

2019 3rd International Conference on Medical and Health Informatics (ICMHI 2019)

**Theme: Healthy data put to good use for
better integrated care**

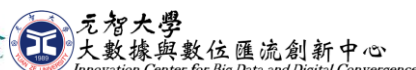
May 17-19, 2019

Xiamen, China

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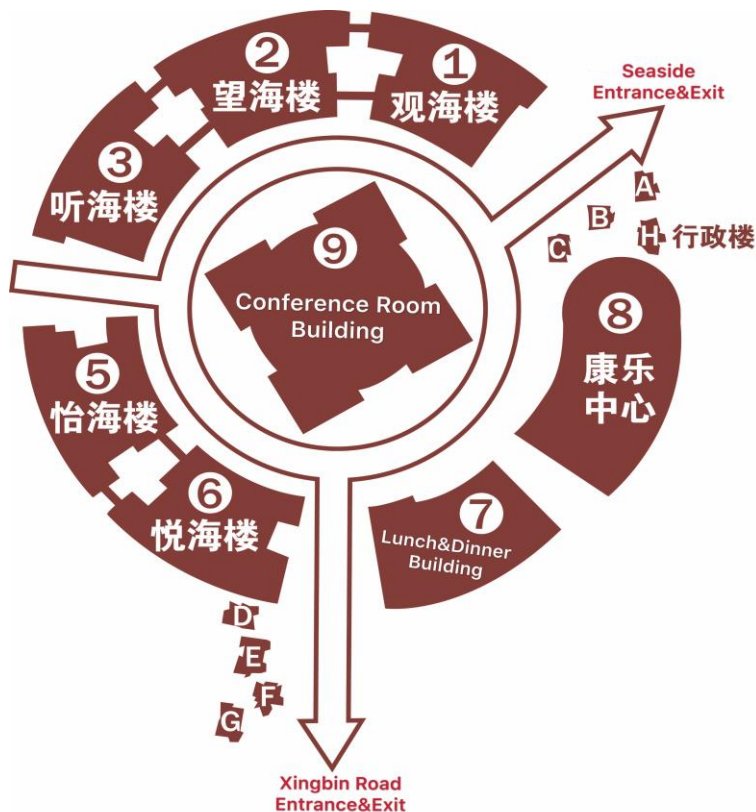


www.cbees.org

Conference Venue

Xing Lin Wan Hotel (厦门杏林湾大酒店)

Address: No. 301, Xing Bin Road, Jimei District, Xiamen (厦门集美区杏滨路 301 号)



Conference Rooms Location:

Room 201-----2nd floor in No.9 Building.

Room 307 & Room 308 & Room 309-----3rd floor in No.9 Building.

Registration place-----lobby in No.9 Building

Lunch place-----1st floor in No.7 Building (逸湖厅, Yihu Hall)

Dinner place----5th floor in No.7 Building (陶然厅, Taoran Hall)

Transportation:

We recommend all participants to take taxi to the conference venue. The fee is around 5 or 6 USD.

Welcome Address

We are pleased to welcome you to attend 2019 3rd International Conference on Medical and Health Informatics (ICMHI 2019) Xiamen, China during May 17-19, 2019.

With the important efforts of the whole committee, the evaluation of all the accepted papers will be performed based on the reports from anonymous reviewers, who are qualified in the field of Medical and Health Informatics. We wish to express our sincere appreciation to all the individuals who have contributed to ICMHI 2019 conference in various ways.

Special thanks to organizing committee and the volunteers who had dedicated their time and efforts in planning, promoting, organizing and helping the conference. We would also express our sincere gratitude to all session chairs and the technical program committee members for their great efforts.

This conference program is highlighted by three Keynote Speakers: Dr. Chalongs Cheewakriangkrai from Chiang Mai University, Thailand; Professor Song Tao from China University of Petroleum, China; Professor Jui-Chien Hsieh from Yuan Ze University, Taiwan.

ICMHI 2019 is dedicated to building an overarching technology platform for researchers in academics. As part of the event, the ICMHI issue means to look far out enough in time, space and across disciplines and focusing on Medical and Health Informatics

Xiamen is a well-known tourist port city in the Southeast coast of China. It is one of the Cleanest Cities of China, the Garden Cities of China, the National Environmental Protection Model Cities, and the best sightseeing cities in China. Not only being wealthy with travel resources, Xiamen has also temperate weather, fast and convenient transport and communication, and complete travel establishments. All makes Xiamen one of the most suitable cities for investors and tourists in China.

At last, we wish all of you enjoy ICMHI 2019 conference and have a good experience in Xiamen!



Prof. Quan Zou
Conference Chair



Prof. Chi-Chang Chang
Conference Chair

Brief Schedule of Xiamen Conference

May 17, 2019 (Friday)

10:00-17:00	Participants Onsite Registration & Conference Materials Collection	Lobby in No.9 Building (厦门杏林湾大酒店)
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May 18, 2019 (Saturday)

Arrival Registration, Keynote Speech and Conference Presentation

9:00-17:30	Arrival Registration	Room 201 (2nd floor in No.9 Building)
09:00-09:10	Opening Ceremony	Room 201 (2nd floor in No.9 Building)
09:10-09:40	Keynote Speech I Dr. Chalong Cheewakriangkrai Chiang Mai University, Thailand	Room 201 (2nd floor in No.9 Building)
09:40-10:10	Keynote Speech II Professor Song Tao China University of Petroleum, China	Room 201 (2nd floor in No.9 Building)
10:10-10:40	Keynote Speech III Professor Jui-Chien Hsieh Yuan Ze University, Taiwan	Room 201 (2nd floor in No.9 Building)
10:40-11:00	Coffee Break & Group Photo Taking	Outside of Room 201 (2nd floor in No.9 Building)

Sub-Session (in Parallel)		
11:00-12:15	Session 1 Topic: “Healthcare Service Delivery” Session Chair: Prof. Chien-Lung Chan	Room 201 (2nd floor in No.9 Building)
	Session 2 Topic: “Biomedical Data Analysis” Session Chair: Prof. Chi-Hua Tung	Room 307 (3rd floor in No.9 Building)
	Special Session1 Topic: “Medicine Information Systems” Session Chair: Prof. Tian-Fu Lee	Room 308 (3rd floor in No.9 Building)
12:15-13:30	Lunch Break	Yihu Hall (逸湖厅) in No.7 Building (1st floor)
Sub-Session (in Parallel)		
13:30-14:45	STD Competition Section: PhD Group Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai; Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu	Room 307 (3rd floor in No.9 Building)
	Special Session 3-(I) Topic: “Health Risk Evaluation” Session Chair: Prof. Mingchih Chen	Room 308 (3rd floor in No.9 Building)
	STD Competition Section: Master Group (I) Session Chair: Dr. Chalongs Cheewakriangkrai; Prof. Tsu Wang Shen; Dr. Tse-Hung Huang	Room 309 (3rd floor in No.9 Building)
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Sub-Session (in Parallel)		
15:00-16:15	Special Session 4 Topic: “Healthcare Quality Management” Session Chair: Prof. Liang-Ju Chen	Room 307 (3rd floor in No.9 Building)
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	STD Competition Section: Master Group (II) Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen; Dr. Tse-Hung Huang	Room 309 (3rd floor in No.9 Building)
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	STD Competition Section: Undergraduate Group Session Chair: Prof. Yen-Chiao Lu, Dr. Wen-Chien Ting; Prof. Chi-Hua Tung	Room 309 (3rd floor in No.9 Building)
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18:00	Dinner	Taoran Hall (陶然厅) in No.7 Building (5th floor)
May 19, 2019 (Sunday)		
7:30-17:00	One Day Tour	Xiamen

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

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 Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on May 18th, 2019.

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Xiamen Conference Introductions

Welcome to 2019 Xiamen conference. This conference is organized by HKCBEEES. The objective of the Xiamen conference is aimed to bring together leading scientists, researchers around the world to discuss the priority topics for Medical and Health Informatics in recent years

2019 3rd International Conference on Medical and Health Informatics (ICMHI 2019)

Publications

Accepted papers of ICMHI 2019 will be published in International Conference Proceedings Series by ACM, which will be 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).

Special Journal Issues

All submitted full paper will have opportunities for consideration for the Special Journal Issue. The final decision for paper selection will be made based on peer review reports by the Guest Editors.

1. [SCI] International Journal of Environmental Research and Public Health(IF 2.145)
https://www.mdpi.com/journal/ijerph/special_issues/data_model_health
2. [SCI] Special Issue International Journal of Medical Sciences (IF 2.399)
<http://www.medsci.org/ms/submit?subgroup=ccchang>
3. [SCI] Special Issue Open Medicine (IF 0.294)
[https://www.degruyter.com/page/1755\[SCI](https://www.degruyter.com/page/1755[SCI)
4. [EI COMPENDEX/Scopus] Special Issue Journal of Quality (JOQ)
<http://aspers.airiti.com/aspers/webHome.aspx?jnliid=J0053>

Conference website and email: <http://www.icmhi.org/>; icmhi@cbees.net

Conference Committee

- **Honorary Chairs**

Prof. Qinghua Cui, Peking University

Prof. Tetsuya Sakurai, University of Tsukuba, Japan

Prof. Ko-Huang Lue, Chung Shan Medical University, Taiwan

- **Conference Chairs**

Prof. Quan Zou, University of Electronic Science and Technology of China

Prof. Chi-Chang Chang, Chung-Shan Medical University, Taiwan

- **Program Chairs**

Prof. Xiangrong Liu, Xiamen University, China

Prof. Gin-Den Chen, Chung-Shan Medical University Hospital, Taiwan

Prof. Tian-Fu Lee, Tzu Chi University, Taiwan

- **Publicity Chairs**

Dr. Chalong Cheewakriangkrai, Chiang Mai University, Thailand

Prof. Su-Hsin Chang, Washington University in St. Louis, United States

Prof. Chi-Jie Lu, Chien Hsin University of Science and Technology, Taiwan

Prof. Hsin-Hung Wu, National Changhua University of Education, Taiwan

- **Poster Chairs**

Prof. Chih-Te Yang, Chien Hsin University of Science and Technology, Taiwan

Prof. Liang-Tsung Huang, Tzu Chi University, Taiwan

- **Student Essay Competition Award Chairs**

Prof. Tetsuya Sakurai, University of Tsukuba, Japan

Prof. Yi-Ju Tseng, Chang Gung University, Taiwan

Prof. Chien-Lung Chan, Yuan Ze University, Taiwan

Dr. Tse-Hung Huang, Chang Gung University Hospital, Taiwan

Prof. Jui-Chien Hsieh, Yuan Ze University, Taiwan

Prof. Yang Xu, Peking University, China

- **Technical Program Committee Chair**

Dr. Jehn-Hwa Kuo, President of Jen Ai Hospital, Taiwan

- **Technical Program Committee Members**

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Prof. Hong-Chun Hsu, Tzu Chi University, Taiwan
Dr. Sethawat Sethasathien, Chiang Mai University, Thailand
Dr. Manatsawee Manopunya, Chiang Mai University, Thailand
Dr. Kittipat Charoenkwan, Chiang Mai University, Thailand
Dr. Charuwan Saeteng, Chiang Mai University, Thailand
Prof. Jin-Long Chen, Tzu Chi University, Taiwan
Prof. Jiann-I Pan, Tzu Chi University, Taiwan
Prof. Ilker Köse, Medipol University, Turkey
Prof. Wen-Wei Chang, Chung Shan Medical University, Taiwan
Dr. Kaung Myat Shwe, Nay Pyi Taw General Hospital, Myanmar
Prof. Yi-Chun Du, Southern Taiwan University of Science and Technology, Taiwan
Prof. Chih-Lin Hu, National Central University, Taiwan
Prof. Rung Ching Chen, Chaoyang University of Technology, Taiwan

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 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 Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on May 18th, 2019.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I



Dr. Chalong Cheewakriangkrai
Chiang Mai University, Thailand

Dr. Chalong Cheewakriangkrai is currently a faculty member and teaching staff in Department of Obstetrics & Gynecology, Faculty of Medicine, Chiang Mai University, Thailand. His research interests are in the area of clinical epidemiology, uterine cancer, chemotherapy and targeted therapy in gynecologic cancer, and gynecological surgery. His experience as guest editor for several issues of Journal of Universal Computer Science (J UCS) (SCI), Journal of Computing Science and Engineering (Ei/Scopus), International Journal of Computers and Applications (Ei/Scopus), Journal of Data Analysis (ECONLIT). He is currently serving as CO-PIs of the Taiwan MOST Two-year International Project (MOST106-2218-E-040 -001 -MY2) "The Implementation of Evidence-based CDSS for Gynecologic Cancer in Northern Thailand-- Contributions to International Efforts" and CSMU Hospital International Project (CSH-2018-D-002) "Developing evidence-based control programs for women with multiple primary malignantneoplasms (MPMNs): a multilateral-international cooperation."

Topic: 'Integration of clinical and health service research and medical informatics '

Abstract—There is a general consensus that clinical decision support systems (CDSS) can give a potential to improve healthcare. Clinicians and healthcare researchers who have a good management of the structure of information systems and databases and the applications of statistical software can use existing data more effectively, assist in creating new databases, and develop new tools to survey populations and data collecting. In the evidence-based medicine and literature reviews, the main focus is on how clinical performance changes. Most studies perform an experimental or randomized controlled clinical trial (RCT) designs to assess system performance or to concentrate on changes in clinical performance that could affect patient care (e.g. disease screening, prevention, and treatment). Some studies involve field tests of a CDSS and rarely use a naturalistic design in routine clinical settings with real patients. It is very important to have a useful information to understand why CDSSs may or may not be effective, for making more informed decisions about these technologies and other medical informatics applications.

