Book of Abstracts

InS1 Oral Session

Invited Session I

Chair: Ms. Du Jing — Tsinghua Univ., China

13:10 - 13:25 InS1.1

Enhancing English Vocabulary Learning via Computerized Adaptive Testing, pp. 3-5.

Yang Fang — Tsinghua Univ.

Zhang Huanrui — Tsinghua Univ.

Yang Mingrui — St.stephen's Episcopal School

English vocabulary, an indicator of one's language proficiency, has drawn much attention by learners as well as educators. This paper discusses a system that aims to facilitate the experience of enhancing vocabulary learning via MOOC videos and quizzes. The present system is a web-based vocabulary practicing and testing program that is geared to the dynamic process of familiarizing learners with the words. Learners can identify the meanings of words in the contexts of sentences, taken mainly from texts explained in MOOC courses. The contextual knowledge of the words helps learners to explore the words in the text interpretations, delivered in the MOOC videos.

13:25 - 13:40 InS1.2

Knowledge System Modeling in MOOC, pp. 6-8.

Lingling Wu — Tsinghua Univ.

Li Zheng — Tsinghua Univ.

MOOC, which means massive open online courses, is a kind of new education and learning pattern. Providing more high-quality, efficient and convenient education resources and learning opportunities, MOOC will be the key point of the construction of courses in the next few years all over the world. MOOC have many problems to be solved, among which the construction of curriculum and knowledge system is a primary one. In this article, through analysis to the course construction of MOOC, the curriculum knowledge system modeling method and steps are put forward. And a specific course in MOOC, taken for example, has been presented as the implementation of the curriculum and knowledge System Model.

13:40 - 13:55 InS1.3

Interactive Teaching Support Systems in Smart Classrooms: Research and Practice, pp. 9-11.

ZHONG Xiao-Liu — Tsinghua Univ.

LI Hai-Xia — Tsinghua Univ.

XU Jun-Hua — Tsinghua Univ.

SONG Shu-Qiang — Tsinghua Univ.

This paper combines the design philosophies of synchronous and asynchronous, online and offline interactive teaching and learning environments to create a long-distance real-time educational support system based on intelligent perception (i-percieve), intelligent manageability (i-manage), intelligent interactive feedback (i-feedback), smart displays (iview) and other core technologies. In addition to creating physical and virtual learning spaces, this system supports remote display synchronization, session recording, live streaming, webcast, interaction and sharing capabilities. This research supports educational model reform by diversifying instructional techniques and improving teaching outcomes.

13:55 - 14:10 InS1.4

Synchronized UML Diagrams for Object-Oriented Program Comprehension, pp. 12-17.

Jeong Yang — Texas A&M Univ.-San Antonio

Young Lee — Texas A&M Univ.-Kingsville

Deep Gandhi — Texas A&M Univ.-Kingsville

Sruthi Ganesan Valli — Texas A&M Univ.-Kingsville

We propose a novel approach for visualizing reverse-engineered Unified Modeling Language (UML) diagrams to improve the Object-Oriented Program (OOP) comprehension. It aims to help students better understand static structure and dynamic behavior of Java programs, and object-oriented programming concepts. This paper presents an initial evaluation of Synchronized UML diagrams to investigate its effectiveness and user satisfaction through qualitative experiments. The experimental results revealed that having synchronized UML diagrams did positively impact the students' understanding on program execution. It was also observed that students were satisfied with the aspects of synchronized visualizations of UML diagrams with source code.

14:10 - 14:25 InS1.5

A Unified Approach to Automate the Usage of Plagiarism Detection Tools in Programming Courses, pp. 18-23.

A. Omar Portillo-Dominguez — Univ.College Dublin

Vanessa Ayala-Rivera — Univ.College Dublin

Evin Murphy — Univ.College Dublin

John Murphy Univ.College Dublin

Plagiarism in programming assignments is a common problem in universities. While many tools automate plagiarism detection in source code, users still need to decide if there is plagiarism or not. Also, users often rely on a single tool, which can be ineffective and risky. Hence, it is desirable to use several tools to complement their results. However, limitations exist in the tools that make their usage time-consuming. In this paper, we propose an automated system to address the common usage limitations of plagiarism detection tools. The system automatically manages the execution of these tools and generates a consolidated comparative visualization of the results. Thus, the user can make better-informed decisions about potential plagiarisms. Our results show that the effort and expertise required to use plagiarism detection tools is significantly reduced, while the probability of detecting plagiarism is increased. Results also show that our system is practical for real-world usage.

14:25 - 14:40 InS1.6

Putting Computer Engineering and Computer Science Programs Together - The Case of AlBaha University, pp. 24-29.

Nadeem Hassan AlBaha Univ.

In the universities where undergraduate Computer Engineering (CE) and Computer Science (CS) programs are offered, people often wrongly argue that the CE program should be offered under College of Engineering instead of under the college where CS program is offered, this is mostly because they think CE program has "Engineering" word in it. This school of thought does not realize that by this, it will take CE program apart from CS program, which will break the natural alliance of both of these programs. In this paper, this natural alliance of CE and CS programs is discussed, which gives strong argument that both CE and CS programs should be put together under the same college. To further support these arguments of putting CE and CS programs together, the best practices adopted in this regards by the top 10 universities in KSA, USA, UK and other European Universities are studied and results are provided to prove that CE and CS programs should be put together under the same college. Since, this is the current debate at AlBaha University in Saudi Arabia (KSA), therefore the case of AlBaha University is presented to settle the argument.

InS2 Oral Session

Invited Session II

Chair: Prof. LI Fengxia Beijing Inst. of Tech., China

Co-Chair: Dr. Yue Yu Beijing Inst. of Tech., China

13:10 - 13:25 InS2.1

Digital Logic Experiment Teaching Based on Experimental Platform, pp. 33-37.

Li Shanshan Tsinghua Univ.

Yang Shiqiang Tsinghua Univ.

Traditional experiments and EDA technique-based CPLD experiments have their own characteristics in digital logic experiment teaching. Therefore, we try to combine such two kinds of experiments in teaching with the aim of taking full advantage of them. This paper introduces the practice in digital logic experiment teaching based on experimental platform, which is under the guidance of such ideas. We scheduled experimental contents to be performed on the platform developed by us, which considers the ratio of the two kinds of experiments, also arranges the comprehensive experiment with topics selected independently by students. The results prove that the combination of such two kinds of experiments is beneficial to train students in improving their software and hardware application ability, not only in mastering the digital logic course effectively, but also in strengthening the ability of practice.

13:25 - 13:40 InS2.2

Smart Mobile APP of Museum -Investigations and Design for Local Culture Protection, pp. 38-41.

Binyue CUI Hebei Univ. of Economics & Business

Wei ZHOU Beijing Jiaotong Univ.

Guangquan FAN Hebei Univ. of Economics & Business

Yanbin WU Hebei Univ. of Economics & Business

IoT and Internet technologies brought more opportunities for museums to interact with their visitors or potential visitors. Smart phone and Mobile APP is widely accepted and took ways to protect local culture. In this research, a museum APP investigation and a questionnaire survey are performed. We summarized the functions of existed museum APP and the demands of young people, and then give a museum APP design based on iBeacon and cloud computing.

13:40 - 13:55 InS2.3

Online Learning Support based on Learning Process in Blended Learning, pp. 42-46.

Wangjia Zhang Ocean Univ. of China

The purpose of this paper is to construct an online learning support in the context of the blinded learning. The learning support includes three parts: environment support, resource

support and emotional support. The characteristics and functionality of the each part are presented. According to the characteristics of blended learning, the function of each module is designed from the three stages of learning: before learning, in learning and after learning. We hope that it can stimulate and maintain learning motivation and improve learning effect through the study.

13:55 - 14:10 InS2.4

The Application of 3D Printing in Mathematics Education, pp. 47-50.

Yuyang Sun Capital Normal Univ.

Qingzhong Li Capital Normal Univ.

