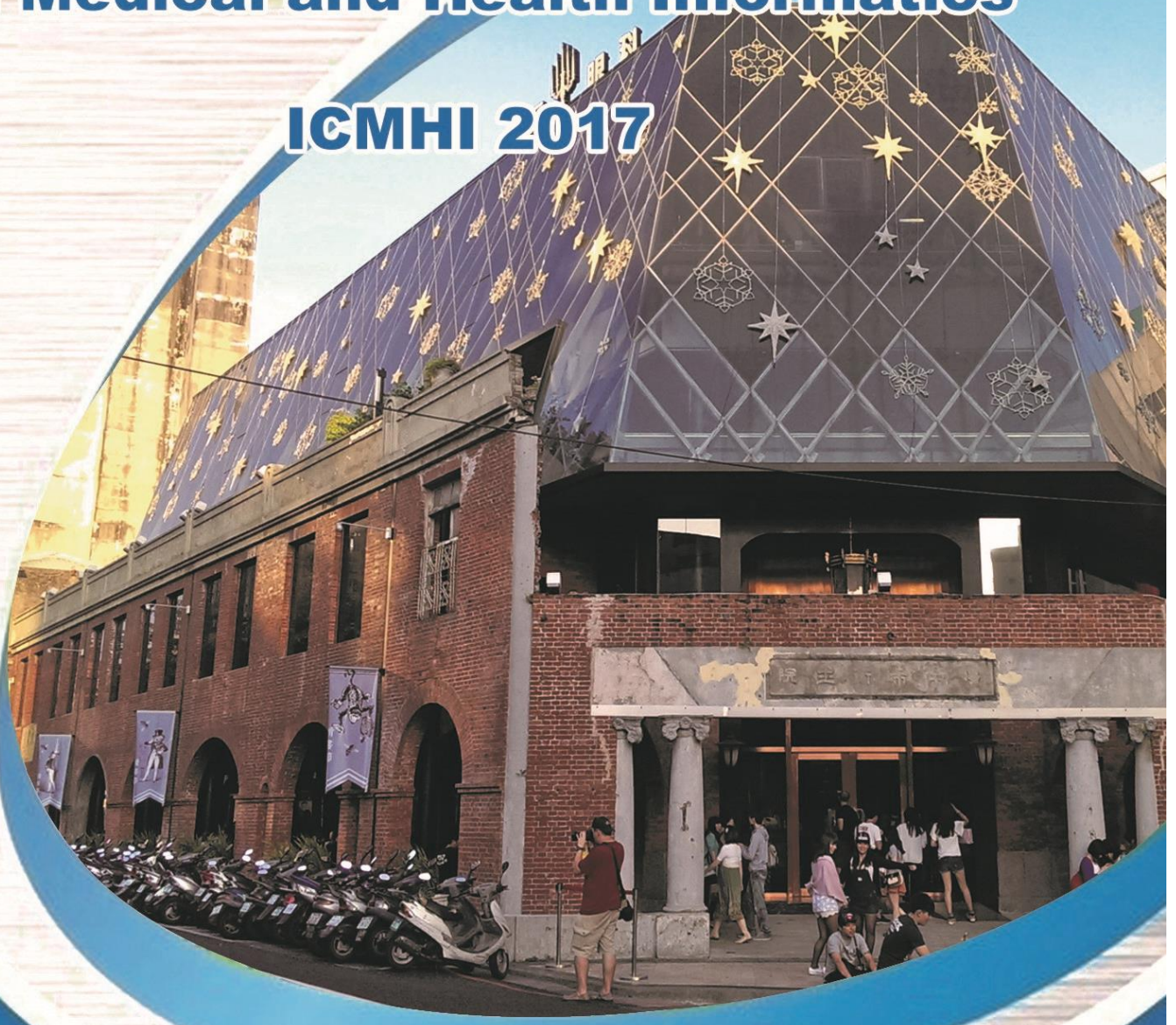
2017 International Conference on Medical and Health Informatics

ICMHI 2017



May 20-22, 2017
Chung Shan Medical University, Taichung City, Taiwan

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Welcome Address

We are pleased to welcome you to the 2017 International Conference on Medical and Health Informatics which will takes place at Taichung city, Taiwan during May 20-22, 2017.

After several rounds review procedure, the program committee accepted those papers to be published in conference proceedings and special journals. We wish to express our sincere appreciation to all the individuals who have contributed to ICMHI 2017 conference in various ways. Special thanks are extended to our colleagues in program committee for their thorough review of all the submissions, which is vital to the success of the conference, and also to the members in the organizing committee and the volunteers who had dedicated their time and efforts in planning, promoting, organizing and helping the conference. Last but not least, our special thanks go to Honorary Chairs President Ko-Huang Lue, Professor Chuen-Sheng Cheng and General Chair Professor Yung-Chyuan Ho for all the kind and patient support and assistance they offered to our whole conference procedure. Without them, our conference could not be prepared so smoothly, thanks again.

This conference program is highlighted by one Keynote Speaker Associate Professor Chih-Jen Tseng from Chung-Shan Medical University Hospital, Taiwan and five Plenary Speakers: Dr. Chalong Cheewakriangkrai from Chiang Mai University, Thailand; Assistant Professor Su-Hsin Chang from Washington University in St. Louis, United State; Associate Professor Yang Xu from Peking University, China; Dr. Ming-Chi Wu from Chung-Shan Medical University, Taiwan and Associate Professor Shih-Hsin Chen from Cheng Shiu University, Taiwan.

The ICMHI 2017 aims to bring together outstanding scholars, researchers, and students to exchange and share their experiences and research results about all aspects of Medical and Health Sciences. It is a great plat form to discuss the most recent innovations, trends, and concerns, practical challenges encountered and the various solutions in the fields of medical and health informatics.

Taichung city is one of the most beautiful in Taiwan, vibrant and cultural place. It is blessed with a number of interesting placed that are culturally endowed and these can be explored at length on foot.

Finally we would like to wish you success in your technical presentations and social networking. Hope your stay in Taichung City will be memorable!

ICMHI 2017
Organizing Committee
Taichung City, Taiwan

Conference Committee

- **Honorary Chairs**

President Ko-Huang Lue, Chung-Shan Medical University, Taiwan
Professor Chuen-Sheng Cheng, Yuan-Ze University, Taiwan

- **General Chair**

Professor Yung-Chyuan Ho, Chung-Shan Medical University, Taiwan

- **Program Chairs**

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Associate professor Chiun-Li Chin, Chung-Shan Medical University, Taiwan
Associate professor Jacky Lee, Tzu Chi University, Taiwan
Associate professor Liang-Ying Wei, Yuanpei University of Medical Technology, Taiwan
Assistant professor Hao-Yun Kao, Kaohsiung Medical University, Kaohsiung, Taiwan
Assistant professor Su-Hsin Chang, Washington University in St. Louis, United States
Associate professor Yang Xu, Peking University, China
Associate professor Ya-Hsin Li, Chung-Shan Medical University, Taiwan
Assistant professor Yen-Chiao Lu, Chung-Shan Medical University, Taiwan
Professor Ya-Fang Tsai, Chung-Shan Medical University, Taiwan
Professor Yang Xu, Peking University, China
Dr. Chalong Cheewakriangkrai, Chiang Mai University, Thailand
Professor Hsi-Chieh Lee, National Quemoy University, Taiwan
Professor Yu-Ju Tu, National Chengchi University, Taiwan
Professor Shih-Hsin Chen, Cheng Shiu University, Taiwan
Professor Chien-Chih Wang, Ming Chi University of Technology, Taiwan

- **International Scientific Committee**

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Associate Professor Tsu-Wang (David) Shen, Tzu Chi University, Taiwan
Associate professor Kuang-Chi Chen, Tzu Chi University, Taiwan
Associate Professor Liang-Tsung Huang, Tzu Chi University, Taiwan
Assistant professor Wen-Cheng Lin, Tzu Chi University, Taiwan
Assistant professor Jin-Long Chen, Tzu Chi University, Taiwan
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Associate professor Ming-Yung Ting, Ming Chuan University, Taiwan
Associate professor Yih-Ping Cheng, Ming Chuan University, Taiwan
Professor Fong-Jung Yu, Da-Yeh University, Taiwan
Assistant professor Chun-Wang Wei, Kaohsiung Medical University, Taiwan
Assistant professor Yu-Hsien Chiu, Kaohsiung Medical University, Taiwan
Associate professor Shu-Fan Liu, Yuanpei University of Medical Technology, Taiwan
Assistant professor Jyh-Shyan Lin, Yuanpei University of Medical Technology, Taiwan
Assistant professor Shun-Chuan Ho, Yuanpei University of Medical Technology, Taiwan
Associate prof. Ya-Ming Shiue, Chia Nan University of Pharmacy & Science, Taiwan
Associate prof. Shih-Wang Wu, Chia Nan University of Pharmacy & Science, Taiwan
Assistant professor Yu-Chiung Hsu, Kun Shan University, Taiwan
Assistant professor Tzu-Miao Lin, Hsin Sheng College of Medical Care and Management, Taiwan
Dr. Ta-Wei Chu, Mei-Jao Life Enterprises, Taiwan

Conference Information

● Publications

All accepted papers will be published in International Conference Proceedings Series by ACM indexed by Ei Compendex and Scopus and submitted to be reviewed by Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

Excellent papers will be published on one of the following journals:

1. International Journal of Management, Economics and Social Sciences (ISSN 2304-1366), and indexed by Ei Inspec;
2. Journal of Quality (ISSN 1022-0690), and indexed by Ei Compendex and Scopus;
3. Chung Shan Medical Journal (ISSN 1680-3108), and indexed by TSCI (Taiwan Science Citation Index);
4. Journal of Computing Science and Engineering (JCSE) indexed by Ei Compendex and Scopus. pISSN (print version): 1976-4677 , eISSN (electronic version): 2093-8020;
5. The Journal of Universal Computer Science (J.UCS), indexed in the Science Citation Index (SCI): The 2015 impact factor of the journal is 0.546, the 5-year impact factor is 0.684 (ISSN 0948-695x; Online Edition: ISSN 0948-6968)

● Conference Venue

2nd floor of JengShin Hall, College of Health Care and Management, Chung Shan Medical University

Address: No.110, Sec.1, Jianguo N. Rd., Taichung City 40201, Taiwan

● Transportation

I. From international airports to Taichung City:

(I)Taoyuan International Airport is about 156 kilometers distance from Taichung City. There are several ways to Taichung City from the airport:

1. Take a passenger bus directly for a Taichung City station - about 2 hours travel time.

2. Take the connecting high speed rail train [called "HSR" in Taiwan - from "high speed rail"] to the Tauyuan HSR station. Take the HSR train to Taichung City's Wuri HSR station - HSR travel time about 38 minutes.

(II)Kaohsiung International Airport is about 200 kilometers distance from Taichung City. Ways to Taichung City from the airport:

1. From the airport, take the Kaoshiung subway/metro-rail-system [called "KMRT" in Taiwan, from "Kaohsiung mass rapid transit"] to the Zuoying HSR station. Take the high speed rail train to Taichung City's Wuri HSR station - HSR travel time about 58 minutes.

2. From the airport, after taking the Kaohsiung subway/metro-rail-system [called "KMRT" in Taiwan, from "Kaohsiung mass rapid transit"] to the Kauhsiung regular train station, transfer to and take a regular [non-high-speed] Taiwan Railway train or passenger bus to Taichung City - about 2.5 hours travel time.

II. From Taichung HSR stations to the school:

We suggest that for convenience you can take a taxi to the school - travel time around 10-20 minutes, and taxi fare somewhere around 100-200 NT Yuan.

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 including **2** Minutes of Q&A.
- Student Essay Competition Presentation: about **12** Minutes of Presentation including **2** Minutes of Q&A.
- Speech: about **40** Minutes of Presentation including **10** Minutes of Q&A.
- Plenary Speech: about **25** Minutes of Presentation including **5** Minutes of Q&A.

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 session (including poster session), One Best Essay will be selected from each group (PhD group, master group and undergraduate group) of the student essay competition (totally 3 best essays). The Certificates will be awarded at closing ceremony at the end of the conference on May 21st, 2017.

Dress code

Please wear formal clothes or national representative of clothing.

Invited Speakers Introductions

Keynote Speaker I

Associate Professor Chih-Jen Tseng,
Chung-Shan Medical University Hospital, Taiwan

Dr. Chih-Jen Tseng is a gynecologist of Chung Shan Medical University Hospital in Taiwan. He is graduated from Chia Medical University in Taiwan in 1984 and Stanford University cancer center in 1991. His main specialty is female cancer and he is a gynecologic surgeon. Since 1991, he has published 79 SCI papers. In 1997 and 1998, he was awarded as the best paper prize of the association of Obstetrics and Gynecology of Taiwan. In 2000, 2001, 2002, Dr. Tseng was also awarded as the first prize of national medical quality in Taiwan. Now, he is the Vice President of Chung-Shan Medical University Hospital, and is the president of the Taiwan Women Cancer Association, and the president of the Cancer Physical Therapy Association in Taiwan.