In the real practice, informaticians are needed who can structure databases that serve the needs of health service or clinical research and who can design and evaluate applications that effectively improve health care delivery. Whenever clinicians or health services researchers and informaticians work in separate aspects, the opportunities to use clinical data from health care encounters to improve patient care, expand knowledge, and develop more effective health policies will be missed. This presentation provides some examples of collaborations between health services researchers and informaticians and opportunities for additional joint work in several core research areas.

Keynote Speaker II



Professor Song Tao
China University of Petroleum, China

Professor Song Tao was born in June 1983, Associate Professor, Master Tutor. China University of Petroleum (East China) Intelligent Information Processing and Computing Innovation Research Team, Director of Scientific Research. Deputy Secretary-General of Biocomputing and Bioinformatics Processing Committee, Circuits and Systems Branch of China Electronics Society, Secretary-General of IMCS, International Society of Membrane Computing, Deputy Editor-in-Chief of International Journal Cogent Engineering, Editorial Board of SCI Journals, Visiting Editors and Reviewers. He served as Vice Chairman (BICTA-2012), Member of the Programming Committee (BICTA 2013), Chairman of the Publication Committee (BICTA 2013-2016), Secretary of the Asian Membrane Computing Conference (ACMC2012), and Member of the Programming Committee (ACMC 2013-2014). Special report of the 4th Asian Membrane Computing Conference ACMC 2015 and the 1st China Membrane Computing Conference.

Topic: ‘Artificial Intelligent Methods in Chololithiasis Recognition, Gallstone Segmentation and 3D Imaging’

Abstract—Cholelithiasis disease is with a high occurrence probability in human population and holds severe complications, such as severe acute pancreatitis, acute suppurative cholangitis, and biliary tract surgery serious complications and the subsequent biliary tumor. Gallstones are different in morphology, different people, and different stages. As well, the sizes varies widely, and the number is inconsistent.

A dataset of cholelithiasis for deep model training will be introduced, which is built by collecting 5,350 CT images of 726 patients, and then labels of gallstones are completed by doctors. With the data set, Yolo neural network model is shown to recognize cholelithiasis from CT images, even by identifying the type of gallstones, such as muddy gallstones and graininess gallstones. After that, a novel develop deep learning models, named U-NeXt, will be given to characterize the shape of gallstones in CT images. Using the segments of gallstones, 3D imaging of the gallstones are reproduced. Finally, some further research topic on how to use artificial intelligence to give suitable and correct treatment prescription to distinguished chololithiasis patients will be discussed.

Keynote Speaker III



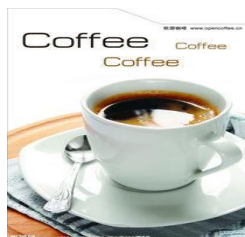
Professor Jui-Chien Hsieh
Yuan Ze University, Taiwan

Dr. Jui-chien Hsieh, the director of Medical Informatics & Telemedicine Lab, works as an associate professor of the Information Management Department at Yuan Ze University in Taiwan. He obtained his Ph.D. and M.S. degrees from the program of Biomedical Engineering at Rutgers University, New Brunswick, New Jersey, U.S.A. His research interests include medical informatics, computational biology, pervasive health and intelligence based computing. Dr. Hsieh's contact address is the Department of Information Management, Yuan Ze University, 135 Yuan Tung Road, Chungli, Taoyuan 320, Taiwan. Dr. Hsieh's email address is jchsieh@saturn.yzu.edu.tw.

Topic: ‘12-lead ECG Signal Processing and Clinical Application on Atrial Fibrillation Detection’

Abstract—In this study, we demonstrated a method to conduct 12-lead ECG signal processing, and then applied it onto deep-learning based atrial fibrillation (AF) detection. Because of the high false-positive errors based on the computer interpretation of clinically-used 12-lead ECG devices, it is on great demands to improve the performance of computer interpretation on the AF diagnoses. Firstly, we collected about 600s 12-lead ECG records which were interpreted as AF by ECG devices. The records were then categorized as AF+ or AF- by two senior cardiologists. Secondly, we developed a noise reduction algorithm based on stationary wavelet transform (SWT) and independent component analysis (ICA) to correct the corrupted ECG signals, such as baseline wandering and high-frequency interferences. Thirdly, a convolution neural network was applied to detect AF. Results indicated that (1) the preprocessed ECG signals showed less distortion on the QRS amplitudes, and better signal-to-noise ratio as compared to traditional wavelet processing. (2) In AF detection test, the sensitivity is 94%, and specificity is also 94%. In conclusion, this developed AF detector showed a better performance on AF detection as compared to computer interpretations of clinically-used ECG devices, and it can bridge the gap between research and clinical practice.

Keywords, 12-lead ECG, atrial fibrillation, deep learning, stationary wavetlet transform, independent component analysis, convolution neural network



Coffee Break & Group Photo Taking
(Room 201, 2nd floor in No.9 building)

10:40~11:00

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 201

Topic: “Healthcare Service Delivery”

Session Chair: Prof. Chien-Lung Chan

X0001 A Presentation 1 (11:00~11:15)

Liver Cancer Prediction in Hepatitis Cohort from 2002 to 2010 with Deep Learning

Dinh-Van Phan, Chien-Lung Chan

Yuan-Ze University, Taoyuan, Taiwan

Abstract- Nowadays, Cancer is still a threat to human and is one of the top concern in medicine around the world. Scientists are striving to find how to prevent and treat this century's disease. The patient is difficult to discern cancer until the disease has become severe and requires high-tech for detection. Therefore, in addition to the treatments, diagnostic and predictive methods are also being developed to detect cancer early to provide a better treatment method for the disease. In this study, we conducted a retrospective study in National Health Insurance Research Data (NHIRD) in Taiwan using deep learning to predict liver cancer in the hepatitis patient cohort. The patients diagnosed with hepatitis in 2002 were followed to 2010. The disease records of each patient were "viewed as" a picture (108 x 998) to analyze. Of these, 108 was the number of months from 2002 to 2010 and 998 was the number of International Classification of Diseases (ICD-9) from 001 to 999, excluding liver cancer - 155. Convolution neural network was used to predict liver cancer and the accuracy was 97.54%.

Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 201

Topic: “Healthcare Service Delivery”

Session Chair: Prof. Chien-Lung Chan

X0007 Presentation 2 (11:15~11:30)

Automatic Prediction of Depression in Older Age

Hui Yang, Peter A. Bath

The University of Sheffield, United Kingdom

Abstract- Maintaining good mental health such as the prevention of severe depressive symptoms is critical for physical health and well-being in older adulthood. However, depression in elderlies is not known quite well and thus cannot be treated adequately. In this study, a large and wide variety of influencing factors from multiple domain areas were investigated using a large nationally representative sample of older people from the English Longitudinal Study of Ageing (ELSA). Five different machine learning algorithms were employed to build the models for the prediction of depression in older age. Several model ensemble strategies were proposed to merge the results from individual predictive models in order to further improve prediction performance. Significant risk or protective factors associated with depressive symptoms in the elder were separately identified in each domain area. The findings from this study will enhance our understanding about the underlying pathophysiology of depression, thus helping develop appropriate intervention strategies to prevent or reduce the onset of depression in older age.

Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 201

Topic: “Healthcare Service Delivery”

Session Chair: Prof. Chien-Lung Chan

X1012 A Presentation 3 (11:30~11:45)

Self-service kiosks in hospitals in Vietnam

Nguyen Thi Ngoc Anh

ISOFH company - Innovative Solution For Healthcare, Vietnam

Abstract- It's common to see very long queues in hospitals in Vietnam, then patients even go to hospital at 2 a.m in order to have the first seats. The hospitals also face with the situation of data entry errors made by administrative staff and mistakes when distributing patients into doctors'room. Based on the survey conducted with patients, receptionists, staffs and managers at hospital,ISOFH, a medtech company in Vietnam, provides self-service kiosks with intelligent features which is customized on special requirements relating to doctor calendar, patient groups and consultation activities of customer care. The system contributes to cut long queues, save staff time and improve patient experience.

Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 201

Topic: “Healthcare Service Delivery”

Session Chair: Prof. Chien-Lung Chan

X0026 Presentation 4 (11:45~12:00)

Meta-analysis of Yam’s Effects on Liver Injury Protection and Blood Lipid-lowering

Liu Rui, Chen Ziwen, Liu Chang

Central China Normal University, China

Abstract- There is a lack of systematic review on liver injury protection and blood lipid-lowering effects of Yam. We constructed a data model and utilized R modules and PERL language to implement a pipeline that is capable of carrying out multiple meta-analysis automatically. We carried out the meta-analysis of 2 outcome measures on the effect of liver injury protection, 5 outcome measures on the effect of blood lipid-lowering. Among them 5 outcome measures were found to be significantly affected after Yam treatment (with p value < 0.05), suggesting that Yam had auxiliary effect on protecting liver injury; while the other 2 outcome measures had no statistical difference after Yam treatment, indicating that the effect of blood lipid-lowering was uncertain. Also, the conclusion from this study could assist policy-makers and consumers to determine Yam as a recommended choice for liver injury protection and blood lipid-lowering effects.

Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 201

Topic: “Healthcare Service Delivery”

Session Chair: Prof. Chien-Lung Chan

X2008 A Presentation 5 (12:00~12:15)

The impact of service design and digital transformation on the process of service delivery in healthcare

Mario Pfannstiel

University of Applied Sciences Neu-Ulm, Germany

Abstract- Background: The working environment in healthcare is being shaped by the digital transformation of products, services and product-service systems. On the one hand, skilled workers and specialists are needed who understand and are able to further develop existing products, services and product-service systems; on the other, labor is also needed for the traditional occupations activities. New jobs are being created as a result of digitization and old ones are disappearing. Inevitably, over the long term conventional job profiles will be perceived in a new way. The workforce of tomorrow will earn their money doing other tasks. Monotonous activities will be increasingly assumed by intelligent systems, machines and robots. To survive this change, businesses must remain competitive and create specialized products and services that promise success and the generation of the largest customer base possible by invoking personal loyalty. Innovations will enable ever stronger networks of service providers and service recipients in the working world. This will affect efficiency, effectiveness, productivity and performance. This presentation addresses the following questions: What role does the digital transformation play? Will automation and artificial intelligence in healthcare soon make people redundant? What is the value of intelligent product-service systems? In which niches will people be working in the future when digitization takes over jobs and tasks?

Methods: An attempt will be made to show where the digital transformation in healthcare leads to changes. Practical examples illustrate that service design influences the process of creating services, on the service provider and the recipient. Businesses will have to develop an understanding of the needs and special features of services. So that services can be provided, existing resources must be coordinated, managed and monitored to deliver services. The exchange of services is subject to social and economic aspects that can be quantitatively and qualitatively measured. Evaluation of service experience is subjective and requires an

objective part to arrive at a holistic evaluation. Service design targets the perceivable elements of the service, while cognition and emotion capture the non-perceivable elements. The impetus behind innovation are found in the process of providing services in the form of customized products in situations where interaction occurs and concrete actions take place in specific situations; of importance here are the usability and the relevance of the service components. Both providers and recipients of services are sources of ideas and multipliers for innovation. Barriers to innovation that impede or frustrate projects must be surmounted so that innovation occurs. In future, the networking of new products, services and technologies will be relevant to developing new innovations. Customers are often not aware of the significant role they need to play in terms of collaborating in the process of creating services. As a result, they do not know when or how to become involved. Process transparency and means for inclusion are lacking.

Results: Among the largest challenges in creating healthcare services are automation, digitization of the working environment, and advances in artificial intelligence regarding product-service systems. Opportunities are connected with this that can increase the attractiveness of jobs. On the other hand, it should not be forgotten that for workers this transformation can invoke feelings of fear, insecurity and stress. Skilled workers and specialists may be inspired by the digital transformation and see new opportunities for optimization, simplification and standardization of service processes. The responsibility for sustainable organization of the future working environment lies equally with employees, employers and policy makers. The creation of services is not only defined by the aspects of cost, time and quality; flexibility, differentiation, individualization, specialization, productive efficiency and competition are also relevant. In the future, the creation of services will be subject to stronger socio-technical tension because services represent a social process that is not dependent on technical factors alone.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 307

Topic: “Biomedical Data Analysis”

Session Chair: Prof. Chi-Hua Tung

SS01-05 A Presentation 1 (11:00~11:15)

A study of document classification using text mining technology-An Example of Biotechnology News

Hsiang-Tsung Yeh Wang, **Chi-Hua Tung**

Chung-Hua University, Taiwan

Abstract- The rise of the Internet has led to the rapid growth of electronic documents. How to effectively manage huge electronic documents is obviously an important subject. However, machine learning can be used to compute the similarity between documents so that the initial classification can be automated in a short period of time. In this study, we classifies the news articles in the field of biotechnology, makes rapid classification into four categories of drug development, medical equipment, investment market, global and international, and saves a lot of time when searching for a particular file.