One difficulty of teaching in mathematics is to present abstract mathematical concepts or laws to students in a simple visual way to promote students' understanding and mastery. Traditionally mathematical teachers tried to explain abstract mathematical concepts and formulas by means of some simple teaching tools and some mathematical models presented by some mathematical software, such as Matlab, Mathematica, etc. As an integrated modern discipline, 3D printing has become more and more important in scientific research and technological developments. This paper intends to explore the close relationship between mathematics teaching and 3D printing technology, and propose a comprehensive programme of mathematical education based on the introduction of 3D printer manufacture, mathematical formula, 3D printing models, logo adding to 3D models, and 3D outcomes. This scenario can well solve the problem of visualization of abstract mathematical concepts. Teachers can easily explain complex mathematical expressions by the visual 3D tools. Students' learning interests of mathematics can be stimulated and their understanding abilities of space and graphics can be greatly enhanced by means of the real practice of mathematical 3D printing.

14:10 - 14:25 InS2.5

A HCI Design for Developing Touch-Operation-Based DGS: What You Think is What You Get, pp. 51-56.

Xiaowei Zhong Guangzhou Univ.

Yongsheng Rao Guangzhou Univ.

Guizhou Provincial Academician Workstation of Educational Big Data Tech. & Educational Mathematics

Juan Tang Guangzhou Univ.

Yong Huang Guangzhou Univ.

We present a man-friendly design for developing the touch-operation-based Dynamic Geometry Software (DGS). It is based on Human-Computer Interaction (HCI). The main concept of this design mode is What You Think is What You Get (WYTIWYG). User has two ways to create geometric constructions at will under this design concept. To archive this concept, five basic units have been designed, which can reduce the traditional menu operations for drawing.

14:25 - 14:40 InS2.6

Research and Development of Intelligent Online Examination Monitoring System, pp. 57-62.

SHI Jun Huaihai Inst. of Tech.

LI Hui Huaihai Inst. of Tech.

GU Hang Huaihai Inst. of Tech.

ZHOU Li-dong Huaihai Inst. of Tech.

This paper proposes a design to implement Intelligent Examination subsystem in the Internet Plus environment, which uses structure model combining B/S and C/S, JSP technology and SSH frames. Student examination terminal facilitates automatic acquisition and maintenance of exam candidate's face image for automatic authentication of its identity, automatically obtaining examination papers' information, automatically uploading answers, giving automatic feedback for incorrect answers. Examination monitoring terminal takes care of user management, examination time password management, examination data bulk importing, intelligent distribution of the examination room sitting, examination monitoring, paper submission information statistics and abnormal submission warning. The application shows that this system can greatly improve the efficiency and reliability of online examination management.

InS3 Oral Session

Invited Session III

Chair: Prof. Hiroki TAKADA Univ. of Fukui, Japan

15:00 - 15:15 InS3.1

Changes in Brain Blood Flow during Stereoscopic Video Clips, pp. 65-68.

Masumi Takada Chubu Gakuin Univ.

Fumiya Kinoshita Toyama Prefectural Univ.

Kazuhiro Fujikake Nagoya Univ.

Masaru Miyao Kagawa Nutrition Univ.

Akihiro Sugiura Gifu Univ. of Medical Sci.

Hiroki Takada Univ. of Fukui

The technology provides an enhanced visual experience with

realistic scene portrayal, but is known to cause motion sickness when stereoscopic video clips of rotating or blurred images are viewed. Viewers complain of symptoms such as eye fatigue, nausea, and dizziness. The underlying cause of these symptoms has not been identified; therefore, an investigation to determine the mechanism for the motion sickness is necessary. Compared to the baseline test, the concentration of oxygenated hemoglobin in the occipital lobe increased significantly during a viewing for both background cases. The result is consistent with both visual recognition methods. Furthermore, for both background cases, the concentration in the upper occipital lobe significantly increased during peripheral viewing versus visual pursuit. Peripheral viewing might enhance the activity in the dorsal stream, which could serve as an indication to the mechanism causing 3D sickness.

15:15 - 15:30 InS3.2

Forms Seen in Daily Life are Useful for Mathematical Education -An Introduction of Japan Mathematics Contest, pp. 69-72.

Hiroki Takada Univ. of Fukui

Initiatives to cultivate students who are interested in science, arithmetic and mathematics are being conducted not only in Japan but also in various other countries. This is also a manifestation of the expectations of the field of mathematics and sciences in each country. Taking the present state of Japan into account, the cultivation of human resources in science and technology who can be active on the international stage will become even more important in the future. For this reason, initiatives such as mathematics competitions and cooperative education between senior high schools and universities are important.

15:30 - 15:45 InS3.3

Numerical Simulation of Equilibrium Systems While Viewing Stereoscopic Video Clips, pp. 73-76.

Fumiya Kinoshita Toyama Prefectural Univ.
Hiroki Takada Univ. of Fukui

Asthenopia and visually induced motion sickness (VIMS) are well-known phenomena experienced by users while viewing videos, playing immersive video games, and performing similar activities. In previous studies, we pointed out peripheral viewing as a pathogenesis of VIMS, the evidence of which was demonstrated and the anomalous sway was described using mathematical models. Moreover, stochastic differential equations were used to mathematically model the body-sway phenomenon. In this study, we discuss the metamorphism of the potential functions in controlling the standing posture while viewing stereoscopic video clips using a mathematical model.

15:45 - 16:00 InS3.4

Experimental Study on Control of Visually Evoked Postural Responses by Galvanic Vestibular Stimulation, pp. 77-82.

Akihiro Sugiura Gifu Univ. of Medical Sci.
Kazuya Akachi Gifu Univ. of Medical Sci.
Akira Yoshida Gifu Univ. of Medical Sci.
Chiharu Ito Gifu Univ. of Medical Sci.
Shuya Kondo Gifu Univ. of Medical Sci.
Kunihiko Tanaka Gifu Univ. of Medical Sci.
Hiroki Takada Univ. of Fukui

Visually evoked postural responses (VEPRs) are physiological responses to perceived motion that are related to visually induced motion sickness (VIMS). We considered that VEPRs are just a conflict correction response aimed at matching information from the senses of vision and equilibrium. We also believe that understanding the consequences of suppression or acceleration of VEPRs may elucidate the pathogenic mechanism of VIMS and help establish methods for preventing VIMS. Our group has developed a system combining digital imagery and galvanic vestibular stimulation (GVS) to manipulate VEPRs. In this study, we attempted to verify a method of extrinsically controlling VEPRs. We determined the GVS current values that induced loss of motion sensation in subjects watching moving objects, measured body sway under different movie speed and GVS-off or on conditions, and tested whether GVS could counteract VEPRs. The results clearly showed that 1) the GVS current value increased along with increased motion speed observed in a video, and 2) it was possible to control VEPRs by GVS. However, it was difficult to completely control VEPRs by GVS, possibly because characteristics of posture can change based on the allocation of consciousness.

16:00 - 16:15 InS3.5

Long Short-Term Memory Model for Predicting Productivity of Drilling Space Units, pp. 83-88.

Jian Zheng Hitachi Ltd.
Bin Tong Hitachi Ltd.
Yoshiyasu Takahashi Hitachi Ltd.
Iwao Tanuma Hitachi America, Ltd.
Anshuman Sahu Hitachi America, Ltd.
Ravigopal Vennelakanti Hitachi America, Ltd.

In the oil and gas industry, there is a growing demand for application of big data analytics and artificial intelligence (AI) technologies to optimize operations and reduce cost. In this study, we work on the productivity prediction, which is an important and challenging task for operators. Unlike previous studies where full field or single well analysis was conducted, we focus on more active operation units, drilling space units. Moreover, significant information is extracted from geology reports which are saved in scanned PDF files and well logs. By using the extracted information, long short-term memory (LSTM) model which could take the special-temporal changes of DSUs into consideration is employed to predict the DSUs' productivity. After rigorous validation, it is found that the accuracy of LSTM model could reach to more than 60%, which is 10% higher than a multilayer perceptron (MLP) model proposed in a previous research.