In addition to medical expertise, his areas of interest include medical information and electronic medical records. Prior to 2010, he served as the chairmen of the Electronic Medical Records Committee of Chang Gung Memorial Hospital in Taiwan. He established a paperless electronic medical record system for Chang Gung Memorial Hospital. In 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, and 2001, he was awarded as the best Medical Website Prize of Taiwan Chang Gung Memorial Hospital. In 2006, Dr. Tseng also won the first prize of National Gold Medal for electrical medical record system, issued by the National of Health of Taiwan. Since 2011, Dr. Tseng is the chairmen of the Electronic Medical Records Committee of Taiwan Chung-Shan Medical University Hospital. He established a paperless electronic medical record system for Taiwan Chung-Shan Medical University Hospital.

Development of a New Unified Electronic Medical Record System and Paperless Hospitals

Abstract:

The new trend in e-Health is changing. Over the past 60 years, hospitals have faced new challenges in improving the efficacy, safety and quality of patients' health. Among them, health information has become a very important area, covering health informatics, medical records, medical images, research, teaching, public health, and data management.

The establishment of an electronic health record system and paperless hospitals to improve quality and efficiency has become one of the leading indicators of the hospital. In order to achieve this goal, it is necessary to establish standard information formats, including texts, images, table structures and structured documents. Based on this structured electronic medical system, the electronic health record system facilitates patient safety and quality improvement through lists and alerts; embedded clinical guidelines that promote standardization, evidence-based practice and electronic prescriptions that reduce errors and redundancy.

In addition, not only the standard formats and unified structures are important, but also include the internet systems and the central cloud databases. Through these infrastructures, we build a cloud of big data for health care that can achieve the practicality of data management. However, the successful implementation of the new paperless eHealth system depends on strong leadership and full participation of the clinical staff involved in the design and implementation.

Using the Chung Shan Medical University Hospital, we have created new ideas and experiences in developing paperless hospitals that would provide solutions for the existing medical informatics issues. In this lecture, we will demonstrate how to establish information standardization, structure, and system, and we will also demonstrate a new electrical medical teaching record system.

Keywords: *electronic medical record, health information, medical structure, cloud, internet, data management*

Plenary Speaker I

Assistant Professor Su-Hsin Chang,
Washington University in St. Louis, United State

Dr. Chang is an applied econometrician and a health economist. Dr. Chang's research focuses on health and economic consequences of obesity and surgical treatments of obesity. Her research uses economic and econometric/statistical modeling to evaluate program and treatment effects. Dr. Chang's research areas include treatment effect and policy evaluation, cost-effectiveness analysis, meta-analysis, and comparative effectiveness.
Dr. Chang teaches "Decision Analysis for Clinical Investigation and Economic Evaluation" in the Master of Population Health Sciences program.

Modeling Multi-Morbidity Related to Obesity and Surgical Treatments of Obesity Using Large National Databases

Abstract:

Over 35% of U.S. adults are obese. Studies have shown that adiposity contributes to the increased incidence of and/or death from serious chronic diseases and cancers. The increased risks of developing such diseases in the obese population lead to multi-morbidity, i.e., the coexistence of multiple chronic diseases. Dr. Chang's research investigates health and economic consequences of multi-morbidity related to obesity and surgical treatments of obesity, using several national databases, Veterans Health Administration database, and data from electronic medical records at the Washington University School of Medicine and the Barnes-Jewish Hospitals.

Keywords: Obesity, medical data, multi-morbidity modeling, surgical treatments.

Plenary Speaker II

Associate Professor Yang Xu,
Peking University, China

Dr. Yang Xu received his Ph.D. from Ecole Centrale de Nantes , France, in 2010. Since 2011, he has joined Peking University and is now associate professor in the Department of Information Management. He is visiting professor in University of Tsukuba, Universit é Toulouse III - Paul Sabatier and National Taiwan University. He has published over 50 peer-reviewed scientific papers, and is in charge of several national scientific projects. His research interests include knowledge management and management information systems.

Decision Making of Health Service Solution Based on Mass Customization

Abstract:

With the appearance of a series of policies about improving health information service and Population Health Information System, Chinese health information service industry is developing rapidly. As fully customized health information service will increase cost drastically, controlling costs and satisfying customers' individual requirements should be balanced. It is well known that economy of scale and economy of scope is a pair of conflicts, and how to get the equilibrium between them is the key issue to promote competition. By analyzing and processing information of client status, client preference, solution features and cost, we proposes a decision support model in mass customization. Genetic algorithm is used for optimization.

Keywords: Medical information system, mass customization, optimization

Plenary Speaker III

Dr. Chalong Cheewakriangkrai,
Chiang Mai University, Thailand

Dr. Chalong Cheewakriangkrai has an extensive clinical experience in gynecologic oncology medicine specializing in relapse patterns and outcomes following recurrent cancers. Dr. Chalong Cheewakriangkrai is currently a faculty member and teaching staff in Chiang Mai University Hospital, Thailand. He got his Doctor of Medicine from Chiang Mai University. His research interests are in the area of clinical epidemiology, uterine cancer, chemotherapy and targeted therapy in gynecologic cancer, and gynecological surgery. He has published over 37 articles in professional journals and presented numerous papers and workshops at the national and international conferences and seminars. He has published articles in various journals, including Asian Pac J Cancer Prev, J Obstet Gynaecol Res, Womens Health, Hum Pathol and so on.

Clinical Aspects of Medical Information Use in (Gynecologic) Cancer Research and Practice

Abstract:

Genital tract cancer is one of the major health problems among worldwide women. There are different types of gynecologic cancer that affect the reproductive organs of women such as uterine, ovarian, cervical, vaginal, and vulvar cancers. The mortality and morbidity rates were high in patients with advanced stage and recurrence of disease. Some clinical data such as risk factors either familial or individual risks can be used to predict the chance of disease occurring in these patients. Many clinicopathologic characteristics such as lymph node status, depth of cancer invasion, tumor grade, histologic type, tumor size, stage of disease, and lymphovascular space involvement are predictive factors of recurrence of cancer. The modalities of treatment may be a definite surgery, primary radiation therapy, and/or adjuvant chemotherapy. For each treatment, the therapeutic efficacies or efficacy endpoints in clinical trials are determined by the terms of response rates such as objective response (OR), complete response (CR), partial response (PR), stable of disease (SD), disease-free survival (DFS), progression-free survival (PFS) or time to progression (TTP), and overall survival (OS).

Biomedical researches and clinical trials in this field are very important. Many cancer tests and treatments that are widely used today exist because of clinical trials. Without clinical trials, cancer care can't improve. In clinical trials, a surrogate endpoint (or marker) has been used as a measure of effect of a specific treatment that may correlate with a real clinical endpoint but does not necessarily have a guaranteed relationship. Surrogate endpoints are endpoints that can replace or supplement other endpoints in the evaluation of experimental treatments or other interventions. For example, surrogate endpoints are useful when they can be measured earlier, more conveniently, or more frequently than the endpoints of interest, which are referred to as the "true" endpoints. Surrogate markers are used when the primary endpoint is undesired (e.g., death or the occurrence of invasive cancer), or when the number of events is very small, thus making it impractical to conduct a clinical trial to gather a statistically significant number of endpoints. The FDA and other regulatory agencies will often accept evidence from clinical trials that show a direct clinical benefit to surrogate markers.

There is a variety of applications in clinical informatics. There are 2 major types of information used in clinical informatics: patient-specific and knowledge-based. Patient-specific information is generated by and used in the care of patients in the clinical setting, whereas knowledge-based information comprises the scientific basis of health care. Here we discuss the common clinical information that will be used and can be applied for medical informatics in (gynecologic) cancer research and practice.

Key words: *clinical, information, cancer, research*

Plenary Speaker IV

Dr. Ming-Chi Wu,
Chung-Shan Medical University, Taiwan

Dr Ming-Chi Wu is currently the Chief of the Neuroradiology Division, Department of Medical Imaging, Chung Shan Medical University Hospital (CSMUH) and Lecture in School of Medicine and School of Medical Informatics, Chung Shan Medical University. He received MD degree from Cebu Doctor's University College of Medicine and master degree and PhD candidate from Chung Shan Medical University. He completed his residency of medical imaging training in CSMU hospital, and then started his career as neuroradiology at the department of medical imaging, Chung Shan Medical University Hospital. Because of his outstanding performance, he served as Chief of the Neuroradiology Division, Department of Medical Imaging, Chung Shan Medical University Hospital. His major research interests are neuroimaging, neurointervension, functional brain imaging, medical imaging process and deep learning in medical imaging.

The Applications of Machine Learning in Medical Imaging

Abstract:

Since a lot of machine learning and deep learning of medical imaging articles has been published. Many radiologists have asked the terrifying question, “Will machine learning and artificial intelligence replace radiologists in the future?”. So what is machine learning? Machine learning is a technique for recognizing medical imaging pattern and feature. Machine learning usually begins with the machine learning algorithm that computes image patterns that are considered important features for making predictions or diagnoses. Machine learning techniques have been increasingly applied in the medical imaging field, including medical image analysis, computer-aided diagnosis, organ/lesion segmentation, image fusion, image-guided therapy, image annotation and predict prognosis models. Although it is a powerful tool that can help in medical imaging diagnoses, however, one must be aware of the possible associated pitfalls that can result in misleading.

More recently, deep learning is already being applied in the practice of radiology. Deep learning, also known as deep neural network learning, it is a class of machine learning algorithms. The advantage of this method is that does not require image feature identification and calculation as a first step; rather, features are identified as part of the learning process. Deep learning is a new and popular area of research that is yielding impressive results and growing fast and will have a greater influence in the future.

Keywords: machine learning, deep learning, medical imaging

Plenary Speaker V

Associate Professor Shih-Hsin Chen,
Cheng Shiu University, Taiwan

Prof. Shih-Hsin Chen received his PhD degree from the Department of Industrial Engineering of Yuan-Ze University in Taiwan. He is currently as an associate professor in the Department of Information Management, Cheng Shiu University, Taiwan. His research interests are in big data analysis, multi-objective problems in production scheduling, soft computing applied in manufacturing problems and development of genetic algorithms. He has published his research works in some international journals, such as Computers & Operations Research, Expert Systems with Applications, Applied Soft Computing, Applied Mathematical Modelling, Annals of Operations Research, Applied Mathematics and Computation, and International Journal of Production Economics.

A Blueprint of implementing the Evidence-based Clinical Decision Support system for Gynecologic Cancer in Northern Thailand

Abstract:

Gynecologic cancers are the uncontrolled growth and spread of abnormal cells originating in the female reproductive organs, including the cervix, ovaries, uterus, fallopian tubes, vagina, and vulva. Gynecological cancer is a common cancer that afflicts Thai woman -physically, psychologically, socially and financially. According to CO-PI Dr. Cheewakriangkrai: “the majority of cancer registries in Thailand are rarely used for conducting research about risk factors in gynecologic cancers.” How to improve gynecologic cancers screening rates and the application of integrated therapies for these cancers, are now the most important subject. Nowadays, Taiwan has several advanced health information profiles and allowing health-care to be more predictive, preventive, personalized and participatory. Based on years of experience, we have observed in our work in Taiwan how conducting research from the cancer registry, beginning with simple descriptive studies, can lead to more complex in-depth studies investigating risk factors for gynecologic cancers. These international collaborations can result in much-needed Information and Communication Technologies (ICTs) transfers so that cancer registries in Thailand can develop high-quality digital databases. In particular, improvements in cancer database for better collection, storage, and analysis of biological specimens can also be facilitated through these international collaborations. In addition to cancer registration database, it is important to develop a Clinical Decision Support system (CDSS) to provide a network of healthcare providers, governmental agencies, and researchers who may contribute and share information from patients to ultimately improve the care of all patients by learning from the experience of others. Therefore, the specific issues addressed in this proposal will focus on prevention, prediction and prognosis topics for gynecologic cancers.