In this research, two sets of methods are designed and studied. After comparing the similarity between the article and the classified topic, the better accuracy is obtained from the two sets of methods. In the process of classifying articles, R language is used for text mining. Data collection are carried out in the news website of "Global Bio & Investment", and Chinese characters are broken by using jiebaR suite. We used key words and TF-IDF to find all the meaningful words in the article as the default classification category. The word vectors are generated using the text2vec suite, and the k-means algorithm is used to group the default classes, and then the new articles are compared and classified by cosine similarity. Finally, the experimental results show that the classification accuracy and stability of the categories numbers method are better than the average classification method.

The future of this study can be further developed into online classification system, provide the user know whether the required in a large number of files in the real-time, but also to the media editors for management and organization of news articles, and can be more accurate in classification of multi-class.

Session 2

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 307

Topic: “Biomedical Data Analysis”

Session Chair: Prof. Chi-Hua Tung

X0021 Presentation 2 (11:15~11:30)

Mixed Reality Patients Monitoring Application for Critical Care Nurses

Chia-Chi Teng, Brady Redfearn, Craig Nuttall, Sabrina Jarvis, James Carr, Jarin Jensen, Sandy Kanuch, Jordon Peterson, David Taylor
Brigham Young University, USA

Abstract- Recent research and development projects have demonstrated the use of virtual reality (VR) technology in the healthcare environment, although most applications are still limited to medical simulations and training applications. Whereas VR removes a user from their immediate environment, augmented and mixed reality (AR/MR) adds virtual content to a user's immediate environment. We endeavor to develop an MR application for hospital medical providers which will enable them to directly monitor any patient and their pertinent medical information from any location, at a glance. With this system, the provider could view a live-stream of patients from other locations and their vital signs to provide information for rapid medical decision making. Such application could significantly improve patient safety, allow quicker response times for emergency and critical situations, and reduce medical errors. It could also enhance the effectiveness of the medical team and allow the providers to more closely monitor their patients, improving patient care outcomes and decreasing costs. A prototype of this proposed MR application is developed with a state-of-the-art head mounted display and the result is presented below.

Session 2

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 307

Topic: “Biomedical Data Analysis”

Session Chair: Prof. Chi-Hua Tung

X2003 A Presentation 3 (11:30~11:45)

Effectiveness of Mobile Devices in dispatching porters at Shin-Kong hospital

Jian-Tai Fu

Shin Kong Wu Ho-Su Memorial Hospital Taipei, Taiwan

Abstract- This paper describes the mobile devices platform (Eporter system) that can help porters at hospital in their patient escort work. To date, in most hospital the patient escort task assignments of the porter are mostly by telephone. A major concern is the delay of their tasks was often caused by personnel unfamiliar experience and the lack of an immediate supervision mechanism.

In this study, a new method that improves the problems above is suggested. To show the feasibility of applying mobile technologies, we developed a mobile devices platform (Eporter system) that uses smart phone to pass the task information to porters that can reduce missing messages and monitor the transmission process. The purpose of this study was to determine how the Eporter system can improve the junior porters work performance and help them perform as good as the senior ones.

The patient escort time records from Jan to March 2018 of 68 porters were download from Eporter system. A One-way ANOVA model is used calculate the porters records by three seniority groups.

Statistical comparisons were made between the patient escort time of these three groupe to determine their difference. These result showed that the patient escort time were no significant differences in these three groups.

The Eporter system may have an effect on porters' escort tasks, it can monitor their escort process and help them just in time. The system presented in this paper may be useful in improving the management of porters at hospital, especially to those new or inexperienced staffs.

Session 2

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 307

Topic: “Biomedical Data Analysis”

Session Chair: Prof. Chi-Hua Tung

X0030 Presentation 4 (11:45~12:00)

Skin Lesion Boundary Detection with Neural Networks on iOS Devices

Bianca Schnalzer, **Baptiste Alcalde**

University of Applied Sciences FH JOANNEUM, Austria

Abstract- Automated skin lesion boundary detection has become a common issue in Health Care. On the one hand, a broad variety of image processing algorithms already exist and they are power consuming on mobile devices. On the other hand, the use of machine learning algorithms is on the rise and new frameworks have been developed to use these techniques with improved on-device-performance. Since iOS 11.0, Apple is providing a Core Machine Learning Interface to use machine learning models. Moreover, conversion tools allow integration of 3rd party models into iOS applications. In this paper, we present an overview of available frameworks for iOS devices as well as their limitations and evaluate in practice the performance and maturity level of Neural Network frameworks for skin lesion boundary detection using only freely available pictures.

Session 2

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 307

Topic: “Biomedical Data Analysis”

Session Chair: Prof. Chi-Hua Tung

X1013A Presentation 5 (12:00~12:15)

Determination of Mandibular Density using CT data

Ariunbold Jargalsaikhan, Nyamlkhagva Sengee, Chinzorig Radnaabazar, Khurel-ochir Tsedendamba

National University of Mongolia, Ulaanbaatar, Mongolia

Abstract- The main goal of this paper is to propose an image processing method to determine mandibular density automatically using computed tomography (CT) data in order to provide accurate information about where to drill and place an abutment screw of implants in the jaw bone for doctors. The experiment was performed on a computed tomography data of jaw bone of two different individuals and the angle between drill and the vertical axis of Cartesian coordinate was changed from 10 ° to 25 ° by 5 ° interval. The results showed that regardless of the angle of the drill and the diameter of the drill a cylinder that drilling is available was found. Also, there was a positive correlation between the angle of the drill and time complexity but a negative correlation between the diameter of the drill and time complexity.

Special Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 308

Topic: “Medicine Information Systems”

Session Chair: Prof. Tian-Fu Lee

SS01-01 Presentation 1 (11:00~11:15)

Computation-Efficient Three-Party Encrypted Key Exchange for Telecare Medicine Information Systems

Chwei-Shyong Tsai, Qi-Xian Huang, Tsung-Hung Lin, **Tian-Fu Lee**

Tzu Chi University, Taiwan

Abstract- A three-party encrypted key exchange (3PEKE) protocol for telecare medicine information systems (TMISs) enables two communicating parties, such as patients, doctors, nurses and health visitors, sharing a long-lived secret only with a trusted third party- Medical Center Server (MCS) to exchange confidential and authenticated Electronic Medical Records (EMRs) and Electronic Health Records (EHRs) with another party over an insecure network. Recently, Lee et al. presented an improved 3PEKE protocol to solve the weaknesses of previous protocols. However, this study states that Lee et al.’s improved 3PEKE protocol still has some security faults such that their protocol cannot execute correctly and fails to resist password guessing attacks. This study also develops an enhanced protocol which is based on Lee et al.’s improved 3PEKE protocol. Additionally, the enhanced protocol protects the user’s password by using a one-time key shared with the MCS, eliminates the redundant computations, and rearranges the messages. Compared with related protocols, the enhanced protocol not only has higher security, but also increases efficiency in computation and transmission.

Special Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 308

Topic: “Medicine Information Systems”

Session Chair: Prof. Tian-Fu Lee

SS01-02 Presentation 2 (11:15~11:30)

An Efficient Date-constraint Hierarchical Key Management Scheme with Fast Key Validation Checking for Mobile Agents in E-Medicine System

Tian-Fu Lee, **Chuan-Ming Liu**

National Taipei University of Technology, Taiwan

Abstract- A hierarchical key management scheme for mobile agents in e-medicine system enables users, such as patients, doctors, nurses and health visitors, to conveniently and securely access a remote hierarchical medical database system via public networks. Efficient hierarchical key management schemes do not require heavy computations even if the hierarchical structure has too many levels and participants. Chen et al. recently developed a hierarchical key management scheme with date-constraint for mobile agents. The key management scheme of Chen et al. is based the Elliptic Curve Cryptosystem and allows each secret key to be partnered with a validity period by using one-way hash chains. However, the scheme of Chen et al. fails to execute correctly, violates authenticated key security, and requires hundreds of hash functional operations. This investigation discusses these limitations, and proposes an efficient date-constraint hierarchical key management scheme for mobile agents in e-medicine system, which provides a fast key validation and expiration check phase to rapidly check whether the secret keys are valid and time-expired or not. The proposed key management scheme not only provides more security properties and rapidly checks the validation of secret keys, but also reduces the computational cost.

Special Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 308

Topic: “Medicine Information Systems”

Session Chair: Prof. Tian-Fu Lee

SS01-06 A Presentation 3 (11:30~11:45)

Developing Data Science Tools for Acquiring Comprehensive Information about Protein Structure by Web-Based and Visualization Technologies

Ciou Chan Wu, Lien-Fu Lai, Chao-Chin Wu, Liang-Tsung Huang, Kai Shien Tan, Yi Ting Kang and QianZhong Pan
Tzu Chi University, Taiwan

Abstract- INTRODUCTION: With the advancement of technology and the maturity of network technology, there are more opportunities for biomedical fields to develop related applications through the Internet, which may significantly improve the convenience and the productivity

PURPOSE: This study aims to establish an integrative website for protein structure information, including motifs, ligands, and mutated residue positions. Therefore, biomedical scientists may search for target proteins online and acquire diverse information from the databases of the Internet. Then the integrated protein information can be presented with 3D structure models.

METHODS: Various frameworks and technologies, such as Html5, JavaScript, RESTful and Web3DMol, are employed to develop a website. The website acquires protein information from other databases by using RESTful (REpresentational State Transfer) Web Service with JSON (JavaScript Object Notation). The information about motifs, ligands and mutated residues is retrieved from ExPASy ScanProsite, RCSB PDB and EBI databases, respectively. Finally, the protein 3D structure with integrative information is visualized by Web3DMol.

RESULTS: On the website, researchers can inquire about protein structure along with related information together, and then analyze the protein comprehensively on visualized 3D models. Through the interactive interface and operations, such as rotation of the model, selection of different sections and markers at the structure, it may enhance the effectiveness for understanding and interpreting diverse information of protein structure. Further, the website is able to provide flexibility to include more structure information to enrich the utility from more databases in the Internet.

The website is available at <http://bioinformatics.myweb.hinet.net/p3d.htm>

Special Session 1

Morning, May 18, 2019 (Saturday)

Time: 11:00~12:15

Venue: Room 308

Topic: “Medicine Information Systems”

Session Chair: Prof. Tian-Fu Lee

SS01-04 Presentation 4 (11:45~12:00)

Histogram Analysis of Photoacoustic Effect Changes on Different Liquid Samples

Tsu-Wang Shen, Ting-Ku Ou, and Chi-Chang Chang

Feng Chia University, Taiwan

Abstract- The photoacoustic imaging is based on the effect of the acoustic response of laser light absorption to avoid the effects of light scattering. The photoacoustic imaging shows the outperformance to compare with traditional ultrasound imaging. However, it is unknown if the photoacoustic effect changes when the laser misalignment on the reticulated piezoelectric ceramic. Our system is mainly composed of hardware and software, including a piezoelectric ceramic, motors, a class III laser diode, relays, and a data acquisition card combined with LabView™ program. The piezoelectric sensor is a 21.9mm by 15.9mm rectangular ceramic with four strip holes in the center. The laser hits several different spots on strip holes of piezoelectric. The total of 6 points are tested to observe if these signals keep consistence. The results demonstrated the laser mis-alignment effect of photoacoustic imaging can be controlled.

Finally, the research tested different samples and analyzed by histogram method to obtain the response signals with different features. This research may help to generate photoacoustic features faster and to improve image quality in the future.



Lunch Yihu Hall (逸湖厅) in No.7 Building (1st floor)	12:15~13:30
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Student Essay Competition

STD Competition Section: PhD Group

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: 307

Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai;

Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu

SS01-03 Presentation 1 (13:30~13:45)

Medical Information Digital Right Management on the Information-Centric Networking

Yu-Jie (Jessica) Kuo, Jiann-Cherng Shieh

National Taiwan Normal University, Taiwan

Abstract- In this article, we described the digital rights management of medical information in an information-centric networking (ICN). ICN is a new internet 3.0-based network architecture that is a way to transform a host-centric internet infrastructure into an information-centric mobile environment. In this new era, the privacy and copyright protection of personal medical information is an important issue of information security. How to use the ICN architecture to establish cross-domain sharing and personal medical information copyright authorization is the most important contribution of this paper. Specially, we used blockchain technology to establish authorization and used zero knowledge key agreement authentication mechanisms to establish each blockchain and data communication. Finally, we designed a mechanism to create and authorize the information sharing of personal medical media using the ICN architecture. The personal medical records that we designed for ICN environment can be securely accessed anytime, anywhere, and can be securely shared with different healthcare professionals to provide data certified by different medical units in the upcoming high-bandwidth network.

STD Competition Section: PhD Group

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: 307

Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai;

Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu

SS02-04 Presentation 2 (13:45~14:00)

Cardiovascular Incidence, Mortality and Web-Based Data in China

Chenjie Xu, Shu Li, **Xinxi Cao**, Yaogang Wang

Tianjin Medical University, China

Abstract- Objective: To analyze whether there is a correlation between the disease burden of two high-risk cardiovascular diseases and the public Internet search volumes, and to explore whether there is a regional difference in public search behaviors.

Methods: The standard Boolean operators were used to determine the search terms for each cardiovascular disease. Spearman correlation analysis was used to explore the correlation among search index values, incidence and mortality rates of the two cardiovascular diseases. The time series decomposition method was used to extract the seasonality and trend of the search index.

Results: The Baidu Index was highly correlated with the incidence and mortality of two cardiovascular diseases in China (coronary heart disease: $r = 0.961$, $P < 0.001$, stroke: $r = 0.833$, $P < 0.001$). The internet search behavior of cardiovascular disease presents a trend of seasonal fluctuations (increased in winter). The East China region has the largest number of searches for two cardiovascular diseases, and the least in the northeast and northwest regions.