16:15 - 16:30 InS3.6

Comparison of Multiple Recommendation Methods of Similar Onomatopoeia, pp. 89-92.

Dongli Han Nihon Univ.
Ryo Fukuoka Nihon Univ.
Genki Wakabayashi Nihon Univ.
Taro Shimizu Nihon Univ.
Shinnosuke Masuda Nihon Univ.

Onomatopoeia is a generic name for onomatopoeia and mimetic words. Using onomatopoeia can express the behavior and state of things in more detail, widening the range of communication. However, learning onomatopoeia has been a difficult task for Japanese learners. There are several existing studies aiming at a support with onomatopoeia learning, while no platform is available to help learners find similar onomatopoeia based on different criteria. In this paper, we have developed a system that proposes similar onomatopoeia for an input in three manners: one with a dictionary, and two based on statistics. A comparison with an existing system shows the effectiveness of our approach and exposes some future issues.

BPA1 Oral Session

Best Paper Award Session I

Chair: Dr. Weng Yang Sichuan Univ., China

15:00 - 15:15 BPA1.1

Code-labeling: A Teaching Activity Encouraging Deep Learning in a non-STEM Introductory Programming Course, pp. 95-100.

Thomas Hvid Spangsberg Aarhus Univ.
Martin Brynskov Aarhus Univ.

The code-labelling exercise is an attempt to apply natural language education techniques for solving the challenge of teaching introductory programming to non-STEM novices in higher education. This paper presents findings from a study exploring the use of natural language teaching techniques in programming education collected in an Action Research cycle. The results support the use of a structural approach to teaching programming to this target audience; particularly, the translation-grammar method seems to integrate well with programming education. The paper also explores the potential underlying reasons. It seems the exercise invokes an assimilation of student's existing cognitive schemata and supports a deep-learning experience. The exercise is an invitation to other teachers to create further iterations to improve their own teaching. It also seeks to enrich the portfolio of teaching activities for solving the challenge of teaching introductory programming to non-STEM novices.

15:15 - 15:30 BPA1.2

A Comparison of Inertial-Based Navigation Algorithms for a Low-Cost Indoor Mobile Robot, pp. 101-106.

Tobias Fauser Embry-Riddle Aeronautical Univ.
Stephen Bruder Embry-Riddle Aeronautical Univ.
Aly El-Osery New Mexico Tech

Reliable navigation of a low-cost mobile robot in an indoor environment can prove to be challenging as position fixing sensors, such as a GNSS receiver, are typically unavailable. Subscribing to the premise of a baseline of odometry and inertial sensors, this paper compares three navigation strategies, namely, a full 6-DOF inertial measurement unit (IMU) with kinematic constraints, a partial IMU with gyro pseudo-measurements, and an IMU with a depth camera. In the third configuration, by embracing the reality that vertical and horizontal planes dominate the indoor environment, an infrared depth camera is employed to determine surface normals and thereby provide attitude aiding. The paper presents a theoretical basis of the aided inertial navigational problems, MATLAB/Simulink-based simulation results, and finally the performance realized from the implementation of the algorithms on a QUANSER QBot 2 mobile robot employing a VectorNav VN-200 IMU and Kinect IR depth camera.

15:30 - 15:45 BPA1.3

Age-Dependence of Work Efficiency Enhancement in

Information Seeking by Using See-Through Smart Glasses, pp. 107-109.

Hiromu Ishio	Fukuyama City Univ.
Ryota Kimura	Nagoya Univ.
Masaru Miyao	Nagoya Univ.

Very recently, wearable devices have become popular and recognized as useful tools to assist human activities. Especially, see-through smart glasses, which are featuring the augmented reality (AR) technology, can overlay a virtual image on the real view. One of the major functions of the device is to effectively direct attention to a certain location in the view and there let one read virtually-presented information in relation to the real world as is intended. Our primary research interest is age-dependence of work efficiency enhancement in information seeking with the help of AR by using see-through smart glasses. We report the result of our experimental study, adopting our originally developed Route Tracking Test (RTT) for information seeking. We also discuss a potential application to visual instructions for assembly work in school education.

15:45 - 16:00 BPA1.4

New 2D Pupil and Spot Center Positioning Technology Under Real - Time Eye Tracking, pp. 110-115.

Jiancheng Zou	North China Univ. of Tech.
Honggen Zhang	North China Univ. of Tech.
Tengfan Weng	North China Univ. of Tech.

Eye tracking technology is an important technology in the field of artificial intelligence(AI). Spot Center Corneal Reflex (PCCR) is an eye tracking technique that relies on pupils and reflected light spots. The traditional algorithm used the edge and the gray information of the image to extract the contours of the pupil and the spot. However, the boundary point and the fitting calculation will greatly affect the efficiency and stability of the algorithm. In this paper, a new method combining image gradient information with threshold segmentation is proposed. Gradient detection and threshold segmentation are carried out in the region of interest, and the pupil and reflection spot are extracted directly. So we calculate the center coordinates more accurately. The algorithm has a good robust performance to avoid noise and environmental effects. The algorithm used to develop human eye tracking system to achieve real-time eye tracking, while ensuring accuracy.

16:00 - 16:15 BPA1.5

Software Verification of Orion Cockpit Displays, pp. 116-120.

M. A. Rafe Biswas	Univ. of Texas at Tyler
Samuel Garcia	Univ. of Texas at Tyler
Matthew Prado	Univ. of Texas at Tyler
Sadad Hossain	NASA Johnson Space Center
Matthew Souris	NASA Johnson Space Center
Lee Morin	NASA Johnson Space Center

NASA's latest spacecraft Orion is in the development process of taking humans deeper into space. Orion is equipped with three main displays to monitor and control the spacecraft. To ensure the software behind the glass displays operates without faults, rigorous testing is needed. To conduct such testing, the Rapid Prototyping Lab at NASA’s Johnson Space Center along with the University of Texas at Tyler employed a software verification tool, EggPlant Functional by TestPlant. It is an image-based test automation tool that allows users to create scripts to verify the functionality within a program. A set of edge key framework and Common EggPlant Functions were developed to enable creation of scripts in an efficient fashion. This framework standardized the way to code and to simulate user inputs in the verification process. Moreover, the Common EggPlant Functions can be used repeatedly in verification of different displays.

16:15 - 16:30 BPA1.6

Mobile Brand Analysis Based on WiFi Hotspots on Campus, pp. 121-126.

Xuan Zhang	Beijing Univ. of Posts & Telecommunications
Yaqiong Liu	Beijing Univ. of Posts & Telecommunications
Zhigang Guo	Beijing Univ. of Posts & Telecommunications
Yihong Hu	Beijing Univ. of Posts & Telecommunications
Guochu Shou	Beijing Univ. of Posts & Telecommunications

With the rapid development of mobile Internet, the ways in which users access the network become diverse, which provides much convenience for us to collect huge amount of users’ behavior information. In this paper, we combine data acquisition based on wireless access and brand analysis innovatively. This paper analyzes proportions of mobile terminal brands on campus using the data collected from WiCloud which is a WiFi-based data acquisition platform built by our lab, and classifies and analyzes the characteristics of mobile terminal brands. Finally, we put forward a method of predicting the proportions of mobile brands on campus based on ARIMA model, and the results prove that our brand prediction method has good fitting effect and good prediction ability.

BPA2 Oral Session

Best Paper Award Session II

Chair: Dr. Cui Binyue — Hebei Univ. of Economics & Business, China

15:00 - 15:15 BPA2.1

Blended Learning Supported by the Knowledge Indexed Video Case Base in the Course about History of Science and Technology, pp. 129-132.

Jing DU — Tsinghua Univ.
Jian YANG — Tsinghua Univ.

The paper constructs a knowledge indexed video case base. A total of four functions are being incorporated in the casebase including case study, collaboration, case reflection and case management. Large-scale class and blended learning are attempted in classroom in this paper, and the video casebase is employed for pre-class preparation, video-watching, case discussion and reflection. After class, students who attended the class are investigated and interviewed. Three opinions are proposed in this paper: Knowledge points shall be used as the indexes for the casebase as many as possible for precise support for pre-class preparation; case discussion shall be carried out in groups since group discussion is helpful for profound discussion of the connotations contained in different cases and facilitating of deeper reflections; the reflection process shall provide better supporting tools to collect the achievements of collaborative learning. All of these opinions may support the author for further exploration.

