:00
Day 2	**April 22, 2017 (Saturday)** 9:00~18:10 **Venue: Diamond Room (5th floor)** Keynote Speech, Plenary Speech and Conference Presentation
	Morning Conference
	Venue: Diamond Room (5th floor) **Opening Remarks** 9:00~9:05 **Keynote Speech I** 9:05~9:45 **Keynote Speech II** 9:45~10:25 **Coffee Break & Group Photo Taking** 10:25~10:50 **Keynote Speech III** 10:50~11:30 **Plenary Speech I** 11:30~12:00
	Lunch 12:00~13:00 **Venue: Amazing (ground floor)**
	Afternoon Conference
	Plenary Speech II 13:00~13:30
	Session 1: 13:30~15:15 **Venue: Diamond Room (5th floor)** 7 presentations-Topic: "Biometrics and Image Processing"
	Coffee Break 15:15~15:40
	Session 2: 15:40~18:10 **Venue: Diamond Room (5th floor)** 10 presentations-Topic: "Biomedical Engineering and Bioinformatics"
	Poster session 9:00~18:10 **Venue: Diamond Room (5th floor)**
	Dinner 18:10 **Venue: Hotel Restaurant**

Tips: Please arrive at the Conference Room 10 minutes before the session begins to upload PPT into the laptop.

Detailed Schedule for Conference

April 21, 2017 (Friday)

Venue: Hotel Lobby (Ground Floor)

10:00~17:00	Arrival and Registration

Note: (1) The registration can also be done at any time during the conference.

(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(3) One Best Oral Presentation will be selected from each oral presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on April 22, 2017.

April 22, 2017 (Saturday)

Venue: Diamond Room (5th floor)

Time		Session
9:00~9:05		**Opening Remarks** Prof. Chiharu Ishii Hosei University, Japan
9:05~9:45		**Keynote Speech I** Assoc. Prof. Gautam Sethi Department of Pharmacology, National University of Singapore, Singapore Topic: *"Targeting Transcription Factor STAT3 for Prostate Cancer Therapy"*
9:45~10:25		**Keynote Speech II** Prof. Chiharu Ishii Hosei University, Japan Topic: *"Medical and Assistive Devices Developed for Aging Society"*
10:25~10:50		**Coffee Break & Group Photo Taking**
10:50~11:30		**Keynote Speech III** Prof. Yuan-Ting Zhang The Key Lab for Health Informatics of Chinese Academy of Sciences, China Topic: *"Cardiovascular Health Informatics: Wearable MINDS"*
11:30~12:00		**Plenary Speech I** Prof. Yasushi Yagi Osaka University, Japan Topic: *"Gait Video Analysis for Criminal Investigation"*
12:00~13:00		**Lunch: Amazing (Ground Floor)**
13:00~13:30		**Plenary Speech II** Prof. Raymond Veldhuis University of Twente, The Netherlands Topic: *"Advances in Face-Recognition at a Distance"*

Let's move to the session!

Session 1

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0003 Presentation 1 (13:30~13:45)

Tamper Resistance Evaluation of PUF Implementation against Machine Learning Attack

Yusuke Nozaki and Masaya Yoshikawa

Meijo University, Japan

Abstract—Recently, the semiconductor counterfeiting has become a serious problem. To counter this problem, Physical Unclonable Function (PUF) has been attracted attention. However, the risk of machine learning attacks for PUF is pointed out. To verify the safety of PUF, the evaluation (tamper resistance) against machine learning attacks in the difference of PUF implementations is very important. However, the tamper resistance evaluation in the difference of PUF implementation has barely been reported. Therefore, this study evaluates the tamper resistance of PUF in the difference of field programmable gate array (FPGA) implementations against machine learning attacks. Experiments using an FPGA clarified the arbiter PUF of the lookup table implementation has the tamper resistance against machine learning attacks.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0005 Presentation 2 (13:45~14:00)