Conclusion: Search behavior reflects the public's perception of cardiovascular diseases from a different perspective. Researching internet search behaviors provides an innovative and real-time approach to monitor and estimate the disease burden of cardiovascular disease.

STD Competition Section: PhD Group

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: 307

Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai;

Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu

X1011 Presentation 3(14:00~14:15)

The Psychophysiological Effects of Cross-Cultural Transaction in Foreign Students in Russia: a Pilot Study

Iuliia Muzychenko, Irina Apollonova, David Evans, Li Zhang

Harbin Institute of Technology, China

Abstract- Have you ever studied or worked abroad? Most people assume it would be stressful — but would you ever think that it could be detrimental to your health, though? Stress literature relates cross-cultural transactions to the chances of gaining higher levels of chronic stress. The present article aims to study if the psychological stress linked to relocation to a different country can possibly lead to psychobiological effects of chronic stress, namely elevated levels of resting heart rate. A longitudinal pilot study was conducted for 10 expatriate students during the first 2-5 months (with a mean of 3.6 months) of their relocation. Quantitative data was gathered via surveys cross-sectionally, the health data and daily activity journals were collected weekly and provided continuous information about the participants' pulse rate and clues of what its changes can be related to. The results show that the participants have changes in the resting heart rate (RHR) baseline and thus are consistent with those of previous chronic stress research. However, additional further research is required for the consistency of the data and for identifying risk markers and individual stress pathways, with the goal of identifying “at-risk” students and providing treatment options before any serious harm is done to their health.

STD Competition Section: PhD Group

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: 307

Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai;

Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu

X1009 Presentation 4(14:15~14:30)

Evaluating mHealth Interventions in an Underserved Context Using Service Design Strategy:
A Case of Kenya

Danny Ronald Nyatuka, Retha de la Harpe

Cape Peninsula University of Technology

Abstract- mHealth interventions have been widely adopted across health systems in attempts to improve healthcare delivery particularly in underserved contexts, Kenya included. This has made mHealth more established as opposed to telemedicine. However, the effectiveness of the interventions is questionable as there lacks a clear sustenance and scale-up strategy for their successful implementation, despite mHealth having been adopted as one of the pillars for Kenya's national e-health strategy. Apparently, there is a paucity of empirical evidence to understand the complex nature of technology use in mHealth services from a design thinking perspective. Also, the role of stakeholders in designing the services has not been well recognized. This study focuses on mHealth as a healthcare service facilitated by technologies that incorporate mobile technologies. Objectives of the study include: (1) To identify and engage relevant stakeholders, (2) To establish design characteristics of the desired solution, (3) To design & develop context-specific solutions, (4) To evaluate new services in-use situation. A generic model is proposed to guide design and evaluation process for mHealth services, using both lens of service design research and stakeholder theory. Two distinct phases were added to the double diamond process of service design i.e. 'engage context' as pre-evaluation phase at the start and 'evaluate in-use' as post-evaluation phase at the end of the process. The new model was empirically tested by fifteen participants (n=15), of which the outcome was rated as 'Satisfactory'. In so doing, our study extends and complement existing body of knowledge.

STD Competition Section: PhD Group

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: 307

Session Chairs: Prof. Chien-Lung Chan; Prof. Tetsuya Sakurai;

Prof. Yi-Ju Tseng; Prof. Jui-Chien Hsieh; Prof. Yang Xu

X0004 Presentation 5(14:30~14:45)

Formation of thrombosis and its potential diagnosis and treatment with optoacoustic imaging

Muqun Yang, Tian Tan and Tian Guan

Tsinghua University, China

Abstract- Thrombosis is fatal cardiovascular diseases and has caused a lot of pain to human body. Through this passage, we analyze the potential mechanism of thrombosis from non-biomechanics and biomechanics respects. Furthermore, the article concludes its current diagnosis and treatment and points out their responding advantages and disadvantages, after which I propose a possible solution for both diagnosing and curing thrombosis with photoacoustic imaging technology.

Special Session 3-(I)

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchi Chen

SS03-01 Presentation 1 (13:30~13:45)

Association Analysis Among Treatment Modalities and Comorbidity for Prostate Cancer

Yi-Ting Lin, Mingchi Chen, Tian-Shyug Lee, Chih-Kuan Liu , Yen-Chun Huang
Fu Jen University, Taiwan

Abstract- Prostate cancer is a common cancer treated with multi-modality. The combinations of modalities are numerous and complex. Clinical practice guidelines and rules have already been proven in many studies. However, the hypotheses of these studies came from physicians' and experts' experiences and observation. Association analysis, as an importance component of data mining, has been proved to be helpful for us to discover rules from big medical databases. We believe association analysis is able to help us to discover new rules between comorbidities and modalities in subjects of prostate cancer, so that employed it to analyze prostate cancer dataset derived from million people file of NHIRD. We successfully found six rules and rule 1,2,3,5,6 could be well explained with known knowledge and literatures, which were "Young prostate cancer patient who were spared from definite treatment tend to be spared from HT.", "TRUS is associated with younger age group, while TURP is associated with older Age.", "RT is associated with HT.", "CT is highly associated with RT.", "Hemiplegia, cerebrovascular disease, moderate to severe renal disease, diabetes with end organ damage is associated with TURP. Patients with TURP are associated with more comorbidity." We also discovered rule 4: "Younger patients who received HT is highly associated with previous RP.", which are still hypothesis and deserve our validation.

Special Session 3-(I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchi Chen

SS03-02 Presentation 2 (13:45~14:00)

Physical fitness and happiness research in Taiwanese adults

Ming-Gu, **Mingchi Chen**, Tian-Shyug Lee, Chi-Jie Lu, Chien-Chang Ho

Fu Jen Catholic University, Taiwan

Abstract- We studied the effects of physical fitness performance on happiness in Taiwanese adults. Through the MARS model, we analyzed the impact factors and found that age, smoking, sleep duration, performance of athletic ability and sedentary lifestyle significantly affected happiness.

Special Session 3-(I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchih Chen

SS03-03 A Presentation 3 (14:00~14:15)

Association of physical functional performance with sleep condition in Taiwanese adults

Chi-Chieh, Hsu, Tian-Shyug Lee, Chi-Jie Lu, Chien-Chang Ho

Fu Jen Catholic University, Taiwan

Abstract- Sleep plays an essential role in maintaining quality of life. Inappropriate sleep duration is associated with weight gain and obesity and may contribute to low physical functional capacities. In addition to sleep duration, bedtime and sleep quality are other important markers that predicts physical function. The present study determined the relationship between multiple physical fitness components and sleep condition in a well-characterized population of Taiwanese adults. In this study, we reviewed the data form derived from the National Physical Fitness Examination Survey (NPFES) in Taiwan. This survey was conducted by the Sports Administration, Ministry of Education, Taiwan (MOE-SA). A stratified & convenience sampling scheme was performed at physical fitness test stations in various cities or counties. Each volunteer was examined by using physical fitness tests and standardized face-to-face interview. The interview was conducted by a structured questionnaire. This survey was approved by the MOE-SA and written informed consent was obtained from each participant. The computerized data set of the NPFES released by the Sports and Health Information Application Research Center of the MOE-SA for public research purposes contained information on the demographic characteristics, lifestyle behavior, and physical fitness measurements of each participant. All researchers who wish to use the NPFES and its database are required to sign a written agreement declaring that they will not attempt to obtain information that could potentially violate the privacy of participants. This survey of year 2013 contained questions within physical fitness tests as body composition (body mass index [BMI (kg/m²)] and waist-to-hip ratio [WHR]), flexibility (sit-and-reach tests), abdominal muscular strength and endurance (bent-leg sit-up tests), cardiovascular endurance (3-min step tests). We got data from 69559 Taiwanese adults aged 23 to 65 who participated in such survey 2013. After data cleaning, we screened 62,094 good data. We used the Multivariate adaptive regression (MARS) model to analyze the effects of sleep condition (sleep quality, sleep duration, bedtime) on physical fitness (BMI, sit-ups,

sit-and-reach, CEI). MARS excels at finding optimal variable transformations and interactions, the complex data structure that often hides in high-dimensional data, and hence can effectively uncover important data patterns and relationships hidden in data. The results showed that 7-hours sleep duration was the most suitable sleep time for the BMI index, but sleep quality and bedtime did not affect BMI. For sit-ups, the worse the quality of sleep, the worse the performance of sit-ups. 7-hours was also the optimal sleep duration for sit-ups. Sleeping at 1 o'clock was the best time to fall asleep. For sit-and-reach, the longer the sleep duration, the worse the sleep quality, and the worse the sit-and-reach was. However, the model results showed that sleep duration, sleep quality, and bedtime did not affect CEI performance.

Special Session 3-(I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchi Chen

SS03-04 Presentation 4 (14:15~14:30)

Analysis the Characteristics and in Hospitalization Expenditures for Repeat Revascularization Patient After Percutaneous Coronary Intervention

Yen Chun Huang, Tian-Shyug Lee, Mingchi Chen, Chih-Kuan Liu ,Kuan-Yu Chen
Fu Jen University, Taiwan

Abstract- Objectives: The aim of this research is to determine incidence、 characteristics and medical cost in Repeat Revascularization after Percutaneous Coronary Intervention (PCI) of Taiwan National Health Insurance Research Database (NHIRD).

Background: In-depth long-term and largest administrative health care databases from Taiwan National Health Insurance Research Database (NHIRD) on repeat revascularization patients who after percutaneous coronary intervention.

Methods: Repeat revascularization and its relation to the medical cost, we were analyzed in the NHIRD trial (n =3104) using random forest and ANOVA to analysis.

Conclusion: The main factors (medical cost) which is effect the repeat revascularization patients is medical cost, Patients gender (p-value 0.004) , CCI ,emergent and mace and patient's income (< 0.001 respectively) all had significantly within medical cost.. In addition to, hospital accreditation and urbanization level were all significantly with medical cost. (< 0.001)

Special Session 3-(I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchi Chen

SS03-05 A Presentation 5 ((14:30~14:45)

Using Machine Learning to Define Important Comorbidities and Predict Ovarian Cancer Recurrence

Yu-Chiao Wang, Chia-Yen Huang, Mingchi Chen, Michael TS Lee
Fu Jen Catholic University, Taiwan

Abstract- Objective: Ovarian cancer patients were usually diagnosed at an advanced stage, their prognosis and survival rate were not as expected. Although the initial response was well after treatment, most patients would relapse within two years, so tumor recurrence was quite challenging for ovarian cancer treatment. In this study used machine learning to rank important comorbidities and predict the recurrence of ovarian cancer.

Methods: This study used a retrospective cohort study method, and obtained the data of ovarian cancer patients from the National Health Insurance Research Database in 2006 to 2013. For the age, Elixhauser comorbidity, using machine learning algorithms such as random forest and support vector machine (SVM) method for data mining technology for classification prediction.

Results: A total of 4,143 ovarian cancer cases were included between 2007 and 2011. There were 953 recurrence cases in two years, and the 2-year cumulative recurrence rate was 24.7%. We randomly selected recurrent and non-recurrent groups in a 1:1 ratio, By the stepwise logistic regression, age, paralysis, liver disease, and peptic ulcer disease excluding bleeding are highly correlated with recurrence. The correct classification rate of ovarian cancer recurrence predicted by random forest and SVM was 56%.

Conclusions: In the past, many studies have used the analysis of risk factors as real-world data, and there is still a lack of relevant research on data mining methods. Therefore, this study attempts to use Taiwan's national health insurance data to use data mining methods to verify the effectiveness of machine learning framework for ovarian cancer recurrence prediction. The results of this study showed that the accuracy of using both random forest and SVM methods to predict ovarian cancer recurrence was 56%. Whether stage, grade, histology play an important prognostic factor for recurrence, It is recommended that the analysis can be analyzed in the future.

Student Essay Competition

STD Competition Section: Master Group (I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X0008 Presentation 1 (13:30~13:45)

Extracting PICO elements from RCT abstracts using 1-2gram analysis and multitask classification

Xia Yuan, Liao Xiaoli, Li Shilei, Shi Qinwen, Li Ke

University of Electronic Science & Technology of China

Abstract- The core of evidence-based medicine is to read and analyze numerous papers in the medical literature on a specific clinical problem and summarize the authoritative answers to that problem. Currently, to formulate a clear and focused clinical problem, the popular PICO framework is usually adopted, in which each clinical problem is considered to consist of four parts: patient/problem (P), intervention (I), comparison (C) and outcome (O). In this study, we compared several classification models that are commonly used in traditional machine learning. Next, we developed a multitask classification model based on a soft-margin SVM with a specialized feature engineering method that combines 1-2gram analysis with TF-IDF analysis. Finally, we trained and tested several generic models on an open-source data set from BioNLP 2018. The results show that the proposed multitask SVM classification model based on 1-2gram TF-IDF features exhibits the best performance among the tested models.

STD Competition Section: Master Group (I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X0010 Presentation 2 (13:45~14:00)

Using cTAKES to Build a Simple Speech Transcriber Plugin for an EMR

Stephen John Matthew C. Wenceslao, Maria Regina Justina E. Estuar

Ateneo de Manila University, Philippines

Abstract- Electronic medical records (EMR) in general provide significant benefits to healthcare organizations and clinicians. However, a major challenge of clinicians who use EMRs is the lowered perceived quality of patient-doctor communication and interaction as a result of doctors being distracted with EMR use during consultations. A unique approach to this problem is through applications that automatically document clinical encounters in real-time. This study aims to develop a speech transcriber plugin for a web-based EMR for real-time clinical encounter documentation. We make use of available speech-to-text services on the web as well as cTAKES for clinical annotation. A draft summary of the clinical encounter is presented to the user in editable SOAP format. Blockchain technology for the speech recording is also explored to secure access to the recording. Internal testings showed that the prototype is able to capture audio conversations into text and parse the transcription for medical concepts. However, after a single formal usability evaluation we found that there is much to be done in terms of the usability of the summarization component.