15:15 - 15:30 BPA2.2

Towards a Smart Campus: Innovative Applications with WiCloud Platform Based on Mobile Edge Computing, pp. 133-138.

Yaqiong Liu — Beijing Univ. of Posts & Telecommunications
Guochu Shou — Beijing Univ. of Posts & Telecommunications
Yihong Hu — Beijing Univ. of Posts & Telecommunications
Zhigang Guo — Beijing Univ. of Posts & Telecommunications
Hongxing Li — Beijing Univ. of Posts & Telecommunications
Feng Peng — Beijing Univ. of Posts & Telecommunications
Hock Soon Seah — Nanyang Technological Univ.

A smart campus refers to a campus where modern information and communication technologies assist faculty, staff, students and visitors to improve and more efficiently accomplish their daily activities, and enhance social interactions. Regarding the high demand of smart campus services, we establish an innovative platform, WiCloud, based on Mobile Edge Computing, to provide multiple innovative applications towards a smart campus. We first briefly present the architecture, implementation, and the basic functions of our WiCloud platform. We then elaborate three highly innovative applications, (i) campus users' semantic information analysis, (ii) mobile augmented reality-assisted campus, and (iii) smart class, that are developed based on WiCloud. Multiple examples of each innovative application demonstrate our WiCloud platform provides services with low latency, and the innovative applications have achieved the goal of benefiting campus users as well as building a smart campus.

15:30 - 15:45 BPA2.3

Implementation of Intelligent Recommendation System for Learning Resources, pp. 139-144.

LI Hui — Huaihai Inst. of Tech.
SHI Jun — Huaihai Inst. of Tech.
Shu Zhang — Huaihai Inst. of Tech.
Hu Yun — Nanjing Univ. of Chinese Medicine

With the development of internet and information technology, educational informatization is increasingly focusing on the use of modern technology to provide powerful teaching assistance. Learning resources intelligent recommendation is essential in Smart Education. The paper proposes two aspects of recommendation strategy. First is the basic recommendation strategy, which includes teaching process, error records and learning resources label record to recommend learning resources. Second is the student based collaborative filtering algorithm that uses genetic algorithm to optimize the interest degree function. It will recommend learning resources to students accurately and meet the students' learning needs.

15:45 - 16:00 BPA2.4

Virtual Experiment Method for MOOCs to Solve Abstract Key Notes and Difficult Points, pp. 145-148.

Yue Yu — Beijing Inst. of Tech.
Fengxia Li — Beijing Inst. of Tech.
Sanyuan Zhao — Beijing Inst. of Tech.
Hua Liu — Beijing Inst. of Tech.

The appearance of MOOCs brings a lot of attentions. Although MOOCs provide the people with more learning opportunities and conditions, there are some disadvantages, such as the practice of the skills and the difficulties in the understanding of the key notes due to the lack of the interaction between the teacher and the students. Virtual reality technology brings the chance to solve these problems. This paper presents the software-based virtual experiments of MOOCs to solve the difficulties in the understanding of the key notes in MOOCs by visualizing the abstract problem with virtual reality technology.

16:00 - 16:15 BPA2.5

The Intelligent Video Management System: A Use Case of Software Defined Class, pp. 149-154.

Suyou Li Beijing Univ. of Posts & Telecommunications

Zhigang Guo Beijing Univ. of Posts & Telecommunications

Yaqiong Liu Beijing Univ. of Posts & Telecommunications

Guochu Shou Beijing Univ. of Posts & Telecommunications

Yihong Hu Beijing Univ. of Posts & Telecommunications

Information and Communication Technology is always walking in the forefront of human education. Now, it is the stage where the education has to adapt itself to the developing technologies. In 2016, the Natural Science Foundation suggested that people need to use the human-technology to improve and extend the human learning. This paper provides the concept of Software Defined Class (SDC), where the innovative sensing, communication and computing technologies are integrated with the interactive modes between the teacher and the students. Specifically, this paper proposes an intelligent video management system based on the Mobile Edge Computing and face recognition for the flipped classroom. The video database of every student can be used for real-time assessment, sharing assessment and the capability certification for the school and the 3rd organization. The obtained results demonstrate the enhancement and expansion of learning efficiency and management efficiency.

16:15 - 16:30 BPA2.6

The Design and Implementation of User-Trust Based Social Review Method and System in Online Learning, pp. 155-160.

Qi Wang Beijing Normal Univ.

Haipeng Wan Beijing Normal Univ.

Shengquan Yu Beijing Normal Univ.

Homework review is a crucial process of learning in which teachers can assess the learning condition of students and the whole class. Accordingly, teachers can make adjustments for further teaching. However, there are some key problems which make homework review a pressure for teachers, such as large amount of assignments versus teachers' limited time. Under this condition, teachers could not give personalized, immediate and knowledge points based feedback. These result in negative effects on students. Thus, this study proposes a social review method to help teachers review homework more efficiently and timely, while giving social participants with particular credibility in specific subject access to homework review. The credibility is determined by 3 factors including user score, knowledge level of the subject and the review credibility. After the review the result will be visualized. Based on the method mentioned above, a social review system was designed, developed and used in a photographic course. The result indicated that the system was easy to use and satisfied teachers' and students' demands. In addition, the findings demonstrated that this system facilitated the learning process by increasing the effective interactions, reducing the irrelevant interactions and formed some new interaction patterns among students.

ThA1 Oral Session

Artificial Intelligence

Chair: Dr. M. A. Rafe Biswas The Univ. of Texas at Tyler, USA

Co-Chair: Silvino José P. S. Bastos Univ. of Texas at El Paso, Brazil

10:20 - 10:35 ThA1.1

Musical Instrument Classification Utilizing a Neural Network, pp. 163-166.

Therrick-Ari Anderson Lincoln Univ.

This paper discusses a method for classifying musical instrument audio signals utilizing a neural network. This research will identify the most salient features to evaluate within a neural network that will quickly detect an instrument from another. Feature extraction and selection are crucial steps in helping distinguish musical signals. Feature extraction is the process of obtaining specific characteristics from a data sample. Feature selection is the process that follows extraction in which the most relevant features are chosen to represent each sample. Once relevant features are selected they are applied to the neural network as possible inputs. In this study, the neural network distinguishes between two classes of instruments (e.g., trumpet or tuba). Various features are evaluated to identify which elements worked best.

10:35 - 10:50 ThA1.2

An analysis of Influence Factors for Academic Performance about Personality Traits and Thinking Styles of Students -Use a C Programming Language Course in College as an Example, pp. 167-171.

Jiazhi Du Ocean Univ. of China

Rui Shi East China Normal Univ.

Yuanyi Zhen Ocean Univ. of China

Weigang Lu Ocean Univ. of China

Academic performance is one of the indicators to evaluate the achievement of college students. However, it is worth mentioning that personality traits and thinking styles have an influence on academic performance. To further study the correlation, we carry out a series of experiments using certain C programming language course in certain college as an example. Firstly, we eliminate the overlap of personality traits and thinking styles by principal component analysis (PCA). Then, we perform three groups of regression analysis on C programming language course grades. Finally, the experimental results show that agreeableness has a positive influence on C programming language grades, while Local has a negative influence on C programming language grades. Meanwhile, the personality traits and thinking styles and C course grades are generally not related and the irrelevance is not because of the multiple collinearity between personality traits and thinking styles.

10:50 - 11:05 ThA1.3

Research on Activity Recognition of Students in Physical Education Based on IDT method, pp. 172-176.