PCA Filter Based Covariance Descriptor for 2.5D Face Recognition

Lee-Ying Chong, Andrew Beng Jin Teoh, and Thian-Song Ong

Multimedia University, Malaysia

Abstract—Region covariance matrix (RCM) as a feature descriptor is shown promising in various object detection and recognition tasks. However, vanilla RCM breaks down in face recognition due to its inadequacy in extracting discriminative features from facial image. In this paper, cascaded Principle Component Analysis (PCA) filter responses that derived from the multi-layer PCA network are leveraged to extract the sufficient discriminative facial feature for RCM construction. The factors that affect the performance of cascaded PCA filter responses in forming RCM for 2.5D face recognition is investigated. To be specific, the influence of patch size and filter numbers of cascaded PCA filter responses to RCM is probed. Besides that, block division is proposed for RCM to further enhance the accuracy performance. Experimental results have demonstrated the efficacy of the proposed approach.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0007 Presentation 3 (14:00~14:15)

Face Template Protection via Random Permutation Maxout Transform

Sejung Cho and Andrew Beng Jin Teoh

School of E&E Engineering, Yonsei University, Korea

Abstract—Face template protection is of great interest nowadays due to the increasing concerns on privacy and security of the face templates stored in the databases. There were many attempts to develop plausible face template protection schemes that can satisfy four design criteria of biometric template protection, namely non-invertibility, cancellability, non-linkability and performance. In this paper, a cancellable face template scheme, namely random permutation maxout (RPM) transform is proposed. The RPM transforms a real-valued face feature vector (template) into a discrete index code as a means of protected form of face template. Such a transform offers two major merits: 1) robustness to noises in numeric values of original face template; and 2) nonlinear embedding based on the implicit order of the data. The former promotes accuracy performance preservation while the latter offers strong non-invertible transformation that leads to hardness in inversion attack. Several experiments based on the AR face database are conducted to observe the RPM transform performance with respect to its various parameters. The analyses justify its resilience to inversion attack as well as satisfy the revocability and non-linkability criteria of cancellable biometrics.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0008 Presentation 4 (14:15~14:30)

Ear Verification Based on a Novel Local Feature Extraction

Ibrahim Omara, Mahmoud Emam, **Mohamed Hammad**, and Wangmeng Zuo

School of Computer Science and Technology, Harbin Institute of Technology (HIT), China

Abstract—Accurate recognition and actual classification of fingerprint are vital and necessary for fingerprint identification. Previous researchers have used many classification algorithms to develop fingerprint classification model, but they still have some certain problems like time of implementation to do the task, cost of implementation, working on non-linear features, working on multi-dimensional features and under or over learning problems. In this paper, a Q-Gaussian multi-class support vector machine (QG-MSVM) for fingerprint classification is proposed in which Q-Gaussian function is incorporated into SVM as a kernel function. The proposed method is tested in CASIA, FVC2000, FVC2002 and FVC2004 databases and compared with the MSVM methods with linear kernel, Gaussian Radial Basis Function kernel (RBF), Polynomial kernel and other state-of-the-art methods. The experimental results show that QG-MSVM demonstrates better performance than other classifiers and overcome many MSVM problems. The overall performance of the QG-MSVM classifier is comprehensively superior to all others.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0010 Presentation 5 (14:30~14:45)

Fingerprint Classification Based on a Q-Gaussian Multi-class Support Vector Machine

Mohamed Hammad and Wang Kuanquan

School of Computer Science and Technology, Harbin Institute of Technology (HIT), China

Abstract—This paper proposes a novel local feature approach for human verification using 2D ear imaging based on Polar Sine Transform (PST). The proposed approach consists mainly of four steps. Firstly, normalizing the training and testing images, then, combining the normalized images together. Secondly, dividing the fused image into blocks, then, PST is used to extract the invariant features from each block. Thirdly, the Approximate Nearest Neighbors (ANN) searching criterion is adopted to collect the most similar blocks by means of Locality Sensitive Hashing (LSH). Finally, some morphological operations are used to reduce the number of false matching blocks, then, the system verifies the human ear. False Reject Rate (FRR) versus False Acceptance Rate (FAR) and ROC curve are used to evaluate the performance of the proposed approach. The experiments are performed on IIT Delhi database to validate the proposed approach. The results demonstrate that the proposed approach has better performance compared with the existing methods.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

Session Chair: Prof. Raymond Veldhuis

S0012 Presentation 6 (14:45~15:00)

Active Contour Model Combining Local and Global Information Dynamically with Application to Segment Brain MR Images