STD Competition Section: Master Group (I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X0025 Presentation 3 (14:00~14:15)

A Stroke Detection System Based on Cincinnati Prehospital Stroke Scale

Ting-Ying Chien¹, Chong-Yi Chen¹, Guo-Lun Jin²

1 Yuan Ze University, Taiwan

2 National Chiao Tung University, Taiwan

Abstract- Stroke, also known as cerebrovascular events, is mainly caused by the obstruction of blood flow in the brain, which leads to an inability to supply oxygen to the brain. By 2013, stroke had become the second most common cause of death in Taiwan (accounting for about 12% of all deaths). This study used image processing technology and speech recognition, following the Cincinnati Prehospital Stroke Scale, to determine whether or not the user had a stroke. The Cincinnati Prehospital Stroke Scale has three indicators, including facial droop, arm drift, and speech. Patients with 1 of these 3 findings have a 72% probability of having had an ischemic stroke. If all satisfies, the probability of the stroke is more than 85%. In addition, we developed a mobile APP based on this method to detect whether or not the user had a stroke, and hope to reduce stroke hazards.

STD Competition Section: Master Group (I)

Afternoon, May 18, 2019 (Saturday)

Time: 13:30~14:45

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

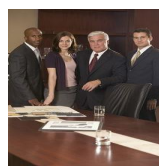
Dr. Tse-Hung Huang

X0028 Presentation 4 (14:15~14:30)

Mining User-Generated Content to Identify Social Support in Chinese Online Smoking Cessation Community

Yuxing Qian, Bingjia Li, **Zhizhen Yao**, **Huakui Lv**, Mengnan Che, Zhuo Cheng
Wuhan University, China

Abstract- Purpose/Significance: This study on the social support behavior of online smoking cessation community users can provide support for community management personnel to guide user behavior, enrich and deepen the functions of online smoking cessation communities and improve user stickiness, and also provides effective basis for public health workers to develop smoking cessation strategy in online communities. **Method/Process:** All the posts published in Baidu JieYanBa from August 1, 2018 to October 31, 2018 were gained. 2758 posts from core users were selected. Theme coding was adopted to divide the stage of smoking cessation of the poster. Keywords extraction and co-keywords network analysis were carried out to identify the types of social support and analyze its similarities and differences in different smoking cessation stages. **Results:** With the development of the smoking cessation stage, the proportion of emotional support and information support is on the rise. Emotional support is the main theme of social support in the preparatory stage, the action stage and the maintenance stage. The types and proportions of social support change regularly at different stages of smoking cessation.



Coffee Break Outside of Room 307 (3rd floor in No.9 Building)	14:45~15:00
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Special Session 4

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 307

Topic: “Healthcare Quality Management”

Session Chair: Prof. Liang-Ju Chen

SS04-01 A Presentation 1 ((15:00~15:15)

Medication Knowledge, Attitude and Practices of the middle-aged and elderly people in central Taiwan

Hsin-Jung Yang, Liang Ju Chen

HUNGKUANG University, Taiwan

Abstract- Background: According to the statistics of Health Promotion Administration, Ministry of Health and Welfare in Taiwan, 86.4% of the elderly suffer from at least one chronic disease and 47.3% suffer from more than three chronic diseases. Elders suffer from multiple chronic diseases should to use more drugs. In addition, the elders not only take prescription drug, but also health food, dietary supplement and alternative medicine, that lead to serious problems with polypharmacy. This study mainly focused on the medication knowledge, attitude, and practices of middle-aged and elderly people in central Taiwan. Methods: The research was a cross-sectional study and a self-administered structured questionnaire was conducted to collect data from middle-aged and elderly patients in a district hospital in central Taiwan. The content of the questionnaire was included personal characteristics, health condition, medication situation, social support, interaction between medical staff and patients, medication knowledge, attitude, and practices. A total of 440 questionnaires were delivered, 415 valid samples were collected. The statistical software SPSS version 19.0 was used to perform descriptive statistics, t-test, ANOVA, correlation analysis, regression analysis. Results: The results showed that an average of 2 types of medicines and 4 drugs were taken per time by respondents. Living arrangement, monthly income, taking types of non-prescription drug were significantly different from medication attitudes. Furthermore, the interaction between medical staff and respondents had significant positive correlation with medication attitude; medication knowledge and attitude had significant positive correlations with medication practices. Conclusion: medical staff should guide the correct instruction of drugs to the patient in a simple and easy way during consultation; patient should take the initiative to ask about how to take the drug. And hospital should organize health education activities for middle-aged and elderly people and promoting the importance of proper medication.

Special Session 4

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 307

Topic: “Healthcare Quality Management”

Session Chair: Prof. Liang-Ju Chen

SS04-02 A Presentation 2 ((15:15~15:30)

Study on dietary behavior and nutritional status of elderly people in SHALU community care sites.

Yu Ting Zhuo, Liang Ju Chen

HUNGKUANG University, Taiwan

Abstract- Background: Malnutrition is an important issue of elders, because of cause physical weakness and reduce immunity. Community care sites were provided lunch for elders in communities, that was a service model to promote social interaction and enhance nutrition status for sub-health and frailty elders.

Therefore, the purpose of this study was to descript the dietary behavior and nutritional status, and examined the relationship between dietary behavior and nutritional status.

Methods: The subjects were senior citizens over 65 years old in 12 Shalu community care sites in Taichung City, Taiwan. This was a cross-sectional study and collected data by face to face interview. The questionnaire was included demographic characteristics, dietary behaviors, health status and nutritional status of the elders. 350 questionnaires were distributed and 299 valid samples, the response rate was 85%. SPSS19.0 was used to perform descriptive statistics, Chi-square test and logistic regression analysis.

Results: The result was showed that most subjects were female, 70-74 years old, married, lower education level. There was a significant correlation between demographic characteristics and dietary behavior. After controlling other variables, the probability of malnutrition was with nervous system disease (OR=2.837), difficulty in chewing (OR=3.709), a lack of protein for lunch (OR=4.272), and who had a daily amount of water was more than 1500c.c and less than 2500c.c. (OR=0.091, 0.200) was less probability of malnutrition.

Conclusions: the study suggest that community care sites could cooperate with professional (such as dietitians) to organize health education issues of nutrition knowledge, and appropriate menu according to chronic disease and oral status.

Special Session 4

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 307

Topic: “Healthcare Quality Management”

Session Chair: Prof. Liang-Ju Chen

SS04-03 A Presentation 3 ((15:30~15:45)

Exploring the relationship between long-term care service preferences and willingness to pay in Taichung City: a population - based study

Liang Ju Chen, Chia Pei Wu

HUNGKUANG University, Taiwan

Abstract- Background: Taichung City is the second largest city in Taiwan. The fast-growing elderly population has begun to receive attention from public welfare policies for long-term care and welfare needs. Long-term care services have also entered the stage of industrial development, especially after the long-term policy of Long-Term Care 2.0 resources are booming. Therefore, the purpose of this study was to explore the relationship between the preference for long-term care services and the amount of willingness to pay as a reference for long-term care resource development and policy. Method: This study was a cross-sectional study which was conducted a structured questionnaire which including demographic characteristics, preferences for the use of long-term care services, and the amount of monthly willingness to pay. The subjects were aged more than 55 years old before May 31, 2018 in Taichung City, and PPS sampling was conducted in 29 administrative districts, with 1,008 valid samples. The data was descriptive and inferential analysis with SPSS 19.0. Result: 54.81% of people aged 55-64 had willing to use long-term care services, which was higher than 47.80% of the population over 65. The proportion of people aged 55 to 64 who had willing to use long-term care services in urban areas was the highest (60.55%), and those who were over 65 years old living in mountainous areas were the most willing to use long-term care services (63.77%). In terms of age, the higher the age, the lower the rate of willingness to use long-term care services; home-based long-term care services were the preferred mode of care for most people. About half of the long-term care services were willing paid less than NTD\$10,000 per month, and those with low or middle-low income earners use government grants. In addition, about 30% of those aged 55 to 64 were willing to pay less than NTD\$5,000 per month, and elderly over 65 years old were only want to use government's free quota (30.09%). Long-term care services usage preferences were significantly associated with monthly willingness payments ($p < 0.05$). Conclusion: Home-based care is the mainstream of long-term care services. The amount to be paid was an important factor affecting the choice of service use. The majority of people pay less than 10,000 for service use. Among them, the people who choose the institutional service were willing to pay higher fees, followed by the choice of community-based service providers, and who choose home-based services are willing to pay lower fees.

Special Session 4

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 307

Topic: “Healthcare Quality Management”

Session Chair: Prof. Liang-Ju Chen

SS04-04 A Presentation 4 ((15:45~16:00)

Monthly salary or hourly wage? Intention to choose of home care workers

Liang Ju Chen, **Wen-Ling Huang**

HUNGKUANG University, Taiwan

Abstract- Background: The loss of manpower in Taiwan due to inadequate remuneration and benefits for home care workers is the key point reason, so there were some home care organizations implemented monthly salary instead of hourly wage. However, there is no empirical data for policy to establish remuneration system. Therefore, the purpose of this study was to explore the intention of home care workers to choose remuneration system.

Methods: The study was a cross-sectional study and collected data from structured questionnaires by self-reported. The questionnaire was included population characteristics, family factors, and work factors. 626 subjects from home care organizations were analyzed with descriptive and inferential statistics by SPSS 19.0 statistical software.

Results: The results showed that subjects chose hourly wage, pay by different levels, monthly salary were 45%, 17% and 38%, respectively. The data showed that different gender, age, working hours, promotion system, job satisfaction and current remuneration system satisfaction were significant differences in intention of choosing remuneration system.

Conclusion: Based on the above results, in order to improve the remuneration system, which might not be the appropriate strategy to implement monthly salary for all workers, there should be more flexible for home care workers to choose the remuneration by individual situation.

Special Session 3-(II)

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchi Chen

SS03-06 A Presentation 1 ((15:00~15:15)

Application of Medical Research Applying Text Mining in PubMed: Case Study of Using Asthma as the Keyword

Yi-Wei Kao, Ben-Chang Shia, Mingchi Chen

Fu Jen Catholic University, Taipei, Taiwan

Abstract- Recently, big data and artificial intelligence are quite popular in each field, and it has no exception on the application in the medical area. The most famous application of medical big data in Taiwan would be the medical research through National Health Insurance Research Database (NHIRD) in the past few years. This database contains information over 99% of people in Taiwan since the beginning of 1995. Scholars in Taiwan have published more than 3,000 SCI papers related to using NHIRD, and all these papers are included in the PubMed. This study aims to introduce the medical research procedure using R-Shiny platform. The platform developed by this research adopts the method of text mining to analyze the relevant documents in PubMed. Ones could easily search for the articles in PubMed by keywords on this platform, and then the following Word Clouds, Word Cluster Diagram, text relevance are produced. As a result, it could provide the possible research directions and recommendations to the researchers. Finally, we introduce the platform using the analysis of asthma as an example. The study used asthma and region names as keywords to compare the results of asthma studies in different regions. Based on the results of the analysis, we analyzed the researches from January 1st to February 28th, 2019, and found out COPD is the only one disease related to Asthma outside Taiwan region. There are two more words ADHD and Children appeared in Taiwan's researches, indicating that a considerable proportion of studies conducted in Taiwan are the studies of Pediatric asthma. Comparing with the result from Korea, which also has a medical big data database, it could be found out that the patterns of Word Clouds between two countries are completely different, indicating that the focus of researches from two countries are also different. The contribution of this research is to simplify the work of collecting and reading a large number of literatures through our platform of analysis. By analyzing big data through text mining techniques, the abstracts and full papers of each designed research subject could be quickly screened to obtain the summary, and thus accelerate the research process.