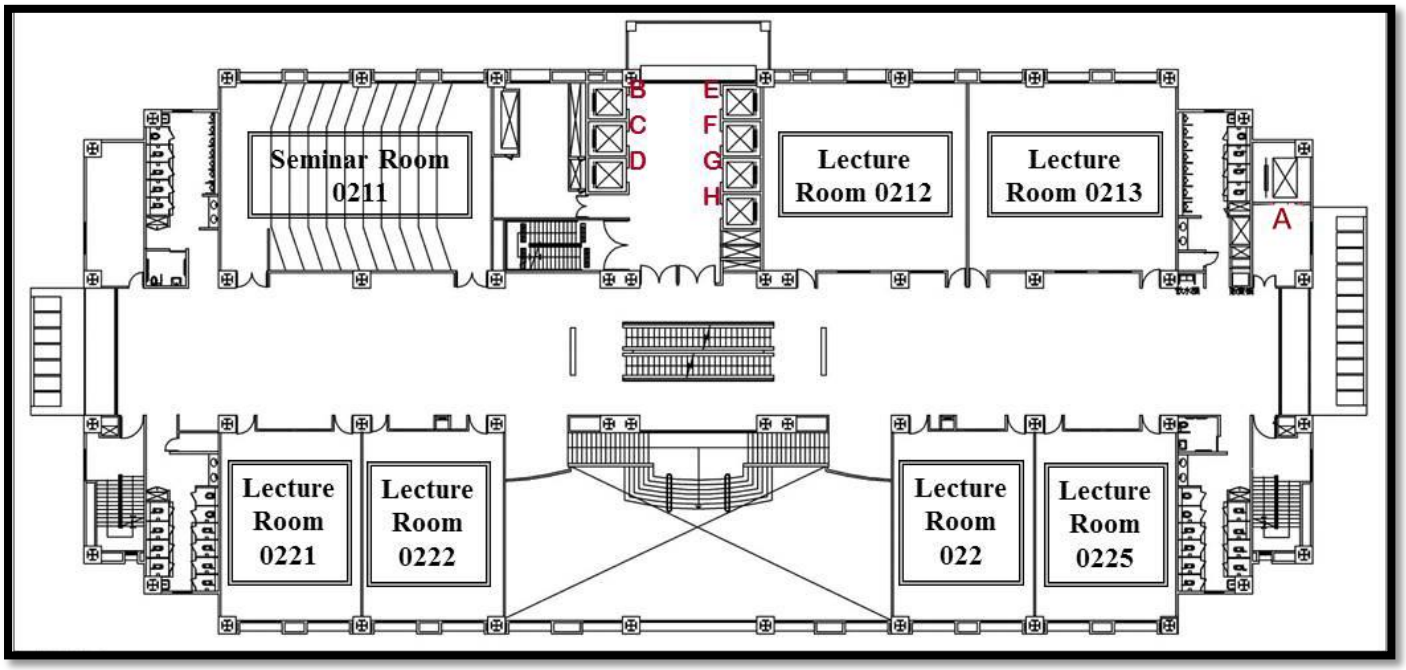
Keywords: gynecologic cancer, prediction, prevention, cancer registration database, Clinical Decision Support system,

Schedule of ICMHI 2017

May 20, 2017 Saturday		Venue
13:00-17:00	**Arrival Registration**	JengShin Hall (2nd level) Lecture Room 0212
May 21, 2017 Sunday		**Venue**
09:00-17:00	**Arrival Registration**	JengShin Hall (2nd level) Lecture Room 0212
09:10-09:20	**Opening Ceremony**	JengShin Hall (2nd level) Seminar Room 0211
09:20-10:10	**Opening Session: Keynote Speech** Associate Prof. Chih-Jen Tseng *"Development of a New Unified Electronic Medical Record System and Paperless Hospitals"*	JengShin Hall (2nd level) Seminar Room 0211
10:10-10:30	Coffee Break	JengShin Hall (2nd level)
10:30-11:00	**Plenary Speech I** Assistant Prof. Su-Hsin Chang *"Modeling Multi-Morbidity Related to Obesity and Surgical Treatments of Obesity Using Large National Databases"*	JengShin Hall (2nd level) Seminar Room 0211
11:00-11:30	**Plenary Speech II** Associate Prof. Yang Xu *"Decision Making of Health Service Solution Based on Mass Customization"*	JengShin Hall (2nd level) Seminar Room 0211
11:30-12:00	**Plenary Speech III** Dr. Chalong Cheewakriangkrai *"Clinical Aspects of Medical Information Use in (Gynecologic) Cancer Research and Practice"*	JengShin Hall (2nd level) Seminar Room 0211
12:00-13:30	Lunch Break, Poster Session	JengShin Hall (2nd level)

13:30-14:00	**Plenary Speech IV** Dr. Ming-Chi Wu *"The Applications of Machine Learning in Medical Imaging"*	JengShin Hall (2nd level) Lecture Room 0213	13:30-15:18	**Student Essay Competition**	JengShin Hall (2nd level) Seminar Room 0211
14:00-15:12	**Session I:** Computational Intelligence Methodologies	JengShin Hall (2nd level) Lecture Room 0213			
15:20-15:40	Coffee Break				JengShin Hall (2nd level)
Sub-Sessions (in Parallel)					
15:40-16:40	**Session II** Biomedical Data mining				JengShin Hall (2nd level) Lecture Room 0221
15:40-16:40	**Session III** Health Information System				JengShin Hall (2nd level) Lecture Room 0222
15:40-16:40	**Session IV** Health Risk Evaluation				JengShin Hall (2nd level) Lecture Room 0223
15:40-16:40	**Session V** Healthcare Quality Management				JengShin Hall (2nd level) Lecture Room 0225
15:40-16:40	**Session VI** Medical Image Processing & Game				JengShin Hall (2nd level) Lecture Room 0213
16:40-17:10	**Closing Session: Plenary Speech V:** Professor Shih-Hsin Chen				JengShin Hall (2nd level) Seminar Room 0211
17:10-17:40	**Closing Ceremony**				JengShin Hall (2nd level) Seminar Room 0211
19:00-20:30	Dinner Banquet				Hotel National International Hall II (B1 level)

JengShin Hall 2nd Level Plan



LET'S MOVE TO THE DETAIL SCHEDULES!

Student Essay Competition

Session Chair: Prof. Ching-Hsiang Lai
Session Co-Chairs: Prof. Yang Xu, Dr. Chalong Cheewakriangkrai, Prof. Hao-Yun Kao, Prof. Su-Hsin Chang, Prof. Yen-Chiao Lu, Prof. Hsi-Chieh Lee, Prof. Yu-Ju Tu, Prof. Shih-Hsin Chen, Prof. Chien-Chih Wang

Venue: JengShin Hall (2nd level), Seminar Room 0211
Time: 13:30-15:18

Note:

*** Each presentation should be 10 mins oral pretention + 2 mins Q&A.**

*** There are 3 groups of students, phd students, master students and undergraduate students, each student will compete in their group. One best essay will be selected from each group by the judges based on the quality of his/her essay and the performance of his/her oral presentation.**

*** The certifications of the best oral presentations will be awarded at the end of the conference at the closing ceremony.**

***Session photo will be taken at the end of the session and update online**

1. Phd Group #1 TW001 Time: 13:30-13:42

Enhancing dynamic identity based authentication and key agreement using extended chaotic maps for telecare medicine information systems

Meriske Florentina Chen, Tian-Fu Lee

Tzu Chi University, Taiwan

An authentication and key agreement scheme enables participants to agree a common secret key and to establish a secure channel. A secure authentication and key agreement scheme for telecare medicine information systems provides doctors, nurses, patients, etc. with mutual authentication and secure communication. Recently, Wang et al. proposed an efficient dynamic identity based authentication scheme using chaotic maps for telecare medicine information systems, and also claimed that their scheme can resist possible attacks. However, this investigation shows that Wang et al.'s scheme fails to provide session key security and user anonymity, and suffers from password guessing and impersonation attacks. To overcome the weaknesses, this investigation proposes an improved authentication scheme by using extended chaotic map-based Diffie-Hellman key change. The proposed scheme avoids the weaknesses in previous schemes, and retains low computational cost.

Keywords: *Chaotic maps; key agreement; authentication scheme; telecare medicine information system*

2. Phd Group #2 TW035 Time: 13:42-13:54

Analysis of Postural Stability of Center of Pressure Data in Normal Foot and Flatfeet during Upright Standing using Signal Energy

Tsui-Chiao Chao

Yuan Ze University, Taiwan

This study applied the signal energy (SE) method using center of pressure (COP) data to quantify postural stability. A randomized control trial was conducted to determine differences between subjects with normal and flat feet. Fifty-four subjects aged 18–30 years participated; 37 normal and 17 flat foot subjects. All subjects undertook tasks commonly used to quantify postural stability. Measurements quantified using the SE method were compared with those quantified using commonly employed methods for assessing postural stability. Using the SE method, total energy values required for maintaining postural stability with flat feet differed significantly ($p < 0.05$) compared with normal feet when eyes were open and closed in the medial-lateral direction. Signal amplification and observed variance were demonstrated by the SE method, and can be used to clarify differences in quantitative postural stability between normal and flat feet. Hence, SE might be a valid biometric method for balance control assessment; however, further study of subjects from different age groups is required to validate the application of the SE method in postural stability quantification.

Keywords*: Flatfoot, Postural stability, Signal energy*

3. Master Group #1 TW018 Time: 13:54-14:06

Usage Patterns and Data Quality: A Case Study of a National Type-1 Diabetes Study

Jinrong Wu, Richard O. Sinnott, Jemie Effendy, Stephan Glöckner, William Hu, Jiajie Li
University of Melbourne, Australia

The Environmental Determinants of Islet Auto- immunity (ENDIA) project is Australia's largest study into the causes of Type-1 Diabetes (T1D). The ENDIA study is supported by a Cloud-based software platform including a clinical registry comprising extensive longitudinal information on families at risk of having a child that might go on to develop T1D. This registry includes both demographic and clinical information on families and children as well as the environmental factors that might influence the onset of T1D. A multitude of samples are obtained through the study and used to support a diverse portfolio of bioinformatics data analytics. The quality of the data in the registry is essential to the overall success of the project. This paper presents a Cloud-based log-analytics platform that supports the detailed analysis of patterns of usage of the registry by the clinical centres and collaborators involved. We explore the impact that the usage patterns have on the overall data quality. We also consider ways of improving data quality by mothers entering their own data through targeted mobile applications that have been developed for dietary data collection.

Keywords: *Type-1 diabetes; log analysis; auditing; Cloud.*

4. Master Group #2 TW020 Time: 14:06-14:18

A Mobile Application and Cloud Platform Supporting Research into Alcohol Consumption

Jinrong Wu, Zhi Zheng, Loren Bruns Jr, Jiajie Li, Richard O. Sinnott University of University of Melbourne, Australia

As the most widely used recreational drug in Australia, alcohol is often misused or over consumed by young people. Binge drinking, drink driving and unsafe sex after drinking have been identified as major health risks affecting young people. This paper reports on a platform applying mobile technology to help doctors and researchers collect data among young people and inform individuals about their alcohol consumption patterns. This app is available in both the iOS and the Android platforms. The app itself collects information on self-reported alcohol consumption patterns and records it for analysis on a Cloud-based data platform. The app tracks individual alcohol consumption longitudinally with a range of server side analysis components. The range of information collected through the app will improve not only the process of data collection and enhance the accuracy of the collected data for alcohol researchers, but also reduce the workload of doctors and researchers in monitoring and analysis of alcohol consumption patterns and their impact on young people and society more generally.

Keywords: *Mobile Computing; Cloud; Data Collection; eHealth.*

5. Master Group #3 TW051 Time: 14:18-14:30

Group Sparse based Super-resolution of Magnetic Resonance Images for Superior Lesion Diagnosis

Avinash Ankur, Kathiravan Srinivasan, Anant Sharma

The LNM Institute of Information Technology, India

In the modern times, retrieval of significant data from low-resolution (LR) magnetic resonance (MR) images has turned out to be a strenuous task. Also, in the recent years, several Super-resolution (SR) techniques have been established to address the issue of MR image resolution. This research focuses on developing a Super-resolution MR Image restoration method using group-based sparse representation technique (GSR). The major objective is to devise a GSR technique which is robust to noise, while most other SR methods cannot perform de-noising and super-resolution simultaneously. Moreover, the restoration dependent approach presumes that the LR images are warped, blurred and decimated from the respective high-resolution (HR) image. The algorithm exploits the similarity between non-locally positioned similar patches to effectively improve the quality of MR images. A single self-adaptive dictionary with low-complexity is used in the model in place of the general dictionary used in traditional approaches. This self-adaptive dictionary is trained for a group of patches rather than for each patch. Training the model for a group instead of patches allows the model to have a better edge and texture retention in the reconstructed image. This approach also establishes the fact that an enhanced detection of lesions is highly possible for superior disease diagnosis. The GSR approach proves to be efficient as it offers better PSNR values for all the MR images than its counterparts.