Yunyun Yang, Xiu Shu, and Shenghua Zhong

Harbin Institute of Technology, China

Abstract—With the rapid development of medical imaging technology, the image segmentation has a special significance in medical applications. It's known that intensity inhomogeneity is one of the important features of magnetic resonance (MR) images, which presents a quite challenge in MRI segmentation. In this paper the authors apply the split Bregman method for minimization of the improved active contour model combining local and global information dynamically to segment brain MR images. The authors have proved this model can segment synthetic and real images with intensity inhomogeneity. Numerical results show the accuracy and efficiency of this model. Besides, this model is also robust to noise. That is exactly the reason why the authors apply this model to segment brain MR images. The authors present this model in a multi-phase formulation and use it to segment brain MR images with multiple regions adjacent to each other. Then the authors have tested this proposed model with many brain MR images. Finally, comparisons with other models and experimental results have demonstrated the efficiency and accuracy of this method.

Afternoon, April 22, 2017 (Saturday)

Time: 13:30~15:15

Venue: Diamond Room (5th floor)

Session 1: 7 presentations- Topic: "Biometrics and Image Processing"

# Session Chair: Prof. Raymond Veldhuis

S0014 Presentation 7 (15:00~15:15)

Effect of Propagation Signal and Path on Verification Performance Using Intra-Body Propagation Signals

Isao Nakanishi, Itaru Ogushi, Ryutaro Nishi, and Takahiro Murakami

Tottori University, Japan

Abstract—Biometrics is the verification or the identification method of users by measuring and analyzing their biometric data, which is only ap-plicable to continuous authentication in a system. In particular, un-consciously presentable biometric modalities are also applicable to an authentication system. As such a biometrics, to use intra-body propagation signals that propagate on a body surface as electro-magnetic waves have been proposed. In conventional approaches, verification performance on palms has been evaluated by a white signal as a propagation signal. In this paper, it is reported that the effects of using a synthesized signal by sinusoidal waves with fixed amplitudes and phases instead of the white signal and propagating this signal on other body parts on verification.
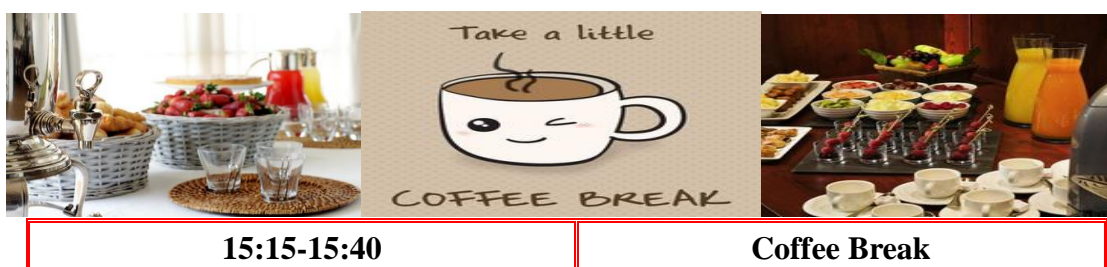
15:15-15:40	Coffee Break

Session 2

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

S0011 Presentation 1 (15:40~15:55)

Double Crosslinked Gelatin Hydrogels via Fenton Reaction and Ion Interaction

Ji Yeon Kim, Dong Whan Oh, and Ki Dong Prak

Ajou University, Korea

Abstract—Dopamine modified hydrogels that formed by coordinating between Iron(III) have attracted. However, the Dopamine–Fe3+ coordination hydrogels have low stability and mechanical strength. In this study, we have developed methacrylated gelatin dopamine (GMD) hydrogels that could form *via* double crosslinking system which are fenton reaction and ion interaction. The chemical structures of the GMD conjugate were characterized by the ^{1}H NMR and UV spectroscopy. To prepare the double crosslinked hydrogels, the gelatin hydrogels were crosslinked *via* fenton reaction by using $FeCl_2$, H_2O_2, and creating Fe3+ as a byproduct. By creating of Fe3+, the Dopamine–Fe3+ complexation was crosslinked and created Fe3+/fenton induced double crosslinked hydrogels instantly in one pot. Through this process, we can improve the hydrogel's mechanical strength, stability and adhesiveness. This newly developed hydrogel may be a highly promising product as a biological glue for internal medical use.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0002 Presentation 2 (15:55~16:10)