Special Session 3-(II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchih Chen

SS03-07 Presentation 2 ((15:15~15:30)

Integrated data mining classification scheme for predicting recurrent endometrial cancer

Mao-Jhen Jhou, Chi-Jie Lu, Chih-Te Yang, Chien-Chih Wang

Chien Hsin University of Science and Technology, Taiwan

Abstract- Background: Early detection can improve a woman's chances of surviving endometrial cancer. But an early diagnosis of endometrial cancer is difficult and to date there are no standardized screening programs. The literature emphasizes that a delay in diagnosis increases mortality rates and recurrence rates. Data mining, which involves the retrieval and analysis of large amounts of data from a data warehouse, has been successfully used to uncover hidden patterns (or rules) among data in a variety of fields. As data mining can capture delicate underlying patterns and relationships contained in empirical data, and provide promising medical diagnosis results, it has been widely used to construct a systematic method to diagnosis the incidence of specific diseases, such as, liver disease, heart diseases, cancers, and more. **Methods:** In this study, three data mining approaches including logistic regression (LR), random forest (RF) and decision tree (DT) were considered in this study for predicting recurrent endometrial cancer. As the real-world medical datasets usually have class imbalance problems because they are often composed of a much larger number of normal instances with only a small percentage of abnormal ones, four approaches including oversampling (OS), undersampling (US), Cost Sensitive Learning (CSL) and Synthetic Data Generation (SDG) were used in this study to reduce the effect of the class imbalance problem. This study integrated three data mining approaches and four class imbalance methods to propose twelve integrated data mining classification schemes for predicting recurrent endometrial cancer. **Results:** In this study, the endometrial cancer dataset provided by one Thailand university is used to verify the feasibility and effectiveness of the proposed twelve integrated data mining classification schemes. Each patient in the dataset contains 18 predictor variables, namely, AGE, response of prim Px, Histology, BMI, Grade_Differentiation, Menopausal status, Tumor size, Diabetes, Date of Surgical Staging, Hypertension, Surgical Margins, Dyslipidemia, Site of residual, Smoking, Distant metastatic, Hx Familial cancers, radiation Therapy and adj chemo. And the response variable is recurrent or no. There are totally 713

patients in the dataset. Among them, 574 datasets with respect to the ratio of recurrent and non-recurrent patients (the prior probabilities or simply priors) were randomly selected as the training sample (estimating the parameters of the corresponding built classification models) while the remaining 139 will be retained as the testing sample (evaluating the classification capability of the built models). Table 1 shows the classification results of the 12 proposed schemes. From the Table, It can be seen that the SDG-LR, which is first use SDG to deal with class-imbalance issue and apply LR as classification method, is the best model as it generate the best ROC area values and provide the relative high accuracy and precision values and reasonable sensitivity value.

Special Session 3-(II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchih Chen

SS03-08 A Presentation 3 ((15:30~15:45)

Establishment of an emergency incidence map in Taiwan

Kuo-Fang Hsu, Tian-Shyug Lee

Fu Jen Catholic University, Taipei, Taiwan

Abstract- According to the statistics of the Ministry of Health and Welfare in 2016, the number of emergency medical treatments in Taiwan was 4.15 million in 2014, the number of visits per 100,000 population was 17,729, and the number of medical consultations was 6.5 million. The emergency medical expenses in 2014 were 19.6 billion points, an increase compared with the 17.7 billion points in 2011. A long-standing problem in emergency care in Taiwan is the "emergency congestion". The situation of emergency congestion is not only in Taiwan, but also in the United States, Australia, Canada, Spain and many other countries.

The emergency department is a unique entry point for the health care system. It not only provides 24-hour service 24 hours a day, but also provides services to all people regardless of age, insurance or financial ability. Important medical treatment pipeline. The use of emergency medical care by the public is on the rise throughout the world. Because the emergency department is designed to deal with the medical needs of the people in a short period of time, its convenience makes the abuse of emergency medical care happen constantly, which leads to the congestion of the emergency department, the burden of medical staff, the increase of medical costs, and the delay in diagnosis and treatment. Etc. There are many studies at home and abroad that indicate that there is a large proportion of users in emergency medical care, and their needs are not urgent. Inappropriate use of emergency care seems to be a worldwide problem and continues to increase.

In view of this study, the Taiwan emergency map was established, and the National Health Insurance database was used to establish a visual analysis module for the emergency use situation of people in Taiwan. According to different county and city, the emergency medical treatment of different areas, the emergency treatment rate per 100,000 population, the number of emergency medical treatment, the emergency medical expenses combined with the geographic information visualization tool, and the analysis of the difference comparison, for emergency use in different regions Suggestions for improvement of the situation.

Special Session 3-(II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchih Chen

SS03-09 A Presentation 4 ((15:45~16:00)

The relationship between dynamic physical fitness and obesity

Wei-Jen Chen, Michael T. S. Lee, Chien-Chang Ho

Fu Jen Catholic University, Taiwan

Abstract- This study explored the effects of dynamic physical fitness on obesity in Taiwanese adults. The research separately discussed the effects of dynamic physical fitness (sit-ups, sit-and-reach, CEI) on the BMI and WHR. The BMI reflects the overall degree of obesity and the WHR reflects the degree of waist and abdomen obesity.

We got data from the National Physical Fitness Examination Survey (NPFES) in Taiwan. This survey was conducted by the Sports Administration, Ministry of Education, Taiwan (MOE-SA). This survey of year 2013 contained questions within physical fitness tests as body composition (body mass index [BMI (kg/m²)] and waist-to-hip ratio [WHR]), flexibility (sit-and-reach tests), abdominal muscular strength and endurance (bent-leg sit-up tests), cardiovascular endurance (3-min step tests). We used the MARS model to analyze the effects of dynamic physical fitness on two types of obesity performance.

The results showed that for the WHR, the risk of waist and abdomen increased with age. People with better sit-ups, sit-and-reach, and cardiorespiratory performance had better WHR index. For BMI, before the age of 37, the BMI value increased significantly with age, and after 37 years of age, there was no effect. The effect of sit-ups on BMI was similar to WHR. The effect of sit-and-reach had the highest obesity risk at value 34, which decreased in both directions. Before the CEI value was 55.9, the BMI showed a rapid declining trend with the increase of cardiopulmonary function, when the threshold 55.9 was exceeded, the change tended to be gentle.

Special Session 3-(II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 308

Topic: “Health Risk Evaluation”

Session Chair: Prof. Mingchih Chen

SS03-10 A Presentation 5 ((16:00~16:15)

The effects of physical fitness and lifestyle on self-rated health

Ming Gu, Chi-Jie Lu, Michael T. S. Lee, Chien-Chang Ho

Fu Jen Catholic University, Taiwan

Abstract- Purpose: The present study aimed to explore the effects of physical fitness performance and lifestyle on self-rated health in Taiwanese adults.

Data source: We reviewed the data form derived from the National Physical Fitness Examination Survey (NPFES) in Taiwan. This survey was conducted by the Sports Administration, Ministry of Education, Taiwan (MOE-SA). This survey of year 2013 contained physical fitness tests as body composition (body mass index [BMI (kg/m²)] and waist-to-hip ratio [WHR]), flexibility (sit-and-reach tests), abdominal muscular strength and endurance (bent-leg sit-up tests), cardiovascular endurance (3-min step tests). And it also contained demographic variables, lifestyle variables including sleep condition and using habits of electronic media products, and self-rated health variables.

Methods: The data contained seven questions related to self-rated health status, namely feelings of nervousness, irritability and anger, depression, feeling of failure, healthy feeling, happiness feeling, and life satisfaction. We used the scoring method of the general health questionnaire (GHQ) to score these 7 variables comprehensively, and got a score range of 0 to 31 points. Then we used the MARS model to analyze the effects of fitness variables and lifestyle variables on SHR. Multivariate adaptive regression excels at finding optimal variable transformations and interactions, the complex data structure that often hides in high-dimensional data, and hence can effectively uncover important data patterns and relationships hidden in data.

Results: The study showed that the three variables related to sleep condition (sleep quality, sleep duration, bedtime) were all important factors on SHR. Among other lifestyle variables, only computer using duration had significant impacts on SHR. Among the physical fitness variables, BMI and WHR representing body composition had no significant effect on SHR, but the performances of bent-leg sit-up tests and sit-and-reach tests which represented exercise capacity and the CEI for cardiopulmonary health had significant effects on SHR.

Student Essay Competition

STD Competition Section: Master Group (II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X1008 Presentation 1 (15:00~15:15)

Visualization Analysis of Cardiovascular Risk Factors Based on Knowledge Mapping

Ling Yan, Zuojian Zhou, Yun Hu, Yihua Song, Weihong Zhou

Nanjing University of Chinese Medicine, China

Abstract- To provide guidance for the study of risk factors of cardiovascular disease in China, we analyze and compared the research hotspots and frontiers of cardiovascular risk factors in China and outside China in this paper. The Cite Space software is used to visualize the research literature on cardiovascular risk factors from Cnki(China Knowledge Network Internet) and Web of Science core collection database from 2010-2018, and to draw the knowledge map of high-frequency words, research institutions and countries. In this project, a total of 318 Chinese literatures and 9,009 English literatures were screened out as research objects. The number of annual publications assumes an increasing tendency, most of which are concentrated in developed countries or regions. Study of cardiovascular risk factors abroad is significantly taken more seriously than in domestic. This study shows that the research frontier has already been extended to lifestyle, particulate air pollution, socioeconomic status, depression, stroke and breast cancer, etc. Moreover, children, adolescents and women have been more concerned in the target population. In consideration of the main reasons for cardiovascular disease---Hypertension, diabetes, coronary heart disease, obesity, atherosclerosis and metabolic syndrome, etc., we should pay close attention to the influence on the risk of cardiovascular disease produced by psychological state, living habits, regional differences, air pollution and so on. Meanwhile, we also need to take the screening and prevention of cardiovascular risk more seriously among adolescents.

STD Competition Section: Master Group (II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X1010 Presentation 2 (15:15~15:30)

Evaluation of Upper Limb Joint's Range of Motion Data by Kinect Sensor for Rehabilitation Exercise Game

Peng Nan, Amnad Tongtib, Theeraphong Wongratanaphisan
Chiang Mai University, Thailand

Abstract- Rehabilitation is a tedious process both for patients and physiotherapists. Many games have been developed, especially for upper limb rehabilitation, to help training more enjoyable for patients which results in an increase in participation and shortening recovery time. Using game, patient's performance in each training course is assessed by the score patient receives after the session. Although these scores might correlate to the range of motion (ROM) of the arm, they cannot be used to directly for evaluation. In this study, a game was created for upper limb rehabilitation which also provides summary of upper limb movement over training session in terms of ROM by using Kinect camera. Formulae to obtain seven upper limb's ROM angles i.e., especially for shoulder flexion, shoulder extension, shoulder abduction, shoulder adduction, shoulder internal rotation, shoulder external rotation and elbow flexion, have been derived. Experiments were conducted to evaluate accuracy of the ROM obtained from the calculation with respect to conventional measurement using goniometer. The results show that, with proper setting (position and orientation) of the Kinect sensor, ROM values obtained from the Kinect sensor match well to the goniometer to within $\pm 13.5\%$. Various statistics related to ROM data can be analyzed after each training session. This game would be a useful tool for physiotherapist to monitor and evaluate the progress of patient's recovery.

STD Competition Section: Master Group (II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X0020 Presentation 3 (15:30~15:45)

Predict the Synchronous and Metachronous SPCs in Patients with Colorectal Cancer

Yi-Xiang Zhang, Chi-Chang Chang, Wen-Chien Ting

Chung-Shan Medical University, Taiwan

Abstract- Background: The advanced screening and treatments resulted in the rising numbers of Second Primary Cancers (SPCs) in Taiwan.

Purpose: The purpose of this study was to identify risk factors of SPCs in colorectal cancer (CRC) survivors.

Methods: The clinical dataset collected from the cancer registry centers of three hospitals. Of the 4,287 records, each patient has 14 independent variables and one dependent variable (with SPC or not). The research method will use the Naive Bayes (NB), Logistic (LG), Kstar (KS), Random Committee (RC), Randomizable Filtered (RMF), RandomForest (RF), and RandomTree (RT) in Weka to explore the risk factors of SPCs for patients with CRC.

Result: The results showed that among the 14 predictive factors, the risk factors of the SPCs were Combined Stage, Tumor Size, Chemotherapy, Grade/Differentiation and Primary Site. In addition, the best accuracy of the classifiers in $< \text{IIb}$ and $\geq \text{IIb}$ staging was NB with 88.03% and 93.62%. Further, in the colon primary site: the accuracy of $< \text{IIb}$ staging was the best with KS (87.07%), and the accuracy of $\geq \text{IIb}$ staging was the highest with NB (92.88%). In the rectal site: the best accuracy of the classifiers in $< \text{IIb}$ and $\geq \text{IIb}$ staging was NB with 89.97% and 95.36%.

Conclusion: In this study, we analyzed the Synchronous/Metachronous SPCs in CRC patients. Our findings support that Chemotherapy is independent prognostic factor in synchronous, Surgical Margins is independent prognostic factor in metachronous. BMI and Smoking Behavior were significantly related to the Synchronous/Metachronous SPCs in CRC.

STD Competition Section: Master Group (II)

Afternoon, May 18, 2019 (Saturday)

Time: 15:00~16:15

Venue: Room 309

Session Chairs: Dr. Chalong Cheewakriangkrai; Prof. Tsu Wang Shen

Dr. Tse-Hung Huang

X0009 A Presentation 4 (15:45~16:00)

Pharm: An R package for medication analysis of electronic health data

Yeh-Yung Chiu, **Ching-Yu Su**, Yi-Ju Tseng

Chang Gung University, Taiwan

Abstract- Currently, most health data, such as electronic medical data and medical insurance data, are digitized. Thus, international coding standards, such as the International Classification of Diseases for diagnosis and procedure coding, are indispensable for accurately and effectively recording electronic health data. However, compared to diagnosis and procedure coding, medication coding is more complicated, and multiple coding standards are available. The most common medication coding standard is the Anatomical Therapeutic Chemical (ATC) code, which is used to classify active substances of drugs according to the organ or system on which they act and their therapeutic, pharmacological, and chemical properties. For clinical and billing needs, providers record active substances as well as brand names, packs, and forms of medications. For fulfilling the prescriptions, regional coding standards, such as the US national drug code (NDC), are used for medication coding. In addition, to integrate different drug vocabularies, the US National Library of Medicine developed RxNorm, which provides normalized names for clinical drugs and links these names to many drug vocabularies commonly used in pharmacy management and drug interaction software. When researchers process and analyze medication data, they must standardize the coding system in the data. However, there is no easy method or an open source package to assist researchers in accomplishing this process. In this study, we developed an R package called “pharm” to standardize and analyze the medication data. The “pharm” package provides preprocessing functions for medical records, including medication transcoding, filtering, and defined daily dose (DDD) calculations. To process medication data from the providers in Taiwan, this package converts Taiwan’s National Health Insurance codes for medications into the ATC code. After standardizing medication codes based on the international standard, researchers can further convert ATC codes to RxNorm codes for subsequent analysis and filtering. To process medication data from providers in the US, “pharm” converts the NDC to RxNorm code. Then, users can query the medication details

and indications based on the RxNorm standard. Furthermore, “pharm” filters medications based on indications. Users can identify all medications used for specific indications. Finally, users can use the ATC code converted from “pharm” to calculate the cumulative DDD value for each patient on a particular medication for subsequent analysis. Thus, this study constructed the “pharm” package to simplify the burden on researchers in analyzing medication data and improve the accessibility for nonprofessionals to analyze them.