Keywords: *Super-resolution; MRI; Group Sparse approach*

6. Master Group #4 TW052 Time: 14:30-14:42

Predicting Patient Volumes in the Emergency Department Using an Interval-valued Forecasting Scheme with Support Vector Regression

Chi-Jie Lu and **Hui-Wen Lee**

Chien Hsin University of Science and Technology, Taiwan

Forecasting patient volumes in the emergency department within any given time frame is an important but difficult task. Interval-valued time series forecasting indicates possible future outcomes for upper and lower bounds of interval-valued data and generates a prediction interval. Since the time-interval information contains valuable information about data structure and interval boundaries, it can be utilized to construct an effective forecasting model which can generate more accurate predicted values of the bounds of interval-valued data. Therefore, this study uses time-interval information to construct interval-valued forecasting model for emergency department patient volumes. The features which can be used to represent time-interval information of the interval-valued data are served as the inputs of support vector regression (SVR) to build the interval-valued forecasting model. A real data from a regional hospital in Taiwan is used as illustrative examples to evaluate the performance of the proposed model. Experimental results revealed that the proposed interval-valued sales forecasting scheme outperforms the two competing models and hence is an effective alternative for interval-valued forecasting for emergency department patient volumes.

Keywords: *Interval-valued time series forecasting, patient volumes forecasting, emergency department, support vector regression.*

7. Master Group #5 TW053 Time: 14:42-14:54

Forecasting Medical Resource Consumption of Diabetic Nephropathy Patients Using Data mining techniques

Bo-Lin Huang, Tian-Shyug Lee, Chi-Jie Lu

Fu Jen Catholic University, Taiwan

Dialysis treatment has become a large burden on the National Health Insurance (NHI) of Taiwan. Nephropathy is the leading factor that affects whether diabetic patients need dialysis treatment. Medical resources for the treatment of diabetes continue to rise as the population of diabetes increases and its attendance increases. In this study, we use data mining techniques to establish the medical consumption prediction model of diabetic nephropathy patients. The used method include multivariate adaptive regression splines (MARS), multiple regression model and stepwise regression model. The data collected from National Health Insurance Research Database (NHIRD) of Taiwan is used. Experimental results reveal that the MARS forecasting model outperforms the results of using multiple regression model and stepwise regression model and hence provides an efficient alternative for forecasting medical resource consumption of diabetic nephropathy patients.

Keywords: *Medical resource, diabetic nephropathy, medical resource consumption forecasting, data mining, multivariate adaptive regression splines.*

8. Master Group #6 TW057 Time: 14:54-15:06

An Analysis for Medical Expenses of Bronchia and Pulmonary Cancer Group by Two-Stage Cluster Method

You-An Lin, Wen-Tsann Lin, An-Jin Shie, Chia-Pao Chang, Pei-Chun Pan

National Chin-Yi University of Technology, Taiwan

The objective of this study is to discover the influencing factors in groups of the different gender & ages and expense of bronchial & pulmonary cancer for insight into the root of the problems. Due to the rising of population aging, it brings huge expenditure in the cancer care. Thus, this study proposed a two-stage cluster method by using k-means and SOM (Self-Organizing Map) conducted a scientific analysis in the health insurance database of the cancer prescription & patients in 2016 year. The finding in this study revealed that the 'bronchial' and 'pulmonary' cancer consumed the largest medical expenditure; the average cost for female aged 50 to 54 was $ 306,776 and for male aged 65 to 69 was $ 301,788. Meanwhile, it indicated that the 'bronchial' and 'pulmonary' cancer concentrated in the aged 45 to 89 interval and both male and female, which caused huge expenditure consumed by the cancer care. The implications are summarized in this article.

Keywords: *two-stage cluster method; tumors; cancers; data mining; self-organization map; k-means.*

9. Undergraduate Group #1 TW050 Time: 15:06-15:18

Incidence and Clinical Features of Multiple Primary Malignant Neoplasms: A 5-Year Retrospective Analysis

Ting-Yu Tsai, Yu-Wen Lin, Yu-Hsin Chang, Hsin-Yang Chen, Chi-Chang Chang

Chung-Shan Medical University, Taiwan

The high effectiveness of cancer screening and therapies resulted in the increased diagnosis of multiple primary malignancies (MPMNs) in Taiwan. The aim of the present study was to investigate the clinical data of patients, and determine the frequency and clinical features of MPMNs. Between January 2010 and December 2014, a total of 2,518 patients were screened and obtained retrospectively from the Tumor Registry Center of a metropolitan hospital. We quantified the clinical features and the most common cancer pairs of MPMNs by using statistical and epidemiological indicators. Two hundred and eleven patients with MPMNs were evaluated. The median age at initial cancer diagnosis was 63 years old (range 12–100 years). The median age of diagnosis of secondary cancer was 67 years old (range 35–95 years). The median time between initial and secondary cancer diagnoses was 5 months (range 0-57.1). The overall incidence of MPMNs was 8.38%, and the male:female ratio was 2.01:1. The most frequent types of cancer at secondary diagnosis were digestive (79 patients; 3.05%), breast (22 patients; 0.87%), liver (22 patients; 0.87%), head-neck (18 patients; 0.71%), and bladder cancer (14 patients; 0.56%). In women, the most frequent types of cancer at secondary diagnosis were digestive (25 cases; 2.21%), breast (22 cases; 1.95%), liver (11 cases; 0.97%), lung (8 cases; 0.71%), and gynecologic cancer (7 cases; 0.62%). In men, the most frequent types of cancer at secondary diagnosis were digestive (54 cases; 3.89%), head-neck (16 cases; 1.15%), liver (11 cases; 0.79%), bladder (10 cases; 0.72%), and prostate cancer (10 cases; 0.72%). The most common cancer pairs in males were digestive/digestive (22 cases; 1.59%), head-neck/head-neck (4 cases; 0.29%), lung/digestive (3 cases; 0.22%), and prostate/bladder (3 cases; 0.22%). In addition, tobacco smoking, alcohol consumption and betel-chewing were observed to be important risk factors for the development of MPMNs. MPMNs is an evidence-based related cancer. Hospital-based tumor registries provide the advantage of cancer survivors' information, however, their therapy-related data are quite limited. In this present study, we discovered that patients with MPMNs tend to be older than those with a single primary malignant neoplasm. In conclusion, the clinical features and the most common cancer pairs of MPMNs are demonstrated in the present study to further analyze the risk factors described.

Keywords: *Multiple Primary Malignant Neoplasms (MPMNs); Tumor Registry Center; Retrospective Analysis*

Detail Schedule for Sub-Sessions

Session I< Computational Intelligence Methodologies >

Session Chair: Prof. Yeong-Cheng Liou and Prof. Chi-Jie Lu
Venue: JengShin Hall (2nd level) Lecture Room 0213
Time: 14:00-15:12

Note:

*** Each presentation should be 10mins oral pretention + 2 mins Q&A.**

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***Session photo will be taken at the end of the session and update online**

Session I: #1 TW002 Time: 14:00-14:12

Autism Spectrum Disorder Tools: Machin Learning Adaptation and DSM-5 Fulfillment: An Investigative Study

Fadi Thabtah
Nelson Marlborough Institute of Technology, Auckland, New Zealand

One of the primary psychiatric disorders is Autistic Spectrum Disorder (ASD). ASD is a mental disorder that limits the use of linguistic, communicative, cognitive, skills as well as social skills and abilities. Recently, ASD has been studied in the behavioural sciences using intelligent methods based around machine learning to speed up the screening time or to improve sensitivity, specificity or accuracy of the diagnosis process. Machine learning considers the ASD diagnosis problem as a classification task in which predictive models are built based on historical cases and controls. These models are supposed to be plugged into a screening tool to accomplish one or more of the aforementioned goals. In this paper, we shed light on recent studies that employ machine learning in ASD classification in order to discuss their pros and cons. Moreover, we highlight a noticeable problem associated with current ASD screening tools; the reliability of these tools using the DSM-IV rather than the DSM-5 manual. Hence the necessity to amend current screening tools to reflect the new imposed criteria of ASD classification in the DSM-5 particularly the diagnostic algorithms embedded within these methods.

Keywords: *Accuracy; Autism Spectrum Disorder-ASD; ADOS; ADI; Classification; DSM-5; Predictive Models; Machine LearningCartilage hydrolysis, Enzymatic bioprocessing*

Session I: #2 TW003A Time: 14:12-14:24

A Fractal Dimension Analysis of the QRS Complex of Electrocardiograms

Yen-Ching Chang, Bei-Lin Chuang, **Chen-Hua Chen** and Shin-Ya Yu

Chung Shan Medical University, Taichung, Taiwan.

Electrocardiograms (ECGs), measured by an electrocardiograph, are the electrical records of the heart and are usually used in the investigation of heart disease. The QRS complex is the most outstanding waveform within the ECG. It can reflect the electrical activity of the heart during ventricular contraction and even provide much information about the current state of the heart through the time of occurrence and its shape. In this work, three steps will be used to explore the potential characteristics of electrocardiograms. First, the QRS complex is detected. Second, R-R intervals, Q-Q intervals and S-S intervals are calculated. Third, the fractal dimensions (FDs) of time sequences formed by three types of intervals are computed by a fast maximum likelihood estimator (MLE). Finally, some meaningful features of electrocardiograms can be found out based on these three FDs. These results can further provide clinicians with some insights to help them handle and even deal with physiological conditions of patients.

Keywords: *electrocardiogram, electrocardiograph, QRS complex, fractal dimension, maximum likelihood estimator*.

Session I: #3 TW004A Time: 14:24-14:36

Introducing More Locally Best Locations into the Firefly Algorithm

Yen-Ching Chang, **Sut Kio Leong**, Ting-shou Chuang and Chiao-Yu Chuang
Chung Shan Medical University, Taichung, Taiwan.

Following the success of considering more locally best particles to the standard particle swarm optimization (PSO) and the bare bones particle swarm optimization (BBPSO) as well as introducing more locally best locations to the bat algorithm (BA), the issue of nature-inspired algorithms integrated with more locally best locations is more and more interesting and valuable as well as promising. In order to further understand the usefulness of the idea, this work will study a variant of the standard firefly algorithm (FA), an FA with more locally best locations, and then compare it to the standard FA. For objective comparison, some common benchmark functions were adopted to test. Experimental results show that an appropriate choice of the number of locally best locations does get higher performance. In the future, the newly proposed FA will try to deal with the problem of getting trapped in local optima by introducing an effective jump function.

Keywords: *firefly algorithm, particle swarm optimization, bare bones particle swarm optimization, bat algorithm.*

Session I: #4 TW011 Time: 14:36-14:48

Hearing Performance Testing Application

Thakerng Wongsirichot, Nittida Elz, Napaporn Suwanmanee, Hassana Hmad-A-Dam and

Sukgamon Sukpisit

Prince of Songkla University, Songkhla, Thailand

To have a hearing test using an audiometer, patients have to go to a hospital to be examined and be tested by an audiologist in a soundproof room. In some cases, a test with an audiometer may not be convenient or cannot be performed because not all hospitals have an audiometer or an audiologist available. Recently, mobile devices such smartphones and tablets are widely used. Users are able to exchange information or install mobile applications via the Internet. Moreover, with the HTML5 cross-platform technology, developers can build cross-platform mobile applications that are able to operate on both iOS and Android operating systems using the same code. With the power of the Internet and the mentioned technology, this paper proposes a Hearing Performance Testing Application which is a cross-platform mobile application. This application is able to perform hearing tests for patients in the similar manner as an audiometer and provide testing results to a doctor or an audiologist via the Internet.

***Keywords**: Hearing test; Hearing impairment; Mobile application.*

Session I: #5 TW041A Time: 14:48-15:00

A Hybrid Model Based on EMD and SVR for Medical Data Forecasting – A Case Study in the Emergency Department

Liang-ying Wei, Kuo-Hsiung Liao, Shun-Chuan Ho

Yuanpei University of Medical Technology, Hsin Chu , Taiwan

Time series methods have been applied to forecast clinical data, such as daily patient numbers forecasting for emergency medical center. The application of conventional the time series models need to meet the statistical assumptions, and not all models can be applied in all data sets. Further, most of the traditional time series models use a single variable for forecasting. However, there are many noises involutedly in raw data that are caused by changes in weather conditions and environments for daily patient numbers forecasting. Time-series models which use complicated raw data would reduce the forecasting performance. In addition, many forecasting features have been used by decision makers for medical data forecasting, but most of the data analysts subjective select features based on their own personal experience. Hospital managers who use inappropriate features to predict daily patient numbers will not provide proper medical service for patients. For solving above problems, this paper proposes a hybrid time-series support vector regression (SVR) model based on Empirical mode decomposition (EMD) and feature selection method to forecast clinical data. Proposed model considers that EMD can decompose the complicated raw data into simpler frequency components and highly correlations variables, which is adopted into model for building the primary model. Then, this study utilizes SVR as forecasting model which can overcome the limitations of statistical methods (data need obey some mathematical distribution). In verification, this paper would collect daily patient volumes in the emergency department as experiment datasets to verify proposed model.