Correlation of Balance Ability and Physical Conditions

Yi-Yang Chen, Xu-Yang Gao, Li-Chi Liao, **Chia-Ling Lee**, and Chaur-Heh Hsieh

Ming Chuan University, Taoyuan, Taiwan

Abstract—Generally, students with intellectual disability are not good at athletic, since they have poor balance abilities. The problem causes a bad influence for their daily life and future work. The objective of this paper is to investigate what causes this situation by measuring balance capability with Zebris FDM-System. For comparison, normal college students are also chosen as subjects for the testing. The balance test types include standing with the eyes opened and the eyes closed, and disturbing balance by rotation scheme. The indexes including BMI, leg length and footprint area are adopted as physical conditions. The T-test is used to study the significant differences between normal students and mental disability students (MDs). The results show that there are significant differences in some balance ability index between the students with mental disability and normal students More importantly, this paper uses correlation and Grey relation to find out the relationship between balance ability and physical conditions. The results by Grey relation shows BMI is the most relevant condition influencing equilibrium. However, the correlation measurement reflects that there is significant relevance just for some index.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0003 Presentation 3 (16:10~16:25)

Development of PVDF Film for Monitoring Breathing Sounds

Gayathri V. Panicker, Xiong Li, **Seung H. Lee**, **Soo M. Chae**, and Jae J. Im

Chonbuk National University, Department of Electronic Engineering, Jeonju, South Korea

Abstract—PVDF (polyvinylidene fluoride) film as a sensing material with FET amplifier, wearable sensing module for monitoring breathing sounds were developed. Current method of respiratory monitoring such as SpO2 has limitation of providing late information about obstruction of respiratory malfunction. It calls for the use of PVDF film sensor, which could provide prompt warning caused by abnormal respiration. Sensing system could be placed on the patient's trachea non-invasively as means of routine monitoring during sleep or sedation. The results showed that the developed sensor provides accurate detection of breathing sounds. Developed sensor is simple in design, non-invasive, patient friendly and hence shows promising routine clinical usage and it could be expanded for the development of wearable sensing device such as monitoring sleep apnea and snoring detection.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0004 Presentation 4 (16:25~16:40)

Development of Sensing Module for Korotkoff Sounds

Xiong Li, Seung H. Lee, **Hee C. Kim**, **Kyoung H. Hwang**, and Jae J. Im

Chonbuk National University, Department of Electronics Engineering, Jeonju, South Korea

Abstract—Measurement of blood pressure is very important for the management of hypertension, and there's various automatic blood pressure devices, which provides the values based on osillometric algorithm using brachial arterial pulse waveforms. However, the most accurate method for determining blood pressure is listening Korotkoff sounds using stethoscope during deflation of cuff pressure known as auscultatory method. The problem is that there are no effective methods for listening Korotkoff sounds without using stethoscope. It calls for the development of sensor for listening Korotkoff sounds conveniently and accurately. PVDF (polyvinydene fluoride) film pattern was designed and fabricated, which was used with supporting structure. It was found that the developed sensing module detects Korotkoff sounds accurately.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0007 Presentation 5 (16:40~16:55)

EMG Analysis on Gyro-Roller Rehabilitation Device for Stroke Patients

Tulakan Ruangrong and Panrasee Ritthipravat

Department of Biomedical Engineering, Mahidol University, Nakhon Pathom, Thailand

Abstract—This paper presents a novel rehabilitation system, called "Gyro-roller", for stroke patients. The system utilizes gyroscopic effect and virtual reality technology to regain physical strength and functions of individuals with upper extremity disabilities. Efficacy of the gyroscopic effect is investigated by electromyography analysis on deltoideus, triceps brachii, biceps brachii, extensor carpi ulnaris and flexor carpi radialis muscles of 10 healthy subjects. Results show that all muscles are exercised when the subjects control the proposed device in any direction. The gyroscopic effect helps increasing muscle activities and can be adjusted to fit with individuals. An example of rehabilitation game is shown in this paper. The game was assessed using System Usability Scale (SUS) by physical and occupational therapists. The results showed that average percentile rank is of 73 which represents the game is more likely to be used in practice.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0008 Presentation 6 (16:55~17:10)