Special Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 307

Topic: “Computational Intelligence Methodologies”

Session Chair: Prof. Yi-Ju Tseng

SS02-01 A Presentation 1 (16:15~16:30)

emr: An R package for electronic health records preprocessing and integration

Hsiang-Ju Chiu, **Yi-Ju Tseng**

Chang Gung University, Taiwan

Abstract- Research with structured electronic health records (EHRs) becomes more accessible. However, the characteristics of healthcare big data, such as heterogeneity and sparseness, make reprocessing and analysis of information difficult, creating a common bottleneck in analysis of healthcare big data. The proposed open-source emr package is a software tool aimed at expediting an integrated analysis of disease comorbidities by incorporating several analytical and visualization functions. The emr package for clinical big data standardization provides mechanisms to examine, organize, and analyze clinical data, including diagnosis and procedure records. Before starting the integration processes, the emr R package examines the correctness of International Statistical Classification of Diseases (ICD) codes, uniforms format, and displays clear warning messages to help a researcher identify the EHR. The package also contains a set of flexible built-in querying functions for extracting data using specified criteria and selecting data before or after an event (e.g., index date) or a eligible case within a certain time period. The emr package supports four strategies to group clinical diagnosis data (ICD-9/ICD-10 codes), including Clinical Classifications Software (CCS), phenome-wide association studies, comorbidity (Elixhauser, Charlson, and AHRQ), customized defined grouping method, and implementation groups of clinical procedure data to CCS or procedure classes. After EHRs are organized, the emr package supports researchers to filter out data based on the ICD code or grouped method (e.g., CCS). The structure of organized narrow data can be also converted to a wide form of dataset that is suitable for statistical analysis. The processed data can be used to calculate condition era by ICD code or grouped method (e.g., CCS). Data empower researchers to focus on further analyses and studies. This simplified and accelerated workflow for EHR data extraction results in simpler and cleaner scripts that are more easily debugged, shared, and reproduced. The emr package helps researcher explore EHRs to acquire crucial information from the data and understand disease progression. Preparing a research-ready dataset from EHRs is a complex and time-consuming task and requires substantial data science skills, even for simple designs. The emr package simplifies and accelerates the process of extracting ready-for-analysis datasets from EHR databases. Availability and implementation: This R package is freely available at <https://github.com/DHLab-CGU/emr>. It is implemented in native R and is platform independent.

Special Session 2

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 307

Topic: “Computational Intelligence Methodologies”

Session Chair: Prof. Yi-Ju Tseng

SS02-02 A Presentation 2 (16:30~16:45)

Sanfutie: A Comprehensive Review of Acupoint Herbal Patching Therapy for Allergic Diseases

Tse-Hung Huang, Chiung-Hsin Chang, Hsin-Ning Chang, Yuan-Chieh Yeh
Chang Gung Memorial Hospital, Taiwan

Abstract- Sanfutie is a special form of acupoint herbal patching therapy performed topically with irritating herbs in the “dog days” to optimize therapeutic effects. According to the literature, Sanfutie can be used to treat various allergic diseases. Currently, there is encouraging evidence for Sanfutie treating respiratory diseases, including allergic rhinitis, asthma, and chronic obstructive pulmonary disease (COPD). Some published clinical trials or reviews concluded that Sanfutie can improve symptoms and quality of life of allergic rhinitis, and reduce the attack frequency of asthma and COPD without severe adverse effects. Two researches investigated the possible immune-modulating mechanism of acupoint herbal patching. However, clinical trials comparing acupoint herbal patching performed in the dog days and non-dog days are still lacking. Moreover, no study evaluates the efficacy of Sanfutie in treating allergic diseases other than respiratory system. More researches focusing on the mechanism and the relations between climate and efficacy are required to benefit future clinical practice.

Special Session 2

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 307

Topic: “Computational Intelligence Methodologies”

Session Chair: Prof. Yi-Ju Tseng

SS02-03 A Presentation 3 (16:45~17:00)

Ensemble Feature Learning to Identify Risk Factors for Predicting Secondary Cancer

Xiucan Ye, Hongmin Li, Tetsuya Sakurai, Pei-Wei Shueng

University of Tsukuba, Japan

Abstract- Background: In recent years, the development and diagnosis of secondary cancer have become the primary concern of cancer survivors. A number of studies have been developing strategies to extract knowledge from the clinical data, aiming to identify important risk factors that can be used to prevent the recurrence of diseases. However, these studies do not focus on the secondary cancer. Secondary cancer is lack of the strategies for clinical treatment as well as risk factor identification to prevent the occurrence. Methods: We propose an effective ensemble feature learning method to identify the risk factors for predicting secondary cancer by considering class imbalance and patient heterogeneity. We firstly divide the patients into some heterogeneous groups based on spectral clustering. In each group, we apply oversampling method to balance the number of samples in each class and use them as training data for ensemble feature learning. The purpose of ensemble feature learning is to identify the risk factors and construct a diagnosis model for each group. The importance of risk factors is measured based on the properties of patients in each group separately. Thus, in different patient groups, the rankings of risk factors are different. We predict secondary cancer by assigning the patient to a corresponding group and based on the diagnosis model in this corresponding group. Results: Analysis of the results shows that decision tree obtains the best results for predicting secondary cancer in the three classifiers. The best results of decision tree are 0.72 in terms of AUC when dividing in 15 groups, 0.38 in terms of χ^2 score when dividing the patients into 20 groups, 0.94 in terms of Accuracy when dividing in 20 groups. Different groups provide different ranking results for the predictor variables. For the proposed method, the improvements on the AUC and χ^2 score are significantly, while maintaining the similar level of Accuracy with the pure methods. Conclusion: The accuracies of predicting the secondary cancer using k-nearest neighbor, decision tree, support vector machine indeed increased after using the selected important risk factors as predictors. Group division on patients to predict secondary cancer on the separated models can further improve the prediction accuracies. The information discovered in the experiments can provide important references to the personality and clinical symptom representations on all phases of guide interventions, with the complexities of multiple symptoms associated with secondary cancer in all phases of the recurrent trajectory.

Special Session 2

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 307

Topic: “Computational Intelligence Methodologies”

Session Chair: Prof. Yi-Ju Tseng

X0012 Presentation 4 (17:00~17:15)

Influence of online and face-to-face collaboration and learning style on cognitive load and engagement in a health introductory course

Cheng-Hsuan Lan, Meng-Huei Sheng, Yu-Chiung Hsu, **Ya-Ming Shiue**

Chia-Nan University of Pharmacy and Science, Taiwan

Abstract- Although collaborative learning has received increasing attention, few studies have examined the differences between online and face-to-face (f2f) collaboration. This study utilized a two-factor experimental design to investigate the influences of collaboration mode (f2f versus online) and learning style on students' cognitive load and engagement. To assess the differences between online and f2f collaboration, cognitive load scale and engagement were collected from two different classes taking the same course at a university in Taiwan. The results show that online collaboration led to a higher cognitive load than that required for f2f collaboration because students have to learn how to use the online collaboration platform. However, online collaboration had higher engagement compared to that for f2f collaboration which represented student were more willing to engage in collaborative technologies. Students who preferred visual learning reported that the use of online collaboration led to less cognitive load and higher sustained attention than that experienced with verbal learning. No significant differences were found related to students' learning style in the f2f collaboration group.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucui Ye

X0005 Presentation 1

An effective ROI extracting method for color brain slice in assisting the diagnostic analysis of epilepsy

Bin Liu, **Mingzhe Wang**, Song Zhang, Xiaohui Zhang, Yiqian Yang, Li Gao, Liang Yang
International School of Information Science & Engineering (DUT-RUISE), Dalian University of Technology, China

Abstract- For the epilepsy disease, many studies about the thickness of cortex among various brain regions haven been implemented. However, there is few research about the cell distribution of the gray matter of adjacent gyrus and sulcus. Our studies indicate it is possible different that the thickness of the GFAP-IR interlaminar astrocytes somas between in gyri and sulci in epilepsy. Based on this motivation, we proposed a color brain slice image ROI (region of interest) extracting method. A classifying method is imported to compute the comparability between two pixels in the slice image. An improved mechanism of color data query table is designed to accelerate the processing speed. Human brain tissue images acquired during surgical resection for epilepsy are utilized as the experimental object. The regions of most interest can be extracted and the 3D color gradient field can also be visualized. In conclusion, we can not only achieve the information of interlaminar astrocytes, but also provide a technic support for building the information network of epilepsy diseases.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucan Ye

X0013 A Presentation 2

Gut microbiota composition and bone mineral loss—ridge regression

Can Li, Qi Wang

Huazhong University of Science and Technology, China

Abstract- Introduction Gut microbiota plays important roles in human health and associates with a number of diseases. However, few studies explored its association with bone mineral loss in human.

Methods We collected 102 fecal samples from each eligible individual belonging to low-bone mineral density (BMD) and control groups for high-throughput 16S ribosomal RNA (rRNA) gene sequencing. For data analyses, we used the ridge regression analysis—a penalized regression approach that offers good performance in multivariate prediction problems—to explore the association between gut microbiota relative abundance and bone mass measurements (i.e. BMD, T-score and Z-score) while adjusting for covariates such as age, sex, and body mass index (BMI).

Results The low-BMD individuals had smaller number of operational taxonomic units (OTUs) and bacterial taxa at each level. At the phylum level, Bacteroidetes were enriched in the low-BMD group; Firmicutes were more abundant in the control group. At the family level, the abundance of Lachnospiraceae in low-BMD individuals reduced. At the genus level, low-BMD individuals had decreased proportions of Roseburia compared with control ones ($P < 0.05$). Ridge regression analysis showed that the BMD in femoral neck (FN) increased with rising Actinobacteria abundance after adjusting for age, sex, and BMI (all $P < 0.05$). At the family level, the BMD and T-score in lumbar spine (LS) and the BMD in FN increased in response to the increase in Bifidobacteriaceae community abundance (all $P < 0.05$). At the genus level, the BMD, T-score, and Z-score in total hip and T-score in FN decreased with increasing Clostridium_XIVb abundance (all $P < 0.05$). The BMD in LS increased with increasing Bifidobacterium abundance after adjusting for confounders ($P < 0.05$).

Conclusions Several taxa with altered abundance were discovered in low-BMD individuals. Our findings provide novel epidemiologic evidence to elucidate the underlying microbiota-relevant mechanism in bone mineral loss and osteoporosis.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucan Ye

X0014 A Presentation 3

Bayesian random-effects meta-analysis to construct a robust prior distribution in clinical trials

Mingming Yan, Tingting Qin, Ping Yin

Huazhong University of Science and Technology, China

Abstract- Introduction: Meta-analysis, as a powerful tool for evidence synthesis, can be used in clinical trials to derive prior distributions from existing historical trial information. But given the less historical trial data available in clinical trials, the accuracy and robustness of pooled results from frequency meta-analysis remains to be studied. Based on this, we considered the Bayesian random-effects model to evaluate the robustness of heterogeneous estimation and the reliability of constructing prior distribution. Besides, considering the occurrence of prior-data conflict, we studied to optimize and construct robust prior distribution.

Methods: In the simulation tests, we set the true value of the combined effect μ as 0.5, with prior distribution as $\pi(\mu) \sim N(0, 4)$, the true value of the heterogeneity parameter τ as 0, 0.1, 0.5, 1 or 2, with prior distribution as Half-Normal (0.5), Half-Normal (1.0), Half-t (0.5) and Half-Cauchy (0.5). We simulated 2 and 3 cases with different sample size combinations (25, 50, 100, or 400) and the total simulation sample was 15000. The DL, REML and PM method of frequency-based random effects meta-analysis as well as the Bayesian random-effects model with different prior distributions of heterogeneity parameters were used to estimate the heterogeneity and the pooled effects. And then the mixed distribution and heavy-tailed distribution were used to construct the robust prior distribution. All the analyses were completed using R software.

Results The results of meta-analysis from two and three historical studies suggested the frequency meta-analysis was not suitable for small studies when the heterogeneity between studies was large. While the Bayesian random-effects meta-analysis method can accurately estimate the heterogeneity between studies when the specified heterogeneity prior was comparable to the actual one, and when the specified heterogeneity prior was larger than the

actual one, the heavy-tailed distribution (Half-t distribution and Half-Cauchy distribution) can provide a more robust heterogeneity posterior estimate. In addition, compared with the frequency method, the Bayesian random-effects meta-analysis can not only provide accurate interval estimation of the pooled effects, but also provide higher precision of interval estimation.