Keywords: *Support vector regression (SVR), Empirical mode decomposition (EMD), clinical data forecasting.*

Session I: #6 TW044 Time: 15:00-: 15:12

Unsupervised Feature Learning for Gene Selection in Microarray Data Analysis

Xiucai Ye and Tetsuya Sakurai

University of Tsukuba, Tsukuba City, Ibaraki, Japan

Feature selection has become one of the most important computational techniques in processing the analysis of high dimensional microarray data. In this paper, we propose a novel unsupervised feature selection method, which utilizes local regression and discriminant analysis to microarray data learning. During the learning of cluster labels, gene selection is performed simultaneously. By imposing row sparsity on the weight matrix, the proposed method optimizes for selecting the discriminative genes which are more informative and better capture the interesting natural clusters of samples. We evaluate the proposed method on real microarray gene expression datasets. The experimental results demonstrate that the proposed method not only achieves good performance, but also outperforms other state-of-the-art unsupervised feature selection methods.

Keywords: *Unsupervised feature selection, local regression, discriminant analysis, gene selection, microarray gene expression datasets.*

Session II< Biomedical Data Mining >

Session Chair: Prof. Hsi-Chieh Lee & Prof. Hao-Yun Kao
Venue: JengShin Hall (2nd level) Lecture Room 0221
Time: 15:40-16:40

Note:

*** Each presentation should be 10mins oral pretention + 2 mins Q&A.**

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Session II: #1 TW033A Time: 15:40-15:52

On the application of clustering techniques to analyze metabolic syndrome severity distribution area and critical factors of Taipei County in Taiwan

Chien-Chih Wang and Jin-Jiang Jhu

Ming Chi University of Technology, Taiwan

With the economic improvement and changes in demographic structure and lifestyle, the illness suffered by people in Taiwan has also moved from inherited communicable diseases to those of chronic, degenerative nature, and cancer. The diseases derived from metabolic syndrome have been occupying the top ten causes of death. These illnesses endanger people's health and are public health concerns. This research applied clustering analysis to group people 40-years and older in Taipei County according to their health risk, using the integrated community health screening database and the five risk factors in metabolic syndrome used as attributes. This classification processed through two stages. The first stage used Word's method to determine the number of groups, and the second stage compared groups using K-means and decision tree analysis were then used to identify the primary risk factors that may have caused the metabolic syndrome in these groups. This study finds that the prevalence of metabolic syndrome among the subject was 30.62%, and the area these people dwelled can be classified into high-risk, relatively high risk, global risk, and low-risk areas. The results point out that most high-prevalence areas are in remote regions of the country, with the highest (64.56%) being in Wulai Township. Through examining the characteristic of these groups, the researchers have identified some common causes such as smoking, drinking, betel nut chewing, lunching out, and snacking.

Keywords： *Metabolic Syndrome*、*Data Mining*、*Cluster Analysis*、*Decision Tree*

Session II: #2 TW034 Time: 15:52-16:04

A Study of Implementing Artificial Neural Networks and Cluster Analysis to Distinguish Fatigue Type and Level in Graduate Students

Chen-Yuan Huang, **Fang-Jung Chang**, Yi-Chieh Lin, Cheng-Chih Huang and Chwen-Tzeng Su
National Yunlin University of Science and Technology, Taiwan

There are many causes of fatigue and the prevalence rate and key factors of fatigue differ according to population groups. Masters students in Taiwan are a high risk group for fatigue, and their lifestyle data was collected as the subject of the present study. Physiological parameters are measured using mobile devices, and the checklist individual strength (CIS) questionnaire and fatigue type checklist are utilized to explore the prevalence rate and type of fatigue in master students. Cluster analysis was used to establish fatigue levels, and Pearson's correlation analysis was used to explore the correlation between different fatigue types and fatigue level. The results obtained from the CIS questionnaire showed a fatigue prevalence rate of 50%, with a Cronbach's alpha value of 0.885, indicating good internal consistency. Fatigue type was established using the fatigue type checklist and a neural network. Masters students who are fatigued with an active sympathetic nervous system accounted for 28.75% of the subjects, while 21.75% of the subjects were fatigued with an active parasympathetic nervous system, where the key factors are the number of exercise days and the number of steps taken. Cluster analysis was then used to separate the degree of fatigue into four levels. Fatigue scores between 111 and 140 are classified as extremely fatigued; between 77 and 110 as generally fatigued; between 48 and 76 as borderline fatigued; and between 20 and 47 as removed from fatigue. Different fatigue levels were found to have different key factors, and the results of the present study can help provide differentiated solutions for different levels of fatigue.

Keywords: *Fatigue prevalence rate, neural networks, fatigue types, cluster analysis, fatigue level*

Session II: #3 TW045A Time: 16:04-16:16

Acute Oral Toxicity (LD50) Study of Crude Exopolysaccharide from Rhodotorula minuta BIOTECH 2178 in ICR Mice

Mary Ann Jilly R. Ramirez, Ludito V. Ramirez, Amelita C. Estacio, Francisco B. Elegado
Southern Leyte State UniversitySogod, Southern Leyte, Philippine

Acute toxicity study on lyophilized exopolysaccharide produced from Rhodotorula minuta BIOTECH 2178 EPS was evaluated using laboratory mice. In this study, twenty male ICR mice were divided into 4 groups; Group I received 0.5 ml saline solution, Group II treated with 50mg EPS/kg body weight, Group III treated with 225mg EPS/kg body weight and Group IV treated with 400 mg EPS/kg body weight. Blood samples were collected via orbital sinus for hematological analysis. Body weight, feed and water consumption were recorded daily. Liver and kidney were collected for histopathological analysis after 15 days administration of EPS. Statistical analysis was performed through one-way analysis of variance with only $p<0.05$ F-values were presented. Blood chemistry analysis showed that mice fed with crude EPS had comparable BUN, creatinine and ALT values with that of the control. Liver histopathological analysis of the control and treated group showed normal hepatic architecture with hepatic cells, nucleus, sinusoidal spaces and a central vein. Histopathological analysis of the kidney showed normal renal structure of cortex, which showed a normal architecture of renal glomeruli, proximal convoluted tubule and distal convoluted tubules. Moreover, the tubules showed a relatively regular distinct lumen of both control and treated groups. Thus, crude EPS from Rhodotorula minuta BIOTECH 2178 was neither hepatotoxic nor nephrotoxic and considered safe even in the administration of 400mg EPS/kg bodyweight within 14 days consumption. Moreover, its safety property lays a good foundation for application of EPS in food and pharmaceutical industries.

Keywords: *histopathological analysis; creatinine; hepatotoxic; nephrotoxic*

Session II: #4 TW048 Time: 16:16-16:28

Exploring the Impact of Climatic Risk Factors for Spontaneous Intracerebral Hemorrhage in Different Patient Groups: an Application Using Decision Tree

Hsien-Wei Ting, Chien-Lung Chan, Ren-Hao Pan, Robert K Lai and Ting Ying Chien

Taipei Hospital, Ministry of Health and Welfare, New Taipei City, Taiwan

Background: Spontaneous intracerebral hemorrhage (SICH) has a high mortality rate. Research has demonstrated that sICH occurrence is related to weather conditions. This study used the decision tree method to explore the impact of climatic risk factors for sICH at different ages.

Methods: The Taiwan National Health Insurance Research Database (NHIRD) and other open-access data were used in this study. The inclusion criterion was first-attack sICH. The decision tree algorithm, C5.0, was implemented in R programming language. We defined a high risk as higher than the average number of cases daily, and the younger, middle-aged and older groups were calculated as having 0.77, 2.26 and 2.60 cases per day, respectively.

Results: In total, 22,684 sICH cases were included in this study; 3,102 cases were younger (< 44 y/o, younger group) patients, 9,089 were middle-aged (45 y/o to 64y/o, middle group), and 10,457 were older (> 65 y/o, older group). The risk in the younger group was not correlated with temperature, wind speed or humidity. The middle group had two decision nodes: a higher risk if the maximum temperature was > 19 ℃ (probability = 63.7%), and if the maximum temperature was < 19 ℃ in addition to a wind speed < 2.788 (m/s) (probability = 60.9%). The older group had a higher risk if the average temperature was > 23.933 ℃ (probability = 60.7%).

Conclusions: This study found that the sICH incidence in the younger patients was not significantly correlated with weather factors; that in the middle-aged sICH patients was highly correlated with the apparent temperature; and that in the older sICH patients was highly correlated with the mean ambient temperature. “Warm” cold ambient temperatures resulted in a higher risk of sICH, especially in the older patients.

Keywords*: Big Data; Decision Tree; Humidity; Spontaneous Intracerebral Hemorrhage; Temperature; Weather; Wind Speed.*

Session II: #5 TW059 Time: 16:28-16:40

Medical Decision Support for Diabetes Using a Regression-based Prediction Model

Hsien-Wei Ting, Cheng-Zen Yang, Hong-Yu Chang, Yu-Han Chung and Chih-Fang Chen

Taipei Hospital, Ministry of Health and Welfare, New Taipei City, Taiwan

Diabetes is one of the important public health issues in Taiwan, especially the type 2 diabetes. Though diabetes can be controlled with medical treatment, it may take a long time to find an appropriate way of medication which contains the process of periodically detecting the concentration of HbA1c. In this paper, we propose a machine learning process for constructing a medication decision supporting system to provide medication advices based on the linear regression prediction model which is trained by considering medication history and age information of patients. The benefit of the system is that it can help shorten the process of medicine adjustment. The prediction model has been evaluated with 1,881 patient data. The results show that the prediction model achieves 79.1% accuracy on average for the total number of the correctly predicted cases and it outperforms a baseline implemented with the CART decision tree model, which achieves 78.93% accuracy on average. With regard to four studied groups, the proposed system achieves 73.84%-81.95% accuracy on average.

***Keywords**: Diabetes; Medical Treatment; Decision Support; Linear Regression.*

Session III< Health Information System >

Session Chair: Prof. Yang Xu and Prof. Yen-Chiao Lu
Venue: JengShin Hall (2nd level) Lecture Room 0222
Time: 15:40-16:40

Note:

*** Each presentation should be 10mins oral pretention + 2 mins Q&A.**

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Session III: #1 TW017 Time: 15:40-15:52

Marketing Innovation: A New Informative Communication Case for the Skull and Palate-Craniofacial Implants

Chen Poshun and Huang Paochia

Chaoyang University of Technology, Taiwan

Marketing innovation is an important aspect of information communication. This study designs medical 3D image technology. The information platform is directly linked to physician communication, offering a substantial increase in traditional communication between medical practitioners. This can enable fast and accurate completion of the skull and palate-craniofacial implant customization, response product feasibility and modification, thereby reducing the operation time and customization of the medical error rate, while also reducing the delay in the treatment of patients with time-course risk.

Keywords: *Marketing innovation; 3D annotation; interactive marketing; skull implants; palate-craniofacial implants*

Session III: #2 TW013 Time: 15:52-16:04

Research on Performance Evaluations of Talent Quality-management System Imported by Medical Institutions in Central Taiwan

Wen-Tsan Lin, Chin-Wen Liao and Yu-Yi Wang
National Chin-Yi University of Technology,Taiwan

This study focuses on exploring performance evaluations before and after Talent Quality-management System (TTQS) is imported and promoted by the medical institutions in central Taiwan. The design of this study is implemented in two stages. The first stage is on the basis of “Talent Quality-management System Imported to Performance Evaluations and New Indicators Plan” carried out by the Research and Development Institute of Vocational Training authorized by the Workforce Development Agency, aiming to adjust and modify the questionnaire of “TTQS Imported to Performance Evaluations” presented in the planning report to better meet the industrial pattern of medical institutions.Through the results of quantitative analysis received in the first stage, the resulted important items are drafted as the questionnaire items based on five dimensions of PDDRP (Plan, Design, Do, Review, and Outcome) of TTQS, in order to conduct in-depth interviews in the second stage.

In addition, the second stage is based on the results of quantitative analysis to process qualitative analysis to do research by means of in-depth interviews. Through sorting and exploring of information obtained from the interviews, it is revealed that if the establishment of the organization is equipped with complete training process and system, the organizational staff can gain their accomplishment after training; all departments can well communicate with one another to come to an agreement, so that it can help the organization facilitate its operation. Therefore, the results of this study not only can help medical institutions to substantially promote their manpower performance but also can let the related appraisal units refer to the TTQS plan to offer different counseling projects for various industries based on their needs, in order to successfully give an impetus to the industrial talent cultivation.

Keywords: *medical institutions, Talent Quality-management System, performance evaluations, in-depth interviews*

Session III: #3 TW042A Time: 16:04-16:16

The Influence of Online and Face-to-Face Collaboration, Learning Style on Cognitive Load and Sustained Attention

Ya-Ming Shiue, Yu-Chiung Hsu

Chia-Nan University of Pharmacy of Science,Taiwan

Although the collaborative learning has received increased attention given to educators, there have been few attempts to investigate the differences of online and face-to-face collaboration. This study utilized a two-factor experimental design, explored the influence of different type of collaboration and different learning styles on students' cognitive load and sustained attention, as indicated by brainwave activity. To assess the differences between the effects of online and face-to-face collaboration, this study collected cognitive load scale and brainwave data from two different classes taking the same course at a university in Taiwan. The results showed that the online collaboration increased students' cognitive load than the face-to-face collaboration, because students have to learn how to use the online collaborative technologies. However, the online collaboration group had higher sustained attention than face-to-face collaboration. Students who preferred the visual learning style reported that the use of online collaboration had less cognitive load and higher sustained attention than the verbal learning style. No significant differences were found related to students' learning style in the face-to-face collaboration group.