Bayesian Classification of Ribosome Binding Sites in Prokaryotic Genome Sequences: A Communications Theory Approach

Mohammad Al Batatineh and Zouhair Al-Qudah

Yarmouk University, Telecommunications Engineering Department, Irbid, Jordan

Abstract—Dramatic advances in genomics and computational biology have resulted in large amounts of data and have encouraged the development of computational algorithms for the identification and analysis of coding regions. This paper proposes a novel application of fundamental principles and concepts from communications theory for the identification of exact translation initiation sites in prokaryotic genomes. It employs several Bayesian classifiers to assess the performance of the ribosome binding sites detection algorithms investigated in this work. The proposed classification algorithms utilize well-known principles in communications theory such as cross correlation and Euclidean distance based metrics to make precise real-time decisions of weather a given open reading frame (ORF) is a valid protein coding region or not. The simulation results confirm that the proposed Bayesian classification algorithms can provide an efficient and accurate gene identification with sensitivity and specificity values comparable to the ones obtained by the well-known prokaryotic gene detection methods such as GLIMMER and GeneMark. This further confirms the significance of applying communications theory concepts to genomic sequence analysis.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0009 Presentation 7 (17:10~17:25)

Graphene-Oxide Incorporated Injectable Gelatin Hydrogels with Enhanced Tissue Adhesiveness for Biomedical Glue

Seung Bae Ryu, Yunki Lee, and Ki Dong Park

Department of Molecular Science and Technology, Ajou University, Republic of Korea

Abstract—Injectable tissue adhesive hydrogels have been developed to replace surgical sutures and staples. However, the lack of tissue adhesive strength limits it use as a wound closure. In this study, we developed enzyme-mediated crosslinking gelatin-hydroxyphenyl propionic acid (GH)/graphene oxide (GO) composite hydrogels to improve mechanical properties. The effect of different concentration of GO on the physico-chemical properties of GH hydrogels were investigated. Particularly tissue adhesive strength of GH/GO composite hydrogels. Interestingly, we found that the mechanical properties of GH/GO hydrogels were increased by the incorporation of GO into GH hydrogels. The maximum tensile strength (50 kPa, 3 folds increased compared to GH hydrogels) and adhesive strength (80 kPa, 8 folds increased compared to fibrin glue) of the GH/GO composite hydrogels were observed at 0.2 wt% of GO was incorporated into 5 wt% of GH hydrogels. In vitro cell study confirmed the GH/GO composite hydrogels were bio-compatible. In conclusion, incorporating GO into a GH hydrogel reinforced the tissue adhesiveness via additional interfacial interactions, showing a promising potential as an injectable tissue adhesive.

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B1001 Presentation 8 (17:25~17:40)

Garlic Leaves (Allium Sativa) as Control of Black Molds (Rhizopus Stolonifer)

Wanya Shawn Tan, Lailani Evangelista, and Liwayway H. Acero

College of Arts and Sciences San Beda College, Mendiola Manila, Philippines

Abstract—This research was undertaken to help mushroom farmers in SitioPactil in BaukoMonamon Sur Mt. Province, Philippines to control Black molds in their farm and to tap the beneficial use of Garlic leaves. Black mold tends to lower the production of spawns in Mushroom Farm as nutrient competitor. Experimental research method with four treatments was utilized. Black molds were cultured under standard laboratory condition. Dried garlic leaves was macerated in 70% ethanol and concentrated in Rotary evaporator. Three concentrations (30%, 45% and 60%) served as experimental groupsand were used to inhibit the growth of Black molds by Poison Technique Method. Data was analyzed using ANOVA single factorial and Fisher Least Significant Difference Test as post hoc test. Findings of the study revealed that least mycelial growth, was obtained from treatments with 30%, 45% and 60% ethanolic dried garlic leaf extracts. The zone of inhibition was also high on the said treatments which implie that any of the three concentrations inhibited the growth of Black Mold.