Conclusions: In clinical trials, when the available historical data information is less, the frequency random-effects meta-analysis is no longer applicable. The Bayesian method can be used to summarize the historical data and obtain accurate pooled effect estimates. And then combined with the method of mixed distribution and heavy-tailed distribution, we can construct a robust prior distribution from pooled effect estimates that can deal with prior-data conflict flexibly. Therefore, the Bayesian random-effects meta-analysis can be better used as an effective prior distribution extraction tool in clinical trials when less historical data information was available.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucan Ye

X0017 Presentation 4

Medical Modeling and Numerical Analysis of Thoracoabdominal Aortic Aneurysm

ZHANG Hongna, ZHANG Nandong, Song Yujie, PENG Hongmei

Inner Mongolia University for Nationalities, China

Abstract- Objective: Thoracic and abdominal aortic aneurysm is a very difficult problem in the field of vascular surgery. According to discoveries of basic medical in recent years, hemodynamic changes are very important factors affecting the development of aneurysms. Methods: Three-dimensional of patients' CT images with thoracic and abdominal aortic aneurysms is reconstructed by medical imaging modeling software MIMICS, using ANSYS ICEM CFD 14.5 to divide the model into unstructured grids, finally using ANSYS 14.5 analysis hydrodynamics of thoracic and abdominal aortic aneurysms. The fluid pathline of blood flow distribution in the model, distribution of dynamic pressure and shear stress on the wall of blood vessels are obtained in this article. Results: when the blood flow inlet velocity is different, the blood flow distribution of the human thoracic and abdominal aorta is significantly different. Conclusions: According to the pressure and shear stress in individuals with thoracoabdominal aortic aneurysms, the formation of aortic aneurysm is closely related to hemodynamics, provide effective help for clinical diagnosis and treatment.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucan Ye

X0019 Presentation 5

Aberrant functional connectivity dynamics of superior temporal sulcus and its associations with GABA genes expression in autism

Xiaonan Guo, Changchun He, Xujun Duan, Shaoqiang Han, Jinming Xiao, Huaifu Chen
University of Electronic Science and Technology of China, China

Abstract- Autism spectrum disorder (ASD) is associated with functional coordination disturbances among brain regions. Genetic studies implicated that dysfunctional gamma-aminobutyric acid (GABA) system may play an important role in autism etiology. Based on previous reported static functional connectivity abnormalities of the posterior superior temporal sulcus (pSTS) in ASD, the current study aimed to explore the dynamic functional connectivity (dFC) variability of the pSTS in ASD and its associations with GABA receptor genes expression. Resting-state functional magnetic resonance imaging data obtained from the Autism Brain Imaging Data Exchange repository were analyzed in 209 males with ASD and 298 demographically-matched control males. For each subject, dFC maps of the bilateral pSTS were constructed through Flexible Least Squares strategy, and the variance of the dFC time series at each voxel was further calculated to quantify the temporal variability. Finally, gene expression decoding analysis was performed using NeuroVault to associate the dFC variability abnormalities with expression data of the GABA receptor genes.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucui Ye

X0031 Presentation 6

DGFE-VG: Dynamic Gene Feature Extraction via Visibility Graph

Jin-yin CHEN, Zhen WANG, **Hai-bin ZHENG**, Liang-ying Liu, Zi-ling Zhu, Shi-yan Ying, Yi-tao Wei

Zhejiang University of Technology, China

Abstract- Gene expression time series data plays an important role in the field of bioinformatics and data mining, as the analysis of the expression level and time series could detect specific information like gene function and classifications. In this paper, we propose a dynamic gene feature extraction method via visibility graph (VG). It is carried out in four stages: 1) complex networks are constructed from gene time series data; 2) different features are extracted based on the network structure and the specific characteristics of VG algorithm; 3) different classifiers are adopted to analyze gene time series data compared with different feature extraction methods, while, clustering algorithm are applied based on dynamic feature extraction via VG to achieve better performance; 4) different datasets are used to verify our method including clarifying and clustering according to the feature we extract. Abundant experiment results prove the effectiveness of VG method's in extracting the time varying and specific gene features underlying realistic complex gene expression data from time series.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucui Ye

X0022 Presentation 7

Major depressive disorder shows frequency-specific abnormal functional connectivity patterns associated with anhedonia

Yajing Pang, Qian Cui, Yifeng Wang, Yuyan Chen, Qi Yang, Huaifu Chen

University of Electronic Science and Technology of China, China

Abstract- Anhedonia is a core feature of major depression disorder (MDD), is associated with the dysfunction of the dopamine system. Here, we aimed to examine how resting-state functional connectivity (FC) within the dopamine system in MDD patients is related to anhedonia and whether this relationship relies on specific frequency bands (slow 4: 0.027—0.073 Hz and slow 5: 0.01—0.027 Hz). The regional connectivity strength and FC were evaluated. Our results revealed decreased connectivity strength in MDD in the posterior cingulate cortex and hippocampus at slow 4 and in the anterior insula and hippocampus at slow 5. Of note, increased FC in the mesocorticolimbic system was found in MDD only at slow 5. Furthermore, the altered connectivity at slow 5 contributed to predicting anhedonia symptom and depression severity. These findings highlighted the role of the dopamine system in the neural mechanism underlying the anhedonia of MDD, which may contribute to improving the treatment of MDD.

Poster Session

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 308

Session Chairs: Prof. Chih-Te Yang; Prof. Liang-Tsung Huang;

Prof. Ya-Ming Shiue; Prof. Xiucui Ye

X1006 Presentation 8

Current Situation and Experience of EHR in Primary Medical Institutions

Feng Tianyang

Kunshan Lujia Town Community Health Service Center, China

Abstract- Medical informationization can improve the quality and efficiency of medical services and reduce medical costs. Electronic health records can play a good role in this area. There are few studies in this area in China. The government also needs to strengthen its leading position.

Student Essay Competition

STD Competition Section: Undergraduate Group

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 309

Session Chairs: Prof. Yen-Chiao Lu, Dr. Wen-Chien Ting

Prof. Chi-Hua Tung

X0029 Presentation 1 (16:15~16:30)

Plantar Fasciitis Detection Based on Deep Learning Architecture

Ting-Ying Chien, **Yi-Ting Hsieh, Hou-Cheng Lee**, Yun-Jui Hsieh

Yuan Ze University, Taiwan

Abstract- Background: Plantar fasciitis is one of the most common foot pain problems in adults. The current diagnosis mainly relies on the inquiry of medical history and a physical examination of the body. In the objective laboratory examination, the blood test has not yet provided an effective diagnostic reference. In this study, we combine a deep learning algorithm architecture with thermal imaging to develop a plantar fasciitis medical decision system that predicts whether the patient has the condition.

Methods: This study collected patient image-related data, including 360-degree thermal video and RGB images of the affected area (foot), and patient clinical data. In data preprocessing, we first adjust the thermal image data, based on the different detection environments. After data processing, we employed the Convolutional Neural Networks (CNN) deep learning architecture to develop a prediction model.

Results: In total, 1,000 frames were used as the training dataset in this study—300 cases that had the condition and 700 cases that did not. The results showed that the CNN model can effectively predict plantar fasciitis. The inflammatory response is often accompanied by redness and swelling. This study used thermal imaging to detect the temperature of the affected area, which it combined with a deep learning algorithm to successfully detect the inflammatory condition. In the future, this technique can be used to detect other inflammatory reactions such as wound healing and hemorrhoids.

STD Competition Section: Undergraduate Group

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 309

Session Chairs: Prof. Yen-Chiao Lu, Dr. Wen-Chien Ting

Prof. Chi-Hua Tung

X2005 A Presentation 2 (16:30~16:45)

eHealth Literacy Plays Critical Role of Shared Decision Making: A Cross-Sectional Study

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Abstract- Despite the growing literature on coping strategies related variables predict health-related knowledge, yet little is known about eHealth literacy may be predicted by patient's Shared Decision Making. This study adopts a cross-sectional design to investigate whether the information ability has an mediating/moderating effects between health literacy and shared medical decision making. All participants completed the health literacy, ehealth literacy, and shared medical decision making questionnaires, respectively. The shared medical decision making index was used as an outcome measure. The mediation models and mediating hypotheses were tested by applying hierarchical multiple regression analyses. The results of this study show that female health literacy scores higher than male ($T=3.466$ $P=0.001$), ehealth literacy ($T=-0.362$ $P=0.781$) and shared medical decision making ($T=-1.555$ $P=0.121$); medical students' Health education manual score was significantly higher than that of non-medical students ($T=3.265$ $P=0.001$). The finding suggests that the college students' e-health literacy has fully mediating effects between health literacy and shared medical decision making. Overall, it is important for health providers to consider the notion that more ehealth literacy may sometimes, but not always, be better. Discussion highlights the need to examine nonlinear as well as linear relationships.

STD Competition Section: Undergraduate Group

Afternoon, May 18, 2019 (Saturday)

Time: 16:15~17:15

Venue: Room 309

Session Chairs: Prof. Yen-Chiao Lu, Dr. Wen-Chien Ting

Prof. Chi-Hua Tung

X3003 Presentation 3 (16:45~17:00)

Advances in the prevention of cardiovascular diseases by phytosterol

Ningzhu Bai

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Abstract- Cardiovascular diseases, mainly atherosclerosis and coronary heart disease, are crucial causes for worldwide morbidity and mortality. Unhealthy lifestyle and diet with high low-density lipoprotein (LDL)-cholesterol level are the major risk factors. Preventions of CVDs need to be taken early in age by changing to more phytosterol-enriched diet. Phytosterol is plant-derived compound with similar structure and function as cholesterol, but when supplied with food, it can lower the serum cholesterol concentration. Studies recommend the daily intake of 2g to 2.5g supplement of phytosterol can significantly reduce plasma LDL-cholesterol level. There are many researches on the mechanisms of cholesterol-lowering effect of plant sterol and plant stanol. It has been found that the differences in solubility and hydrophobicity enable phytosterol to intervene cholesterol from incorporating into micelles and to co-precipitate with cholesterol into solid crystals in intestinal lumen and reduce the absorption of cholesterol. Phytosterol also promotes the transporter gene expression to increase the cholesterol excretion back into small intestine. Furthermore, phytosterol also affect cholesterol metabolism and its transport in blood stream. Therefore, food enriched with phytosterol can be an efficient and safe method of preventing CVDs.



Dinner Taoran Hall (陶然厅) in No.7 Building (5th floor)	18:00
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One Day Visit

May 19, 2019 (Sunday) 7:30~17:00

(Tips: Please arrive at lobby of Xing Lin Wan Hotel (厦门杏林湾大酒店) before 7:30 a.m. The following schedule is only for participants who registered the visit & tour. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. (7:30) Assemble at lobby of Xing Lin Wan Hotel (厦门杏林湾大酒店)

2. Visit Gulangyu

Gulangyu is located southwest of Xiamen, and Xiamen City across (500 meters) across. She is like a crystal jasper, set in the boundless expanse of blue sea of Xiamen island, known as the "Pearl of Southeast Asia, a sea." Gulangyu was originally called "round sand", also known as "Yuen Chau Tsai," was originally just a fishing farm, and half the village. Yuan Dynasty, Li, on



behalf of the families have gradually developed on the island. Due to two meters on the beach there is a high, there are caves in the rocks, briefly sent shock waves of sound, exactly like the drums, was known as "Gulang Stone", was named the island of consequent "Gulangyu" and Ming dynasty official named. Wanli three decades, Celebrity Ding Choan Inscription in the Sunlight Rock, "Gulang Wonderland." To the Ming Dynasty, a national hero Zheng Chenggong stationed themselves there, naval training, so that the Gulangyu is well-known.

3. Visit Shuzhuang Garden & Piano Museum



Shuzhuang Garden, formerly a private garden, was built in 1931 at the foot of the Sunlight Rock, facing the sea, with the Sea-view Holiday Village in the east, and the bathing beach of the Rear Sea in the west. The garden consists of two parts, Canghai (Hiding the Sea) and Bushan (Adding Supplement to the Mountain). The main 4 structure, the 44th Bridge, was built on the sea. Walking on the bridge when tide rises, it seems as if one were walking on the waves. The garden is elegant, yet grand in design.

4. Lunch Time(12:00)

5. Visit Sunlight Rock



The sunlight rock, the best beauty spot of xiamen region, is located in the heart of gulangyu island. also known as "dazzling crag". the sunlight cliff features a huge boulder, 40 meters in diameter, towering atop the cliff as the symbol of xiamen, and it is associated with many stories about general zheng chenggong, a national hero, who once deployed his troops here for recovering taiwan from foreign occupation. the scenic area is full of

grotesque rocks and grottoes amidst lush green woods and flowers in riotous colours, coupled by splashing waves of the exotic subtropical region. famous sights here include "the piece of tile", "lujiang river cave", "the ancient cool grotto", "dragonhead mountain fortress", "the floating drill ground", and "100-meter-high terrace", etc. numerous inscriptions by literary celebrities of ancient times add much interest and antiquity to the site. the hilltop of gulangyu, accessed by the "heavenly ladder", commands a distant view of xiamen city and the isles of dadan and xiaodan. from the sunlight cliff, a cable car gives access to mount hero, where modern entertainment facilities, such as "the garden of all birds", "the movie theatre", and "the heroes garden", offer brisk activities of modern style in the ages-old, tranquil and natural surroundings.

6. Back to Hotel (17:00)

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