Keywords: *Collaboration, learning style, cognitive load, electroencephalography (EEG)*

Session III: #4 TW061 Time: 16:16-16:28

A Laboratory Specimen Management System with Commercially Viable RFID Solution

Chia-Chi Teng, Matthew Leavitt, Andy Ivie
Brigham Young University, USA

Radio Frequency Identification (RFID) uses wireless electronic signal to identify, communicate and track tags attached to objects, animals or human. Applications using RFID technology have been successfully deployed in a variety of industries for many years. Discussions of adopting RFID in healthcare, its potential benefits and major obstacles have been well published in literatures. As healthcare industry increase its effort to improve quality and reduce errors, RFID is an important element in the healthcare information technology (IT) that is helping the industry to reach its goals. However, few has been able to successfully integrate RFID technology in real clinical environment due to reasons such as high cost and availability of suitable products. This study presents a commercially viable RFID solution for anatomical laboratory specimen management systems which has been used in partnering pathology laboratory and urology clinics for over a year. Over five thousand RFID tags has been embedded with prostate biopsy cores for over two thousand subjects with high reliability rate and overwhelmingly positive results.

Keywords: *RFID, Healthcare IT, Health Informatics, Pathology.*

Session III: #5 TW062 Time: 16:28-16:40

Use mHealth Application to Care Older Family Member for Correct Medication

Chia-Li Chen

Lunghwa University of Science and Technology, Taiwan

In recent years, the popularity of smart phones is trend. There are many funny games and community software. But one can provide users with effective drug-use management software will be more meaningful, especially for seniors and chronic diseases. We designed a phone application (APPs) to provide easy to use and quickly control good health. A report that The World Health Organization (WHO) had published showed: patients do not take medicine prescribed by your doctor on a regular basis is a global problem; also referred to Dr. Saba Te stressed regularly take medicine is key to successful treatment. But seniors always forgot to take medicine. We designed the simple operation and meaningful mobile application with the current popularity of smart phones, allowing senior citizens easy to use smart phone, but also to gain control of their health. Construction of a mHealth application combined with the QR code applications to help older family member improving medication management. We resolved two of correct medication five core abilities: Ability II: "See clearly" and Ability III: "Take with the right". There are five features in our system: (1) easy to use (2) useful (3) Do not change the follow of doctors diagnosing (4) Do not change the follow of pharmacist giving the drug (5) Do not spend any other money. Older family member will recover health quickly.

Keywords: *mHealth, correct medication usage, QR code, mobile application, elder*

Session IV< Health Risk Evaluation >

Session Chair: Prof. Su-Hsin Chang and Prof. Yu-Ju Tu
Venue: JengShin Hall (2nd level) Lecture Room 0223
Time: 15:40-16:40

Note:

*** Each presentation should be 10mins oral pretention + 2 mins Q&A.**

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***Session photo will be taken at the end of the session and update online**

Session IV: #1 TW039 Time: 15:40-15:52

The Effects of Home Pharmaceutical Counseling on Prescription of Potentially Inappropriate Medications

Tzu-Chueh Wang, Kung-Chuan Hsu, Hai-Lin Lu, Damien Trezise, Wen-Shyong Liou, Jiunn-Min Shieh
Chia Nan University of Pharmacy and Science, Taiwan

Aging increases the danger of adverse reactions to medication, which can lead to hospitalization and mortality. Aging is also associated with increased rates of polypharmacy, which can lead to harmful interactive effects. The introduction of personalized pharmaceutical counseling for elderly patients when medications are prescribed can potentially reduce the danger of adverse reactions to medications, and thus promote public health. This paper reports on an exploratory project in elderly pharmaceutical counseling conducted in Taiwan from 2010 to 2012. An experiment group consisting of 40 patients received home pharmaceutical counseling from hospital pharmacists and community pharmacists, while a control group received only routine counseling at the time their medications were dispensed. The two groups' prescriptions were analyzed according to Beer's Criteria for Potentially Inappropriate Use of Medication. It was found that the rate of prescription of potentially inappropriate medications was reduced after home pharmaceutical counseling, when considered in terms of gender, rate of polypharmacy and age group. However, while home counseling appeared to reduce the incidence of prescription of potentially inappropriate medications at hospitals, this was not the case for community clinics. The paper discusses implications of these findings for future research and pharmaceutical practice.

***Keywords**: polypharmacy, home pharmaceutical counseling, Beers Criteria, potentially inappropriate medications*

Session IV: #2 TW029 Time: 15:52-16:04

To Construct a Hospital Biomedical Waste Disposal Outsourcing Risk Evaluation Model by Analytic Hierarchy Process

Chao-Chung Ho, **Ming-Shu Chen**
Oriental Institute of Technology, Taiwan

Improvement of medical quality has become a trend in hospital development. In recent years, environmental protection has become a rising issue in Taiwan, and people have begun to discuss the biomedical waste that comes from hospitals. According to an estimate in "To Err is Human," published by Institute of Medicine, the economic loss resulting from medical malpractice is about $17 to $29 billion, and the question of whether biomedical waste is properly disposed of is included as an incident of medical malpractice. Therefore, this study aimed to study use risk evaluation in order to screen out evaluation factors. Subsequently, the Analytic Hierarchy Process was employed to determine the weight of each factor. The results of the study provide hospitals with biomedical outsourcing critical risk factor criteria and their order by importance and can be provided to hospitals as reference for the management of biomedical waste disposal outsourcing.

Keywords: *Analytic Hierarchy Process (AHP); Biomedical Waste; Waste Management; Outsource; Medical Wastes.*

Session IV: #3 TW014A Time: 16:04-16:16

Improvement of Wrist-worn Photoplethysmographic Heart Rate Monitoring During Physical Activities

Jiunyang Hu and Jangzern Tsai
Nelson Marlborough Institute of Technology, New Zealand

While the accuracy of heart rate monitoring using photoplethysmography (PPG) is quite acceptable when the person stays still, it could deteriorate during physical activities. The motion artifacts due to hand movements in the received PPG signal interfere with the heart rate detection. In this study, we propose a two-stage strategy to reject the motion artifacts and improve the accuracy of heart rate detection. At the first stage, the frequency spectrum of the received PPG signal is analyzed and the spectral components owing to the motion artifacts are identified and deleted by spectral subtraction. To detect the frequency spectrum of the motion signal, three-axis accelerometers are used. At the second stage, the heart rate is estimated on the basis of the spectral peaks of next moment and the tracking information of previous heart rates. This tracking estimation method has considerably improved the accuracy of PPG heart rate monitoring during physical activities.

Keywords: Photoplethysmography(PPG) , Heart Rate Monitoring , Wearable Computing, Ambulatory Monitoring, Motion Artifact.

Session IV: #4 TW054 Time: 16:16-16:28

A Model for Aging-Home-Care Service Process Improvement

An-Jin Shie, Shu-Yan Yu

Dhurakij Pundit University, Thailand

The purpose of this study is to develop an integrated model for improving service process in the aging-home-care service. According to the literature, the service process that exists some potential service failures affected the service quality and efficacy. However, most previous studies that merely focused on the conceptual model development in New Service Development (NSD) lacked a systematic model to analyze the potential service failures and to facilitate managers developing solutions to improve service process. In contrast, this study proposes a model by integrating service blueprinting and Failure Mode Effect Analysis (FMEA). First, the service blueprint tool is used to analyze the potential service failures in the service process. Then, FMEA is employed to diagnose the possible causes and effects of the service failure model. Finally, we utilize expert brainstorming method to develop the feasible solutions for improving the service process. A case study of an aging-home-care service process is conducted to demonstrate the applicability of the proposed model. The advantages of the proposed model and the implications are summarized at the end of this article.

Keywords: *aging-home-care service, service process, service blueprint, failure models and effects analysis (FMEA).*

Session IV: #5 TW058 Time: 16:28-16:40

Comparison of Antioxidant Activity of Exopolysaccharides between Lactobacillus Acidophilus La and Bifidobacterium Adolescentis Ba in Vitro

Ta-Chen Lin, Yuh-Shuen Chen

Xiamen University Tan Kah Kee College, China

In order to identify the relationship between antioxidant property of exopolysaccharide (EPS) and composition as well as concentration, the study compared the antioxidant activity of EPS between L. acidophilus La and B. adolescentis Ba in vitro. Firstly, the carbohydrate composition of LaP and BaP were quantified by high performance liquid chromatography (HPLC) equipped with a RI detector. The antioxidant activities of EPS estimated included DPPH radical-scavenging activity, linoleic acid peroxidation, ferrous ion chelating effects, and reducing power. The results revealed all the indications of antioxidant property of BaP were significantly stronger than that of LaP ($P < 0.05$). Moreover, the antioxidant property of BaP was positively correlated with the composition concentration including phenolic content of powerful antioxidant. Therefore, the comparison of composition and concentration of EPS not only could distinguish the antioxidant activity between LaP and BaP, but also made EPS acquire different functionality from composition and concentration. Thus, BaP with more antioxidant potential may merit the potential application of food additives and supplements to the health-promoting food industry.

Keywords: *Antioxidant activity, exopolysaccharides, Lactobacillus acidophilus, Bifidobacterium adolescentis, DPPH radical-scavenging activity, reducing power.*

Session V< Healthcare Quality Management >

Session Chair: Dr. Chalong Cheewakriangkrai and Prof. Shih-Hsin Chen
Venue: JengShin Hall (2nd level) Lecture Room 0225
Time: 15:40-16:40

Note:

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Session V: #1 TW032 Time: 15:40-15:52

Medical Specialists Retrieval System Using Unified Medical Language System

Aulia Zahrina Qashri, Oscar Karnalim, Hapnes Toba

Maranatha Christian University, Indonesia

A large number of doctors and wide range of medical specialties can cause confusion in choosing the right medical specialist. This research aims to build a medical specialists retrieval system that corresponds with the user's disease. To make the system whole, it requires the ability to differentiate a query from common words and relate it to a disease, then associate the disease to related medical specialties. The Unified Medical Language System (UMLS) is used in query handling and finding relations between a disease and medical specialties. Additionally, the search results are sorted by the nearest medical practices based on user's location. This system has been evaluated by two internists which revealed an average score of 4.625 out of 5, which means relevant, of all points evaluated. Thus, provided a positive feedback to overall system performance.

Keywords: Information retrieval; medical informatics; retrieval system; web.

Session V: #2 TW037 Time: 15:52-16:04

The Influence of a Hospital Quality Improvement Strategy on Employees' Service Quality Perceptions

Yafang Tsai, Shih-Wang Wu, Yi-Hua Tsai

Chung Shan Medical University Hospital, Taiwan

Following the reforms that have been implemented in Taiwan's medical and related healthcare systems, Taiwanese hospitals are facing steadily increasing market competition. Hospital administrators, in answer to this competition, are placing increasing importance on improving the quality of care delivered to patients in their efforts to obtain patient satisfaction.How can service quality be improved for patients? This study explored how using total quality management in hospitals influences staff perception of service quality. A cross-sectional study was performed, for which a sample was drawn from five regional hospitals in central Taiwan. A total of 300 questionnaires were distributed, from which 226 valid questionnaires were returned. We found that a total quality management strategy influences staffs' perception of service quality.

Keywords: *Total quality management, service quality, quality improvement, healthcare management*

Session V: #3 TW063 Time: 16:04-16:16

Assessing the Risk of Turnover Intention among Hospital Workers

Yafang Tsai, Shih-Wang Wu, Szu-Chieh Chen

Chung Shan Medical University, Taiwan

Solving the shortage of hospital workers has become an increasingly urgent priority in recent decades. Understanding the turnover problem remains a major scientific challenge. The objective of this study was to assess the risk intention for hospital workers based on probabilistic risk assessment concept. A cross-sectional study was conducted. The survey samples included nursing staff and hospital workers from one regional teaching hospital in Taiwan. Participants completed a questionnaire with measures of emotional labor (EL), job stress (JS), internal marketing (IM), organizational citizenship behavior (OCB) and the perception of turnover intention (TI). To assess a risk-based model of perception of TI based on a dose-response relationship. The results showed that employees' perceptions of JS influence their perceptions of TI, and organizational commitment is a mediator between IM and perception of TI. To represent current knowledge on the predictive model, the present study is the first to incorporate the probabilistic and risk assessment concepts for assessing perception of TI. The proposed dose-response scheme may enable the early identification of perception of TI among individuals, and help maintain workflow stability in hospital environments.