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B0014 Presentation 9 (17:40~17:55)

Indole-Based Anticancer Agents

Woo Chiat Tei, Tengku Sifzizul Tengku Muhammad, and Kok Wai Lam

School of Fundamental Science, Universiti Malaysia Terengganu, Malaysia

Abstract—Research in discovering and designing anticancer drugs with new chemical structure or mechanism of action has become increasingly critical to overcome drug resistance problem in cancer chemotherapy. Despite the tremendous success of cisplatin and its derivatives, these platinum compounds present two major challenges: (i) they are not effective against platinum-resistant tumours and (ii) they are associated with severe side effects including kidney damage, hair loss and nausea. Recently, great efforts have focused on the rational design of non-platinum compounds with high affinity for cancer targets and less severe side effects. Amongst them, ruthenium, gold and titanium are the most studied metals. However, a major drawback of these compounds is their rather limited stability in aqueous solutions. To overcome the problems, we employ an iron compound called ferrocene. Ferrocene is highly stable in aqueous solutions and aerobic media due to the 18 π electron configuration of iron (II), so the risk of its derivatives being degraded before they reach the cancer targets is minimised. Ferrocene is also non-toxic, therefore its derivatives are likely to cause minimal or no side effects. Three compounds were synthesized i.e., ferrocenyl-, hexadecanyl- and phenyl-substituted indoles. They showed cytotoxic activity $IC_{50} < 30$ μM against MCF-7 breast cancer cell line. Incorporation of ferrocene into the parent organic indole has found to enhance membrane permeability and bioavailability of the final compounds compared to the hexadecanyl- and phenyl-substituted indoles. The results have been rationalized by molecular docking studies.

Afternoon, April 22, 2017 (Saturday)

Time: 15:40~18:10

Venue: Diamond Room (5th floor)

Session 2: 10 presentations- Topic: "Biomedical Engineering and Bioinformatics"

Session Chair: Assoc. Prof. Gautam Sethi

B0015 Presentation 10 (17:55~18:10)

Visualization of Intracellular NO/H2S Cross-Talk Using a Nitroxyl-Responsive Two-Photon Fluorescence Probe

Sheng Yang, Yibo Zhou, and Ronghua Yang

Changsha Univeristy of Science and Technology, China

Abstract—It is of scientific significance to explore the intricate relationship between two crucial gasotransmitters nitric oxide (NO) and hydrogen sulfide (H2S), because they exert similar and interdependent biological actions within the living organisms. Nevertheless, visualization of the NO/H2S crosstalk using effective molecular imaging tools remains challenging. To address this issue, and given that nitroxyl (HNO) has been implicated as the interdependent production of NO and H2S via a network of cascading chemical reactions, we herein design a ratiometric two-photon fluorescent probe for HNO, termed TP-Rho-HNO, which consists of benzo[h]chromene-rhodol scaffold as two-photon energy transfer cassette with phosphine moiety as specific HNO recognition unit. The newly proposed probe has been successfully applied in ratiometric two-photon bioimaging of endogenous HNO derived from NO and H2S interaction in the human umbilical vein cells (HUVECs)and as well as in rat brain tissues. Intriguingly, the imaging results consistently demonstrate that the mutually dependent upgeneration of H2S and NO are present in living biosystems, indicating that this molecular probe would provide a powerful approach to elucidate the chemical foundation for the anfractuous cross-talk between the NO and H2S signaling pathways in biology.
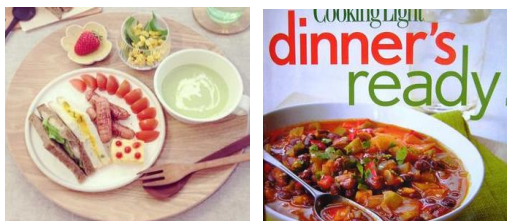
Dinner	
18:10	Hotel Restaurant

Poster Session

April 22, 2017 (Saturday)

Time: 9:00~18:10

Venue: Diamond Room (5th floor)

Poster session: 2 presentations

S0004 Poster 1

An Improved Artificial Bee Colony Algorithm for 3D Protein Structure Prediction

Ting Li, **Changjun Zhou**, and Mandong Hu

Key Laboratory of Advanced Design and Intelligent Computing (Dalian University), Ministry of Education Dalian, China

Abstract—One of the key problems in the field of bioinformatics is protein structure prediction. The thermodynamic hypothesis demonstrates that protein's energy is the lowest in nature state. So protein's structure can be gotten directly by protein sequence's free-energy. In this paper, an improved algorithm based on three-dimensional AB off-lattice model to improve local search and global optimization ability of artificial bee colony algorithm has been presented. The simulation experiment shows that it can effectively search the lowest free-energy in the condition of keeping high accuracy. The experimental results indicate that the minimum energy from the improved artificial bee colony algorithm is better than other similar algorithms, and with the increase of protein sequence's length, this algorithm has better performance.