Jiazhi Du Ocean Univ. of China
Shijun Dong Ocean Univ. of China
Chunrong Li Ocean Univ. of China
Weigang Lu Ocean Univ. of China

With the advancement of new curriculum reform, educators put more attentions on the quality of physical education (PE). However, the traditional way to evaluate the PE class is not efficient and often time-wasting. In this paper, we attempt to realize the automatic evaluation of PE class by activity recognition. Recently, activity recognition methods are widely applied in various fields, e.g., surveillance. This paper utilizes an activity recognition method to evaluate the performance of students in PE from their activities recorded in videos in order to realize intelligent evaluation of the physical education. In this process, the improved dense trajectory (IDT), fisher vector (FV), principal component analysis (PCA) and support vector machine (SVM) are in use. The experiments demonstrate that no matter what feature descriptor is used, the classification accuracy is adequate, so that the activity recognition is effective in PE and the quality of PE can be evaluated automatically.

11:05 - 11:20 ThA1.4

Model Prediction of Dynamic Performance Response of DMFC using Artificial Neural Networks, pp. 177-182.

Mohammad Abu Rafe Biswas Univ. of Texas at Tyler
Melvin D. Robinson Univ. of Texas at Tyler

Direct methanol fuel cell (DMFC) uses liquid methanol as fuel to generate electricity at low operating temperatures as well as to mainly produce water and carbon dioxide. Since DMFC performance characteristics are inherently complex, it can be postulated that artificial neural networks (ANN) represent a marked improvement in prediction capabilities. However, very little investigation has been done to develop dynamic ANN to predict transient behavior of DMFCs. This paper predicts the dynamic performance of a DMFC stack under changes in operating conditions including step change in current. Input variables for the analysis consist of methanol concentration, temperature and current. The performances of the ANN models of four different approaches are judged based on stack voltage, which was shown to be predicted. The results show promise of ANN modeling approaches for optimal control strategy development in DMFC system applications.

11:20 - 11:35 ThA1.5

Real-Time Detection Algorithm of Abnormal Behavior in Crowds Based on Gaussian Mixture Model, pp. 183-187.

Zhaohui Luo Xiamen Univ.
Weisheng He Xiamen Univ.
Minghui Liwang Xiamen Univ.
Lianfen Huang Xiamen Univ.
Yifeng Zhao Xiamen Univ.
Jun Geng Beijing Univ. of Posts & Telecommunications

Recently, abnormal evens detection in crowds has received considerable attention in the field of public safety. Most existing studies do not account for the processing time and the continuity of abnormal behavior characteristics. In this paper, we present a new motion feature descriptor, called the sensitive movement point (SMP). Gaussian Mixture Model (GMM) is used for modeling the abnormal crowd behavior with full consideration of the characteristics of crowd abnormal behavior. First, we analyze the video with GMM, to extract sensitive movement point in certain speed by setting update threshold value of GMM. Then, analyze the sensitive movement point of video frame with temporal and spatial modeling. Identify abnormal behavior through the analysis of mutation duration occurs in temporal and spatial model, and the density, distribution and mutative acceleration of sensitive movement point in blocks. The algorithm can be implemented with automatic adapt to environmental change and online learning, without tracking individuals of crowd and large scale training in detection process. Experiments involving the UMN datasets and the videos taken by us show that the proposed algorithm can real-time effectively identify various

types of anomalies and that the recognition results and processing time are better than existing algorithms.

11:35 - 11:50 ThA1.6

Design and Implementation of a Modular Communication System for the Synthesis of Atomically Thin Nanomaterials, pp. 188-193.

Silvino P. Bastos Univ. of Texas at El Paso
Gustavo A. Sáenz Univ. of Texas at El Paso
Anupama B. Kaul Univ. of Texas at El Paso

High quality atomically thin nanomaterials synthesis by Chemical Vapor Deposition method is a research area in current development. The resulting material depends intimately on the parameters used for the growth, with each material having its own unique process space. In this work, a Modular Communication System has been designed and developed to solve challenges in the synthesis of a wide variety of nanomaterials. Through this modular automation approach, reducing time and cost to optimize material properties, facilitate the data analysis for a more comprehensive understanding of how the process parameters affect the growth, crystallinity and thickness of the synthesized nanomaterials.

ThA2 Oral Session

Information & Technology

Chair: Prof. Lee Li National Sun Yat-Sen Univ., Taiwan
Co-Chair: Shujiao Wang Beijing Univ. of Posts & Telecommunications, China

10:20 - 10:35 ThA2.1

A Novel Interval Partitioning Approach to Finite Time Stability of LTI Systems, pp. 197-201.

Li Lee National Sun Yat-Sen Univ.

The paper addresses the finite time stability analysis of continuous-time LTI systems. Based on its definition, the necessary and sufficient condition can be derived easily. Verification of the condition is almost impossible because an infinite numbers of checking points are required. Therefore, by using the well-known Bellman-Gronwall inequality, a set of more efficient and practical LMI-based conditions for solving the problem is obtained. In viewing of relaxing the conservativeness of the LMIs, the concept of partitioning the time interval of finite time stability is exploited and a new set of less conservative LMIs are proposed. Moreover, a theoretical proof to show the reduction of conservativeness is given. Simple examples are used to illustrate the improvement of the proposed approach.

10:35 - 10:50 ThA2.2

Adaptive Backstepping Sliding Mode Tracking Control for the Stratospheric Airship, pp. 202-207.

Bingwu Chen Xiamen Univ.

Three-degree-of-freedom trajectory tracking of the stratospheric airship is investigated. With a simplified planar dynamic model, an adaptive backstepping sliding mode controller is designed to keep the airship to globally asymptotically track a desired trajectory. Lyapunov functions are used to ensure the tracking performance when model parametric uncertainty and external disturbances exist. Simulation results demonstrate the effectiveness and robustness of the proposed control strategy.

10:50 - 11:05 ThA2.3

Student Clustering and Learning Atmosphere Analysis Based on Trajectory Data, pp. 208-213.

Shujiao Wang Beijing Univ. of Posts & Telecommunications
Yihong Hu Beijing Univ. of Posts & Telecommunications
Yaqiong Liu Beijing Univ. of Posts & Telecommunications
Zhigang Guo Beijing Univ. of Posts & Telecommunications
Guochu Shou Beijing Univ. of Posts & Telecommunications

With the popularity of mobile Internet and the rapid development of data mining, we can collect users' behavior trajectory and find regularity from a large amount of data. In this paper, we use the WiCloud system to obtain students' trajectory information, and propose a spatial-temporal clustering method based on K-means algorithm, which clusters students into three types: study-oriented, enclosed type and active type. A method for analyzing students' learning atmosphere based on trajectory data is also proposed, with which we get different trends of campus students' learning atmosphere in different time periods among different types of users.

11:05 - 11:20 ThA2.4

A Random-Access Algorithm Based on Statistics Waiting In LTE-M System, pp. 214-218.

Yifeng Zhao Xiamen Univ.
Huayu Yang Xiamen Univ.
Kai Liu Xiamen Univ.
Lianfen Huang Xiamen Univ.
Mingjun Shi Beijing Univ. of Posts & Telecommunications
Meng Zhang Beijing Univ. of Posts & Telecommunications

LTE-M, which is an abbreviated version of LTE-MTC(Machine Type Communication) can be said to have a variety of applications, including a large number of heterogeneous

interconnection of large-scale network equipment. One of the most prominent problems is that the machines may have a large amount of access requests in a short time, which can easily lead to network congestion. At present, the contention-based random access scheme is designed for the traditional cellular network, but it is not suitable for carrying a large number of machine communication services.This paper designs a random access resource allocation scheme to reduce the power consumption of the user equipment, so that optimizing the random-access process. In this scheme, we analyze the throughput, access success rate, and delay, then a comprehensive evaluation of the effectiveness of the program is made.

11:20 - 11:35 ThA2.5

Exploration and Practice of Inter-bank Application Based on Blockchain, pp. 219-224.

Tong Wu CFETS Info. Tech. (Shanghai) Co.,Ltd

Xiubo Liang Zhejiang Univ.