Keywords: *turnover intention; hospital workers; risk; job stress; healthcare management*

Session V: #4 TW043 Time: 16:16-16:28

Reporting Verbs in Medical Research Articles

Richard Hill Davis

Feng Chia University, Taiwan

This study of reporting verbs in medical writing is based on a corpus of medical research articles published between 2001-2011, comprising 1,051,368 words (Davis 2015), The corpus holds 250 randomly selected medical articles, all peer-reviewed, located in PubMed, and open sourced. Analysis using WordSmith (Scott 2005) was conducted on all four of the Introduction-Methods- Results-Discussion (IMRD) sections, omitting title, abstract, figures, headings, captions, legends, acknowledgments, references, tables, and appendices. While important features, they were unlikely to include reporting verbs.

Keywords: *Reporting verbs; corpus analysis; medical research articles; semantic prosody; factivity; lexical priming*

Session V: #5 TW040 Time: 16:28-16:40

Potentially Inappropriate Medication Prescription in Elderly Outpatients

Tzu-Chueh Wang, Kung-Chuan Hsu, Hai-Lin Lu, amien Trezise, u-Sheng Hung, iunn-Min Shieh
Chia Nan University of Pharmacy and Science, Taiwan

Potentially inappropriate medication (PIM) is defined as medication which may result in higher than expected risk when used by elderly patients. Its risk of occurrence may be increased through the effects of drug interactions, adverse drug reactions (ADR), adverse drug effects (ADE), and so on. At the commencement of this study, we hypothesized that: 1. After the release of a revised version of the Beers Criteria, the number of medications prescribed that are inappropriate under these guidelines would decline. 2. Polypharmacy would lead to increased potentially inappropriate use of medication. 3. More PIM would be prescribed at hospitals than at local clinics. To test these hypotheses, we analyzed prescriptions that had been issued by physicians at local hospitals and clinics and dispensed at a community pharmacy in Kaohsiung City, from 2009 to 2015. We found that the overall rate of prescription of PIM for elderly patients was 50.8% from 2009-2012, compared with 37.6% from 2013-2015. The largest number of prescriptions filled at the pharmacy was for the 'young-old', while the smallest number was for the 'oldest-old'. Prior to the introduction of the guidelines, the incidence of PIM was highest among the 'oldest-old', while after their introduction, PIM was highest among the 'aged'. In terms of prescribing institutions, physicians in hospitals were more likely to prescribe PIM than those in clinics. In terms of polypharmacy, inappropriate medications were most likely to be prescribed when ten or more medications were being used simultaneously. After the release of the guidelines, the rate of PIM among patients using ten kinds of medication or more exceeded that of those using one to four medications by a factor of six. This study involved only a retro-analysis of prescriptions dispensed at a community pharmacy. In the future, if pharmacists can discuss the appropriateness of prescriptions with physicians after medications have been prescribed, it is likely that the rate of PIM can be reduced, thus contributing to an improved quality of life for elderly patients.

Keywords: Beers Criteria, potential inappropriate medication, elderly patients

Session VI< Medical Image Processing & Game >

Session Chair: Dr. Ming-Chi Wu & Prof. Chiun-Li Chin
Venue: JengShin Hall (2nd level) Lecture Room 0213
Time: 15:40-16:40

Note:

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Session VI: #1 TW049 Time: 15:40-15:52

Application of the Intelligence Computing for Optimizing Enzymatic Bioprocessing in Cartilage Hydrolysis

Tzu-Miao Lin, Hsi-Chieh Lee, Wen-Jia Kuo, Chih-Ching Chien, Yao-Horng Wang, Chai-Li Chen

Hsin Sheng College of Medical Care and Management, Taiwan

Aim: The aim of this study is to use the Taguchi-orthogonal method and artificial neural network to optimize enzymatic bioprocessing in animal waste cartilage (chicken, mini pig and hog). Specifically, the artificial neural network is used in parallel with the Taguchi orthogonal array process for enzymatic hydrolysis of the cartilage tissue to optimize the best quality of bioactive peptides.

Methods: Design of Experiment with Taguchi–orthogonal array optimal levels $L2^5$of physical parameters and key media components namely temperature, pH, enzyme/substrate ratio, substrate concentration, and reaction time were determined. And then the experimentally results were used for training the artificial neural network (ANN) to predict the optimizing enzymatic bioprocessing in animal cartilage hydrolysis. The analysis was performed on a personal computer using the NeuroSolution6.0 software.

Results: The enzymatic hydrolysate of three animal cartilages was followed the Taguchi orthogonal design and discover that at 60±1℃ of hydrolyzing temperature in the most effective to hydrolyzed the cartilage. These peptides molecular size might of smaller than 10kDa (with 95% in 10.7kDa and 2.5kDa) were demonstrated of capable to stimulate the porcine chondrocytes to production of glycosaminoglycan (GAG) and type II collagen in vitro. The NeuroSolution (6.0) back-propagation analysis results of the convergence value (R^2=0.9762) that indicating this enzymatic bioprocessing has a good performance. Therefore, this study suggested that integrating artificial neural network and Taguchi method on constructing an optimal enzymatic bioprocessing model could significantly increase and improve the goods of final bioactive peptide products.

Conclusion: This study suggested that integrating artificial neural network and Taguchi method on constructing an optimal enzymatic bioprocessing in cartilage hydrolysis could be used as nutraceutical component in bone and joint health.

Keywords: *Intelligence computing, Taguchi–orthogonal array, Neural network, Cartilage hydrolysis, Enzymatic bioprocessing*

Session VI: #2 TW005A Time: 15:52-16: 04

Mobile Skin Condition Analysis System

Guei-Ru Wu, Chiun-Li Chin, Tzu-Chieh Weng, Bing-Jhang Lin,

Ho-Feng Chen and Yun-Yun Kang

Chung Shan Medical University, Taiwan

In this paper, we proposed a mobile skin condition analysis system contained skin-analyzing functions to solve users' skin problems owing to people are getting more and more taking notice of their appearance regardless of gender nowadays. This paper focused on how to optimize the image processing on human facial images in analyzing the pores, wrinkles and speckles on human faces. We use the smartphone with camera function and the skin detection algorithm developed by us to detect users' skin condition. To start with, take a facial picture and then if the picture is an eligible one, the system will take it into skin-condition analysis and segment into five regions such as forehead, cheeks, lips and chin. In addition, the results will be transmitted within 4G Networks, users of our system could promptly communicate with our online skin experts how to take care of their skin and which of skin-care products they should use for improving their skin condition. In the future, we expected that we will cooperate with famous Medical Beauty clinics and manufacturers of skincare products. As a result, the clients would acquire their product information no matter what kinds of skin problems they have been confronted with.

Keywords*: Skin analysis, Skin condition, Pore, Wrinkle, Speckle*

Session VI: #3 TW006A Time: 16:04-16: 16

Smart Acupuncture Points Massage Clothes Using Sensor and Image Analysis Technology

Rui-Cih Su, Ming-Chieh Chin, Chiun-Li Chin, Cheng-Xun Yang, Zhi-Yi Yang and Wei-En Chen

Chung Shan Medical University, Taiwan

Modern people often feel some parts of ache after getting off work. The main reason is commonly improper gesture. Furthermore, on the market, most of massage products are using fixed position, but there is no movable massage products. However, this paper proposes multi-sensor, multi-output components and a micro-controller chip which provides acupuncture point-based adjunctive therapy using smart phones, and improves specific conditions and gives medical attention. The system uses the smart phone which combines the Arduino control components with sensors to achieve the effect of the acupressure adjuvant therapy in order to get the result of therapy via pressing the acupressure points. In the term of acupuncture pressing, via the pressure of the straps and the steel balls on the acupuncture points, and then the system can collect the pressure data from pressure sensor. Each the select of sore part from user will record in the database. When some selections of the sore parts appeared too many times, the system will give the user medical attentions by the phone alarm. In respect of the result of experiment, most people who have used this product sooth their pressure effectively. Also, they obtain convenience through the design of wearable clothes.

Keywords*: Calibrated Acupuncture points, acupressure adjuvant therapy, Pulse Width Modulation.*

Session VI: #4 TW065 Time: 16:16-16: 28

Developing an Aging Facial Skin Quality Score System for Asian Female: A Comparison Study

Tzu-Miao Lin, Hsi-Chieh Lee and Kuang-Hung Hsu

Hsin Sheng College of Medical Care and Management, Taiwan

Objective: Using epidemiology investigation method of a cross-sectional study for facial skin quality in Taiwan.

Design: Developed a standardized skin testing procedure to identify facial skin biophysical properties and impact factors of Taiwanese.

Participants: This study had collected 389 females (age range, 18-70 years) with volunteer basis and apparently healthy facial skin.

Intervention: The distribution of samples were conducted between February 2004 and April 2005, proportionately from five parts of Taiwan such as North, Middle, South, Northeast, and East.

Main Outcome Measures: The seven facial skin biophysical properties were taken in a controlled environment and using a standardized protocol to ensure consistency of survey.

Results: The relationship between the facial skin biophysical properties and the chronological age followed a linear model, which declines with age, as expected, the groups aged 18 to 29 years with highest values, and lowest skin quality on the groups aged 50 to 70 years. The certain lifestyle habits known to have significant effects on facial skin aging were identified for Taiwanese women, such as body mass index, menstrual cycle, menopausal status, onset of menopause, lifetime sun exposure, history of hair dye, routine of facial cleansing, methods of daily skin care, skin color, skin type and geographical location. Our Study has been developed a Facial Skin Quality Aging Score System, and discovered that the calculated aging scores were significantly ($p<0.0001$) increased as comparison with the increasing of chronological ages. The facial skin surface sebum casual level was shown a distinguishably biphasic decreased ($p<0.0018$) with sharp-drop between the chronological age-group of 35-39 and 40-44. In conclusion, our study demonstrated that a standardized Facial Skin Quality Aging Score System could be used for producing a global systematic reference of human skin quality aging.

Conclusions: A standardized facial skin testing center, testing procedure and prediction index of skin quality aging for Taiwanese population are important concerns. Such this study results would be prepared to help in the consideration proper measures for dermatology and a cosmetics product.

Keywords: *Skin aging, Skin biophysical properties, Photo-images of facial skin, Facial skin quality aging score system, Courage and Khazaka Cutometer MPA580*

Session VI: #5 TW015A Time: 16:28-: 16:40

A Fatigue-Driving Warning System Based On Electro-Oculography

Yuan Chang, Jang-Zern Tsai
National Central University, Taiwan

According to statistics of Taiwan's National Police Agency in the years 2012 2014, the traffic accidents due to fatigue driving led to more than 1500 deaths per year and the number has been increasing year by year. As smartphone, tablet computer and other portable accessories boomed, we began to conceive some ideas, such as using watches, bracelets, glasses, buttons and/or shoes to design a warning system for fatigue sleeping. It would help reduce traffic accidents. In this study, we embedded electro-oculography (EOG) hardware into a pair of glasses to measure the eye movements. The potential difference measured between the skins above and below the eyes reflected the eye movements in the vertical direction; that measured between the skins to the right and to the left of the eyes reflected the eye movements in the horizontal direction. We analyzed the amplitude of the eye movement, the eye blinking frequency, and the DC level of the EOG signal and sensed the nodding, lifting up, and turning of the head with a three-axis accelerometer. The fatigue warning system was developed on the basis of these analysis and sensing. The system was evaluated by emulation with a game named Euro Truck.

Keywords: *Fatigue driving, Electro-oculography, A pair of glasses*

Poster Session

Session Chair: Prof. Fong-Jung Yu and Prof. Shun-Chuan Ho
Venue: JengShin Hall (2nd level)
Time: 12:30-13:30

Note:

*** The certification of the best poster presentation will be awarded at the end of the conference at the closing ceremony.**

Poster #1: TW025

Research on Efficiency Evaluation of China's Investment and Medical Assistance in Africa under the Background of Constructing 'Silk Road Economic Belt' --- Based on DEA Model and Malmquist Index Method

Tian Ze, Fan Yumei, Liu Chao

Hohai University, China

In recent years, with implementation and propulsion of the strategic planning "One Belt and One Road" of China, quality and efficiency of China's foreign direct investment and medical assistance have increasingly become a focused issue. This paper utilizes the DEA model and Malmquist index method to select the data of China's investment in 20 countries of Africa and conducts the empirical research on dynamic evaluation of efficiency of China's direct investment and medical assistance in Africa. The result shows that the general efficiency of China's direct investment and medical assistance in Africa is in a declined fluctuation trend, while the technical efficiency of the investment is in a constant rising trend, and direct investment and medical assistance in most host countries has reached or is reaching the optimal scale. From the perspective of country difference, the efficiency of direct investment and medical assistance in a small number of host countries has been improved while that in most host countries has declined. With improvement of African countries in absorbing and utilizing foreign technologies and management level and effective innovation of China's direct investment and medical assistance in host countries, the efficiency of direct investment and medical assistance in host countries will be constantly improved. The suggestions such as optimizing investment location selection, emphasizing on the linkage between support facilities and industrial chain of the investment project, improving technology spillover efficiency and enhancing infrastructure investment are proposed.