April 22, 2017 (Saturday)

Time: 9:00~18:10

Venue: Diamond Room (5th floor)

Poster session: 2 presentations

S0009 Poster 2

Face Recognition using Multiresolution Wavelet Combining Discrete Cosine Transform and Walsh Transform

Alpa Choudhary and Rekha Vig

The NorthCap University, India

Abstract—In this paper a face recognition system based on multi resolution hybrid wavelet approach has been presented. The multi resolution hybrid wavelet transform matrix is generated using Kronecker product of Walsh and DCT transform matrices. This wavelet is used to extract features from face images with different expressions of subjects' faces. A feature map is generated using energy compaction technique which is used as a template to extract features of enrolled and test images. The experiments are performed on faces94 database with different variations in facial expression, change in face position and occlusion. The recognition rates achieved are 99.24%.

Conference Venue

The City View Hotel, Hong Kong

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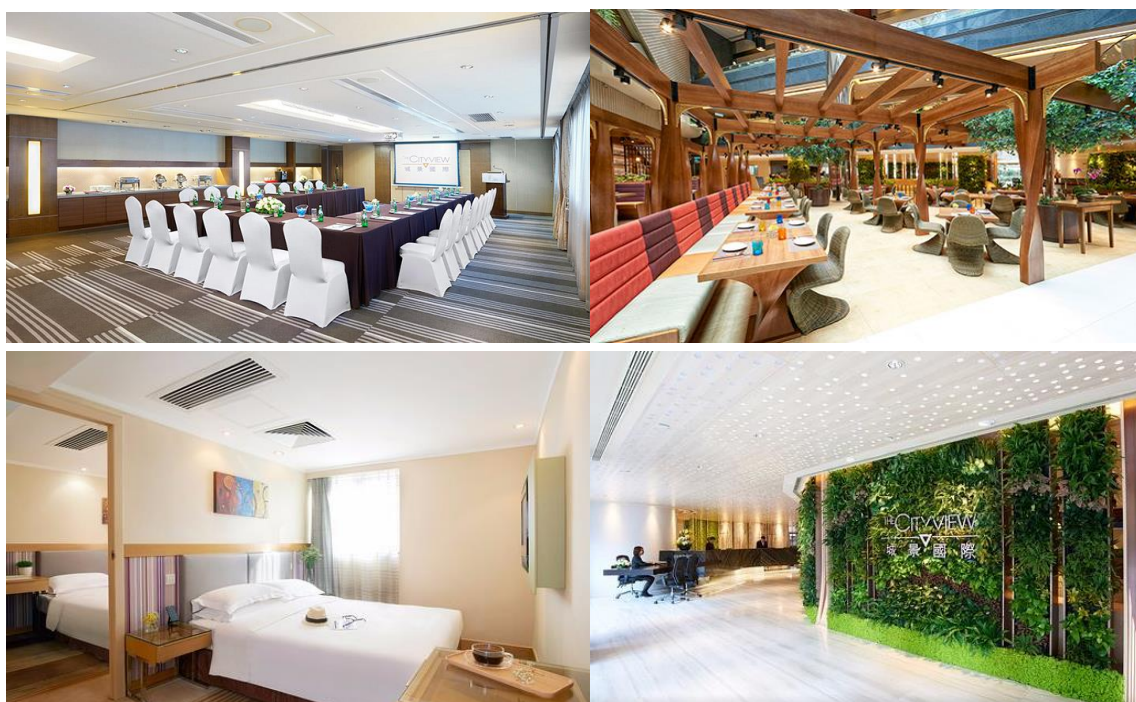
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