Blockchain is considered as the important technological innovation behind Bitcoin system. It facilitates the transaction payment process by creating a decentralized, general ledger to improve regulatory capacity and remove unnecessary intermediaries. At present, the blockchain technology has been employed in the financial industry for a wide range of experimental application and exploration. In this paper, we firstly analyze the principle architecture and the technical characteristics of blockchain. Then its current research achievements and application scenarios are introduced. Finally, the application of blockchain in China Foreign Exchange Trade System is designed and explored. Combining with the credit matching trading system X-Swap, an inter-bank application based on the blockchain technology is implemented.

ThA3 Oral Session

Engineering

Chair: Naser Al Madi Kent State Univ., USA

10:20 - 10:35 ThA3.1

A Novel Method of Extracting and Classifying the Features of Masses in Mammograms, pp. 227-231.

Han Zhen-zhong National Univ. of Defense Tech.

liu Pei-guo National Univ. of Defense Tech.

Mao Jian National Univ. of Defense Tech.

Jimei Univ.

Some improvements in the classification of masses in the breast are proposed in this paper. First, for the purpose of enriching the information concerning the shape of the mass, a new morphological feature is extracted. Then, the textural features of the region of interest (ROI) are extracted by combining the undecimated wavelet transform (UWT) and the gray level co-occurrence matrix (GLCM). Finally, based on the geometrical and textural features, the feature-weighted support-vector machine (FWSVM) is used to distinguish between malignant and benign masses. The experiments implemented on the public digital database for screening mammography (DDSM) indicated that the proposed improvements can achieve better results than the existing methods.

10:35 - 10:50 ThA3.2

i-Memory: An Intelligence Android-based Photo Management System, pp. 232-235.

Ping Zhong Central South Univ.

Hugang Gu Central South Univ.

Pengfeng Li Central South Univ.

Min Xiao Xiamen Univ. of Tech.

Xiaofeng Du Xiamen Univ. of Tech.

More and more personal information are storage in the smart phone, especially including the photos and pictures. It is important to manage these number of rapidly growth photos in smart phone. In this paper, we develop an intelligent photo management system used for android phone, namely i-Memory. The key function mainly include the basic function of classify based on time and location, the advanced function of quickly searching and intelligent classification based on face recognition. The core technology of face recognition consists of three steps: face detection, face comparetion and face searching. Experiment shows that the i-Memory works well and is efficient for mobile photo management.

10:50 - 11:05 ThA3.3

A Comprehension-based Framework for Measuring Semantic Similarity, pp. 236-240.

Naser S Al Madi Kent State Univ.

Javed I Khan Kent State Univ.

We present a comprehension-based framework for measuring semantic similarity between documents of text. In various situations, vector-based similarity measures fail to capture deep semantic relations between terms. Our computational comprehension model processes textual content in a way that resembles human readers, paying attention to context, location, and acquisition time of semantic concepts. The model extracts key semantic structures that are representative of the document.

These semantic structures are compared using the WordNet WUP measure giving a Semantic-similarity score of the processed documents. Three experiments are illustrated comparing our results with three popular vector-based similarity measures and human readers. Our framework provided correct results in cases where vector-based methods fail. These results highlight the importance of using computational cognitive methods, such as comprehension models, in semantic analysis and text mining.

11:05 - 11:20 ThA3.4

Wireless HD Video Laryngoscope System based on Cloud Platform, pp. 241-244.

Lianfen Huang Xiamen Univ.

Jianghe Yang Xiamen Univ.

Chao Feng Xiamen Univ.

Medical laryngoscope has been widely used in medical diagnosis, but traditional laryngoscope still has many deficiencies, especially in the ability of data storage and processing. Therefore, in this paper, the Wireless HD Laryngoscope System combines the Hadoop cloud platform. The images and video information collected by laryngoscope can real-time transmission to the remote client through streaming server and be saved in Hadoop cloud platform. In consequence, the client can replay history video at any time and any place.

ThB1 Oral Session

Computer Application I

Chair: Nikilesh Urella Louisiana State Univ., USA

Co-Chair: Celong Liu Louisiana State Univ., USA

13:30 - 13:45 ThB1.1

Research on Information Equipment Industry Data Analysis Modelling Establish, pp. 247-251.

Jiemin Zhang Jimei Univ.

Fangda Lu Texas State Univ.

Jian Mao Jimei Univ.

Information equipment industry is knowledge-intensive and technology-intensive industry. The ability of independent innovation is the key driver for industry development. This paper studied modeling of the information equipment industry development. The academic attributes and the technical attributes be introduced into the model, through defining the theoretical density, the technology density and the new product density. It is proposed that establishing information equipment industry model with the innovation index, equity index and productivity index, as well as these expressions. Additionally, the paper put forward new way to calculate the weight of indicators which related to specific research problems' context-relevant. Analyzed the batch data of information equipment industry from 2010 to 2014 based on the established model, and through a Python program to achieve the sorting and global optimization of decision-making, shows part of the data analysis results as visualize graphs.

13:45 - 14:00 ThB1.2

WiFi Fingerprint Positioning Based on Clustering in Mobile Crowdsourcing System, pp. 252-256.

Yong Zhang Beijing Univ. of Posts & Telecommunications

Shuoming Zhang Beijing Univ. of Posts & Telecommunications

Ruonan Li Beijing Univ. of Posts & Telecommunications

Da Guo Beijing Univ. of Posts & Telecommunications

Yifei Wei Beijing Univ. of Posts & Telecommunications

Yan Sun Beijing Univ. of Posts & Telecommunications

Baidu China Co., Ltd.

WiFi Fingerprint Positioning (WFP) in outdoor scenario needs mass location information including WiFi signal map and GPS (Global Positioning System) information. Generally pre-measured solution can provide high quality data but it needs lots of labor and time. Different from pre-measured solution, crowdsourcing is an economic and efficient way to obtain location information. WFP based on Clustering (WFP-C) in mobile crowdsourcing system is proposed to improve positioning accuracy and reduce computation complexity. WFP-C includes three phases: offline database building, dataset preprocessing and online positioning. In offline database building phase, Android-based APP is developed to collect crowdsourcing data. In dataset preprocessing phase, according to some clustering algorithm, the geography area is divided into several fingerprint clusters which are identified by Position Feature Vectors (PFVs).In online positioning phase, two-stage matching method is proposed. Firstly, the WiFi signal vector is used to match some cluster according to PFVs. And then, the accurate position is calculate using the WiFi signal vector of the cluster. The Android-based APP is installed in smart phones which are carried by ten volunteers. The collected data is used to evaluated our proposal. The experiment compares WFP-C, grid-based WFP and non-cluster WFP. The evaluation results indicate that WFP-C can achieve higher positioning accuracy and low computation complexity.

14:00 - 14:15 ThB1.3

A VR Scene Modelling Platform for PTSD Treatment, pp. 257-262.

Nikilesh Urella Louisiana State Univ.

Jennifer Hughes Louisiana State Univ.

Erich Conrad Louisiana State Univ.

Junsong Zhang Xiamen Univ.

Xin Li Louisiana State Univ.

We develop a 3D modeling platform for VR scene modeling for Posttraumatic Stress Disorder (PTSD) treatment. Our current system takes photos of humans and houses, and 3D model templates as the inputs to perform the street modeling and human character modeling. For street modeling, the geometry is constructed either by using a 3D template model or manually by the user, then mapped to the photos to produce its texture map. For human modeling, the geometry and base skin texture are constructed using templates. Then by transferring from a portrait, we generate a blended skin texture and produce a complete textured human 3D model.

14:15 - 14:30 ThB1.4

2D Quad Mesh Generation using Divide and Conquer Poly-square Maps, pp. 263-268.

Celong Liu Louisiana State Univ.

Zhonggui Chen Xiamen Univ.

Xin Li Louisiana State Univ.

We develop a structured quad meshing algorithm for large-scale 2D geometric regions based on solving a low-distorted poly-square map. The poly-square map is constructed through a divide-and-conquer strategy in a distributed way. First, a geometry-aware partitioning is performed to decompose the geometric region into solvable subparts. Then, parameterizations and meshing are computed on subregions under certain boundary constraints. The local results are merged and refined through a multi-pass optimization until the global convergence of the poly-square map is achieved. We demonstrate that our algorithm can process huge geometric model effectively on high performance clusters.