Keywords: *Africa; foreign direct investment and medical assistance; efficiency evaluation; DEA; Malmquist index*

Poster #2: TW028

A Selection of Medical Waste Logistic Firms Using AHP and VIKOR Method

Yan Wang

Zhejiang Industry & Trade Vocational College, China

Medical waste is a waste derived from healthcare and other such medical activities. If there is no medical waste management or if that management is inadequate, they may ultimately run high risks of infections and may become hazards because some of these wastes can be infectious, contain toxic chemicals and pose contamination risks to both people and the environment. Most medical institutions outsource their waste treatment to waste disposal firms. Howto select a right logistic firm is a critical issue to the medical institutions. To a medical institution, there are several different criteria to be considered when he wants to select a logistic firm. So the selection of the medical waste logistic firms is a multi-criteria decision-making (MCDM) problem. In this study, an evaluation model is proposed to rank the priorities of potential logistic firms based on their properties using VIKOR and AHP. This approach should increase the level of satisfaction after he decides the logistic firm. A numerical example is also employed to demonstrate the model's working.

Keywords: *Medical waste treatment; Outsourcing; Logistic firms; VIKOR; AHP*

Poster #3: TW030

Statins Use In Diabetes Patients As Primary Prevention And Low-Density Lipoprotein Cholesterol Levels

Chuyun Sun
Pittsfield, USA

Few data are available on the use of statins among the type 2 diabetes patients for primary prevention after publication of the American Diabetes Association guidelines in 2008. The American Diabetes Association (ADA) standards of care for diabetes state that statin therapy should be initiated in individuals with diabetes and other cardiovascular risk factors with a target LDL cholesterol of 100 mg/dl. This paper is to determine statin use in diabetes patients as primary prevention and its impact on low-density lipoprotein cholesterol (LDL-C) control among US individuals in year 2011-2012.

In the research, diabetes patients were first identified among participants of the National Health and Nutrition Examination Survey (NHANES) 2011-2012. Patients were excluded if they had any cardiovascular events including congestive heart failure, heart failure, and stroke before as statin usually recommend for secondary prevention among these patients. Statin use was obtained from review of participants' drug containers. LDL-C control (yes) were defined was defined as <100 mg/dl. A logistic regression was conducted first to understand the characteristics associated with statin use as primary prevention among diabetes patients. A secondary logistic regression was done to examine the effect of statin on LDL-C control. Finally a linear regression model was used to look at the impact of statin on LDL-C as a continuous variable. Full Sample 2 Year Interview Weight (WTINT2YR) was applied for all the analysis. A total of 598 patients were identified and the weighted sample size was 17,387,156 for the data analysis.

The conclusion comes out to be that statin use was associated with substantial improvements in LDL-C control in this study. Nevertheless, suboptimal statin use, especially among women and individuals with lower family income, prevented the maximal public health benefit from statin as a primary prevention among diabetes population.

Keywords: *Logistic Regression; Statins Use; Low-Density Lipoprotein Cholesterol Level; Cardiovascular Disease; Type 2 Diabetes.*

Poster #4: TW031

Gender Differences in Nutrition Knowledge, Attitude, and Practice among Elderly People

Chih-Ping Li

Kainan University, Taiwan

Malnutrition is an important public health concern among elderly people. According to the WHO, malnutrition may be a contributing factor to the development of cardiovascular and cerebrovascular disease, diabetes, osteoporosis, and cancer among others. Prior research documents that nutrition knowledge deficits and poor attitude and practices are prevalent in elderly Taiwanese. The purpose of this study was to identify several factors (e.g. age, education, marital status, money for living expense, physical and mental health) that impact on nutrition knowledge, attitude and dietary practice among elderly Taiwanese men and women. Data from the 2004-2008 Nutrition and Health Survey in Taiwan (NAHSIT) (Data file: D00090) in the Survey Research Data Archive, Center for Survey Research, Research Center for Humanities and Social Sciences, Academia Sinica was used for analysis. The participants were 258 elderly people with an age range of 72.88±6.09. Multiple regression tests were incorporated to examine predictors affecting nutrition knowledge, attitude, and dietary practice of the elderly males and elderly females. The results did not identify any key factors that influence nutrition knowledge for older male and female people. Age was noted to be an independent predictor in nutrition attitude for male but not female elderly people. Both education and marital status had an effect on nutrition attitude and dietary practice for older men. On the other hand, only education affected nutrition attitude and dietary practice for older women. Mental health was an independent predictor for nutrition attitude. Money for living expenses had a significant effect on nutritional dietary practices for older women.

Keywords: *Elderly people; gender difference; nutrition knowledge, attitude, practice.*

Poster #5: TW036

Automatic Screening of Diabetic Retinopathy Images with Convolution Neural Network Based On Caffe Framework

Yuping Jiang, Huiqun Wu, Jiancheng Dong

Medical School of Nantong University, China

Objective Diabetic retinopathy (DR) is a serious complication of eye in diabetes mellitus (DM) patients. In order to automatically screen DR, we aim to use convolutional neural network (CNN) to screen DR fundus images automatically.

Methods A total of 10,551 fundus images from Kaggle fundus image dataset were collected for this experiment. Firstly, the images were preprocessed by histogram equalization and image augmentation. Then, the CNN was constructed and trained with Caffe framework. Our designed CNN models were trained by 8,626 images. Finally, the performance of the trained CNN model was validated by classifying 1,925 fundus images into DR and non-DR ones.

Results The performance results indicated that the CNN achieved accuracy of 75.70% in 1,925 test fundus images.

Conclusions CNN model is useful to classify the DR fundus images, thus might be applicable in further DR screening program for larger DM population.

***Keywords**: Convolutional neural network; diabetic retinopathy; deep learning; Caffe*

Poster #6: TW046

Disparity in HPV Vaccine Use 2009-2015 among Young Adults in the US Interview Survey

Tang Ruyi
Indian Springs School, USA

Objectives: This study aimed to examine difference in HPV vaccine receipt proportion among recipients of different regions, races and genders using national data.
Methods: National Health Interview Survey (NHIS) data in year 2009, 2011, 2012, 2013, 2014 and year 2015 were used. All participants in this study were between 18-26 years old as the last day of survey year. The outcomes of interest include 'ever received any HPV vaccine' and 'ever received three-dose HPV vaccine'. Logistic regression models were conducted to test if there is improvement in HPV immunization over the years compared to year 2009. We also examine the HPV immunization disparity due to sex, race, region, etc. The final weighting variable was applied for all the analysis in this study.
Results: A total of 1929 (17,969,653 after weighting) in year 2009, 4333 (36,946,340 after weighting) in year 2011, 4369 (36,722,787 after weighting) in year 2012, 4225 (36,221,482 after weighting) in year 2013, 4277 (35,920,194 after weighting) in year 2014, 3674 (35,063,591 after weighting) in year 2015 were included in the final analysis. The average age was 22.0 in each year.
Approximately 19% of the participants in year 2009 (female only) received HPV vaccine; it gradually increased to 28% of all (both male and female) in year 2015. Over the years, it increased from 19% in year 2009 to 42% in year 2015 for the females. Meanwhile it increased from 2% in year 2011 to 13% in year 2015 for the males. Over the years, it increased from 26% in year 2009 to 35% in year 2015 for the Northeast region. Meanwhile it increased from 20% in year 2009 to 26% in year 2015 for the Midwest region. It increased from 17% in year 2009 to 26% in year 2015 for the South region. It increased from 18% in year 2009 to 28% in year 2015 for the South region. Over the years, it increased from 21% in year 2009 to 28% in year 2015 for the white. Meanwhile it increased from 15% in year 2009 to 27% in year 2015 for the black. It increased from 12% in year 2009 to 27% in year 2015 for the Asian. It increased from 10% in year 2009 to 19% in year 2015 for the others. All the difference were statistically significant (p-values<0.05). Similar results were observed for 3-dose HPV vaccine receipt. Logistic regression confirmed the regional dispary, sexual disparity, and racial disparity in HPV vaccine receipt were significant.
Conclusions: In this study we found that HPV vaccine use increased over the time. However, sexual disparity, regional disparity and racial disparity in HPV vaccine use continuously existed over the years. Measures to improve the proportion as well as to eliminate disparity were still nearly needed.

Poster #7: TW047

Analysis of Differences in Clinical Index between Lung Cancer Patients with or Without Metastasis

Peihua Chen, Chuandi Pan, Xiaoxiao Xu

Wenzhou Medical University, China

Lung cancer is a malignant disease with high morbidity and mortality. Early prediction of its metastasis is of great clinical significance. A total of 447 clinical indexes from 2847 lung cancer patients with and without metastasis were evaluated and after screening using non-parametric statistical tests. Twenty-one clinical examination indexes were identified that differed significantly between patients with and without metastasis. Tumour markers, nutritional status, immune system parameters, erythrocyte content, erythrocyte morphology and blood viscosity differed significantly between patients with and without metastasis. Among these indexes, the carcinoembryonic antigen index was the most significant. At present, there is a lack of highly specific biomarkers for lung cancer metastasis. The clinical indexes identified in this study can be used as key indicators of lung cancer metastasis during late follow-up.

Keywords*: lung cancer metastasis; tumour markers; blood rheology; immune parameters; nonparametric test；*

Poster #8: TW064

Exploring the Gender Difference in Fear of Crime among Older People

Chih-Ping Li

Kainan University, Taiwan

The purpose of this study was to evaluate anew fear of crime scale that accurately reflects the current criminal experiences of older people and test gender differences in fear of crime in a number of items, in the item wording, and in choice response categories. A series of chi-square tests compared the fear of crime scale of older people according to their gender, and then logistic regression models were created and tested between males and females. The finding presents the odds ratios, which suggest that older female odds were 168% higher than older men odds of the item 'Someone forcibly was taking your property'. They were 43% lower than older men odds of the item 'Some strangers were wandering around your home at midnight' and were 170% higher than older men odds of the item 'Some drag racing adolescents trying to hurt you'. Odds were 141% higher in older women than in older men of the item "Someone trying to abduct you'. In conclusion, older women are more afraid of crime than older men. This study suggests that the fear of crime in older women focuses more on bodily injury than in property damage.

Keywords: *Older people; fear of crime; gender difference.*

Poster #9: TW067

Determination of Total Flavonoid Content in Flos Sophorae Immaturus Using Near Infrared Spectroscopy

Xiaoli Liu

Chang'an University, China

Near infrared spectroscopy combined with multivariate calibration methods was used to analyze the total flavonoid content in Flos Sophorae Immaturus in this paper. Principal component regression (PCR), partial least squares regression (PLSR) and support vector regression (SVR) were performed comparatively to develop calibration models. Data preprocessing methods and calibration model parameters were independently optimized for each case. The performance of SVR model was superior to PLSR and PCR models. The root mean square error of prediction (RMSEP) and correlation coefficient of prediction (R_p^2) of SVR model were 0.0025 and 0.9690, respectively. Results showed that NIR spectroscopy combined with SVR has significant potential in quantitative analysis of flavonoid content in Flos Sophorae Immaturus.

Keywords*: flavonoids, Flos Sophorae Immaturus, NIR spectroscopy, multivariate calibration*

Listeners

Welcome the Listeners to join us!

LS001
Travis Wu
ACT Government, Taiwan

LS002
Ivo Jacobs
H. Hartziekenhuis Molthe, kingdom of Belgium

LS003
Chi-Ping Chang
Tzu Chi University of Science and Technology, Taiwan

One Day Tour

Optional Post-conference Field Trip will be organized. You will have the opportunity to visit Chang Bin Show Chwan Memorial Hospital and Asian Institute of Telesurgery to learn the leading medical technology applied in the field.

In the afternoon, the tour guide will take you to a visit to the interests place in Taichung.

The fee is 40USD per person which covers the transportation and lunch. If you are interested in joining the tour, please contact our staff via email or on-site.

1. Chang Bin Show Chwan Memorial Hospital

2. Asian Institute of Telesurgery

3. Lu-Kang Old Street -Taiwan's Historical Town

Author Index

Note

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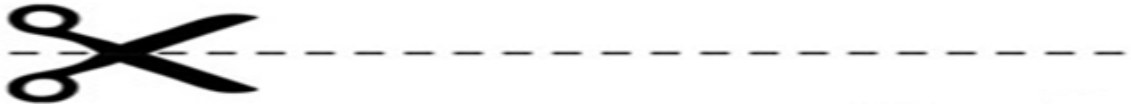

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