14:30 - 14:45 ThB1.5

An Automatic Testing Framework for Embedded Software, pp. 269-274.

Yang Shuaishuai Beihang Univ.

Yu Zhengwei Beihang Univ.

Liu Bin Beihang Univ.

Lu Yunfeng Beihang Univ.

Gao Zhijie 96658 Units

With the widespread use of embedded software, the embedded software testing has become an indispensable part of the development process. The current representative tools for testing embedded software include ADS2 made by TechSAT, RT-LAB developed by OpalRT, and GESTE developed by Beihang University. However, thier degree of automation is inadequate. Therefore, this paper studies an automatic testing framework for embedded software. It through Interface Protocol Modeling Module, Test Profile Modeling Module, Test Data Generation Module and Test Script Generation Module, to achieve platform-related test script generation. The framework greatly reduces the time for testers to design test cases.

ThB2 Oral Session

Computer Application II

Chair: Assistant Prof. Zhao Caidan Xiamen Univ., China

13:30 - 13:45 ThB2.1

A Contextual Awareness-learning Approach to Multi-objective Mobility Management, pp. 277-282.

Shuang Zhao Tianjin Univ.

Qing Wang Tianjin Univ.

Ultra-dense network (UDN) deployment is one of the well known key technologies for enhancing the 5G network data traffic and network capacity. However, UDN deployment brings about many problems such as frequent handover, decreasing Quality of Service (QoS) and Quality of Experience (QoE). The access points' selection and handover decisions making always affected by several factors no matter we consider from the user side or from the network side. A scientific and effective execution scheme has direct influence on the overall network performance enhancement and high users ' satisfaction especially in the context of ultra-dense network, where one user usually has many potentially achievable access points and the mobility is complex there. In this paper, we propose a kind of improved nonstochastic learning approach suits for the multi-objective optimization to achieve the goal of high performance and low frequency handover, by which the handover decision executes once after a given period and the user could learn the dynamic contextual competitive score (CCS) recorded during the period. We evaluate the results of the scheme by two parameters called satisfaction-ratio and handover times. The results show that users could connect to theirs reasonable access points soon without a lot of handover happens.

13:45 - 14:00 ThB2.2

Reducing Complexity in 3D Colored Meshes with Multi-scale Color Saliency, pp. 283-288.

Yue Yu Beijing Inst. of Tech.

Xiangru Chen Beijing Inst. of Tech.

Jiancheng Qiao Beijing Inst. of Tech.

Fengxia Li Beijing Inst. of Tech.

Research on the mesh simplification algorithm has been very active in the past years. The color features are very important and can be perceived by human observers. Nevertheless, these features are ignored by most simplification methods. For this reason, this paper presents the salient color features preserving mesh simplification method. First, the multiscale method for the estimation of the color saliency of 3D colored meshes is proposed. Then, the mesh simplification process based on the salient color features is presented. Finally, the experiment results show that the salient color features could be detected efficiently and this color saliency can improve the preservation of salient color features during the mesh simplification.

14:00 - 14:15 ThB2.3

Detection of Unmanned Aerial Vehicle Signal Based on Gaussian Mixture Model, pp. 289-293.

Caidan Zhao Xiamen Univ.

Mingxian Shi Xiamen Univ.

Zhibiao Cai Xiamen Univ.

Caiyun Chen Xiamen Univ.

With the innovation and development of unmanned aerial vehicle(UAV) technology, small UAV has also begun to attract the people's attention. Because of its characteristic of remote control, small size, low cost and other advantages, it already has a wide range of applications. However, the management of UAV has become a common problem throughout the world. It is a prerequisite which is how to detect UAV. Nowadays, the wireless signal of the UAV can help us detect it. In the low-altitude environment, due to the impact of noise, the first step is to identify the start-point of its single accurately. A detection algorithm for UAV signals with an adaptive threshold based on Gaussian mixture model(GMM) is proposed in this paper. The algorithm makes full use of the signal data characteristics, calculates the threshold using the GMM. Meanwhile, it does not need to set the fixed threshold manually. That means it can adaptively detect the wireless signal in a different noise environment.

14:15 - 14:30 ThB2.4

The Reconstitution of LCD Compromising Emanations based on Wavelet Denoising, pp. 294-297.

Liu Jinming National Univ. of Defense Tech.

Jimei Univ.

Liu Taikang Electronics Tech. Group Corporation

Zhang Jiemin Jimei Univ.

Li Yongmei Jimei Univ.

Digital electronic equipment will emit unintentional electromagnetic signals in working state includes LCD. The distinct reconstitution image of LCD compromising emanations contributes directly to evaluate leakage risk. This study attempts to promote the reconstitution quality of LCD compromising emanations based on wavelet denoising method. The algorithm of setting the wavelet decomposition level and the threshold has been developed to realize the reconstruction of LCD display images automatically and accurately.

14:30 - 14:45 ThB2.5

Wireless Charging Monitoring System Based on Bluetooth, pp. 298-302.

Benbin Chen Xiamen Univ. of Tech.

Lingli Xie Xiamen Univ. of Tech.

Hong Tian Xiamen Univ. of Tech.

Li'an Chen Xiamen Univ. of Tech.

In this paper, Bluetooth is used as the data transmission mode to achieve the connection between the power transmitter and the mobile phone in the wireless charging system. A Bluetooth module is added to the power transmitter to send the relevant data to the mobile phone in the process of wireless power transfer. Both the power transmitter and the power receiver are designed based on the Qi standard to transmit electrical energy through electromagnetic induction. During this process, the voltage, the current and the temperature of the power transmitter can be received by the phone and be showed on the phone APP by the Bluetooth communication. The proposed method not only can solve the communication problem of the wireless charging for mobile phone with extended power transmitter in wireless charging system, but also can monitor the wireless charging process. The test shows that the Bluetooth communication of wireless charging is effectively and convenient to monitor the wireless charging process. The monitoring data is also very useful for wireless charging control in future.

ThB3 Oral Session

Education Reform and Innovation

Chair: Mr. Roosevelt Stallings III Lincoln Univ., USA

Co-Chair: Jia Yue Dalian Neusoft Univ. of Info., China

13:30 - 13:45 ThB3.1

NetPad: An Online DGS for Mathematics Education, pp. 305-309.

Ying Wang South China Inst. of Software Engineering
Guangzhou Univ.
Yongsheng Rao Guangzhou Univ.
Guizhou Provincial Academician Workstation of Educational Big Data Tech. & Educational Mathematics
Yu Zou Guangzhou Univ.
Hao Guan The Chinese Academy of Sci.s

NetPad is an online dynamic geometry software system designed for mathematics education. It is a Web-based application which can run on various terminals by browsers developed by HTML5. The system not only includes intelligent drawing, dynamic geometry, geometric transformations, animations, measurements, but also provides an open platform to share works and explore mathematics problems. In the paper, we describe the features of NetPad and show how it works in concrete scenario. Through geometric drawing experiments, we demonstrate the simplicity, effectiveness, and efficiency of NetPad.

13:45 - 14:00 ThB3.2

Teaching Reform on Database Course for Science Laboratory Class, pp. 310-313.

Na Wang Shanghai Polytechnic Univ.
Chuang Ma Shanghai Polytechnic Univ.

The science laboratory class is a key class in some universities. They learn a wide range of knowledge rather than specialized ones. To deepen knowledge in limited time, we propose a new method for database course. Students learn the basic knowledge from textbook. For difficult point, they can return to videos on MOOC websites. If there are still problems, they may discuss with teacher and classmates after class. The test results show that teaching reform on database course for scientific students has a great advantage in learning.

14:00 - 14:15 ThB3.3

Harmonographs - Using the Build-Design Process to Improve Functionality, pp. 314-318.

Roosevelt Stallings III Lincoln Univ.

This paper presents the build design process used by students at Lincoln University to recreate an 1800's model of a harmonograph. One model of the harmonograph was tested and did not produce the desired visual outcome as expected. The second model was redesigned and will be built using 3D printed parts. The second model should improve reliability of the machine and students' understanding of physics and mathematics principles related to the actions of a pendulum.

14:15 - 14:30 ThB3.4

Exploration and Consideration of Practice Teaching on IoT Comprehensive Practice Base, pp. 319-323.

Liu Zhaobin Suzhou Vocational Univ.
Jiangsu Province Support Software Engineering R&D Center for Modern Info. Tech. Application in Enterprise
Liu Wenzhi Suzhou Vocational Univ.
Jiangsu Province Support Software Engineering R&D Center for Modern Info. Tech. Application in Enterprise

How to play the role of the college training base in the process of talent training? In this paper, the national comprehensive training base of Suzhou Vocational University was taking as an example. It has been proposed that the talent training mode and three layer practical framework for the comprehensive training base of IoT. Practice teaching curriculum system is constructed through the multi-mode, three-dimensional integration and layered progressive. Practical application shows that, through training of the system, application ability of students has been improved significantly in the skills competition, field work and social service. The ability of college students' innovation and entrepreneurship has been improved effectively.

14:30 - 14:45 ThB3.5

Application of MOOC in CDIO Integrated Teaching Pattern – A Case Study of Software Engineering Major, pp. 324-327.

Jia Yue Dalian Neusoft Univ. of Info.
Han Rui Dalian Rockwell Automation Co., Ltd

CDIO （ Conceive-Design-Implement-Operate ） engineering teaching concept values combination of theory and practice and provide sets of theory and system of engineering education. MOOC（massive online open courses）is emerging educational form is used for participants everywhere to obtain courses education through learning of teaching videos and discussion and exchanges among teachers and students. With the aims to challenges existing in teaching of higher learning institution, we conduct pilot teaching reform of software engineering major to establish and implement MOOC+CDIO teaching model with

application of flipped classroom pattern into integrated teaching of CDIO engineering education concept based on MOOC online teaching ,the practice proves that this model efficiently solve teaching-learning disconnection, learning-application disconnection and courses disconnection as well as in-class-post-class disconnection existing in traditional education.

ThP1 Poster Session

Annual Selected Topics

9:00 - 17:00 ThP1.1

Effective Dynamic Algorithms for Massive Mark Point Aggregation Display, pp. 331-336.

Kunhui Lin Xiamen Univ.

Yangbin Pan Xiamen Univ.

Xiaoli Wang Xiamen Univ.

Mengsang Wu Xiamen Univ.

Shiyu Su Xiamen Univ.

In the GIS applications, massive mark point display has become a very important problem. Especially for the application in vehicle networking, high-load vehicle position moving increases the difficulty of the display problem. Many existing efforts have been taken on proposing aggregation algorithms for map mark points. However, all these works suffer from efficiency and scalability problems when we employ them to the application in the vehicle networking. In order to solve the problem of high efficiency map display of high load vehicle location data, this paper proposes the dynamic aggregation algorithm based on the administrative unit and the dynamic aggregation algorithm for K-means service mark point based on the administrative unit. Experimental results show that these two algorithms can make the location data of the vehicle highly efficient display on the map, and can achieve smooth interaction and friendly user experience.

9:00 - 17:00 ThP1.2

Design of Higher Education Quality Monitoring and Evaluation Platform Based on Big Data, pp. 337-342.

Yuqian Li Nanjing Univ. of Posts & Telecommunications

Feng Zhu Nanjing Univ. of Posts & Telecommunications

Peng Li Nanjing Univ. of Posts & Telecommunications

Ruchuan Wang Nanjing Univ. of Posts & Telecommunications

Through the continuous collection and in-depth analysis of the quality monitoring data of colleges and universities, we combine the efficiency processing of big data and data evaluation, monitor the status of higher education normally, and construct a higher education quality monitoring and evaluation platform based on Spark. This platform is teaching centered with schools as its basis, including subsystems of data acquisition, data analysis, machine learning, data storage, data analysis and other areas.Through the application of the higher education quality monitoring platform, we can understand the current situation of the development of higher education scientifically, and provide the basis for the macro-decision of education administration department.

9:00 - 17:00 ThP1.3

A Novel Long-Term Air Quality Forecasting Algorithm Based on kNN and NARX, pp. 343-348.

Kunhui Lin Xiamen Univ.

Liting Jing Xiamen Univ.

Meihong Wang Xiamen Univ.

Ming Qiu Xiamen Univ.

Ze'an Ji Xiamen Univ.

In this paper, we propose a novel approach of forecasting long-term air quality. The methodology of our solution employs similar sequence search (using kNN) of historical data as reference to make up for the lack of information of the unknowing future conditions. Then these reference values as well as time series features, meterological data, air pollutant concentrations, neighbor station's air quality and weather forecast are utilized to forecast target station's future air quality (using NARX). We Compared with baseline approaches, and our approach shows superior performance.

9:00 - 17:00 ThP1.4

Modality-convolutions: Multi-modal Gesture Recognition Based on Convolutional Neural Network, pp. 349-353.

Da Huo Beijing Inst. of Tech.

Yufeng Chen Beijing Inst. of Tech.

Fengxia Li Beijing Inst. of Tech.

Zhengchao Lei Beijing Inst. of Tech.

We proposed a novel method of feature extraction for multi-modal images called modality-convolution. It extracts both the intra- and inter-modality information. What's more, it completes the data fusion at pixel-level so that the complementarity of information contained in multi-modal data is fully utilized. Based on the modality-convolution, we describe a modality-CNN for multi-modal gesture recognition. For extracting the features in

RGB-D images, the modality-CNN is adopted in the gesture recognition framework. The framework use DBN to present the skeleton data. Then, the probability obtained by the two networks are fused and put into the HMM to carry out dynamic gestures classification. We use the Jaccar Index to calculate the accuracy of gesture recognition. A comparative experiment on ChaLearn LAP 2014 gesture datasets shows that the modality-convolution is able to extract the inter- and intra-modality information effectively, which is helpful to improve the accuracy.

9:00 - 17:00 ThP1.5

An Effective Recognition Method for Medical Sheet Based on Deep Learning Approach, pp. 354-357.

Pengsong Duan Zhengzhou Univ.

Zhen Li Zhengzhou Univ.

Yamin Wang Zhengzhou Univ.

Bo Zhang Zhengzhou Univ.

Yangjie Cao Zhengzhou Univ.

At present, most medical sheet (such as medical report, laboratory sheet, medical cases, etc.) in the form of non-electronic is easy to lose, and difficult to be integrated with other electronic health data. In order to fully utilize these valuable data, in this paper we propose a deep learning approach, named k-CNN, which can intelligently recognize the contents of medical sheet. The main advantages of k-CNN are summarized as follows: Firstly, the local feature of the character is extracted by the pattern recognition KNN algorithm; Secondly, CNN algorithm is used to extract the deep features of the characters; Finally, based on the tesseract that is an open source recognition engine, the recognition results of KNN and CNN are combined to get the intelligent identification of medical sheet. The experimental results show that k-CNN recognition algorithm can accurately identify the common medical sheets, and the recognition accuracy is better than other traditional algorithms.

9:00 - 17:00 ThP1.6

Wine Quality Identification Based on Data Mining Research, pp. 358-361.

Zhang Lingfeng Ningxia Univ.

Feng Feng Ningxia Univ.

Huang Heng Ningxia Univ.

For the quality of the wine big data identification technology, the introduction of data mining classification algorithm, effectively according to the content of several impact compounds in wine level identification;Are introduced including the Logistic regression and BP neural network and SVM classification algorithm, in view of the three algorithms identify the modeling analysis of wine quality.Data mining is closely related to big data, applying data mining to the wine in the quality detection of big data, can quickly to the quality of the wine.

9:00 - 17:00 ThP1.7

Under Different Cultural Background: Emotion and Framework Effect to National Communication, pp. 362-368.

Ting Lei Northwestern Polytechnical Univ.

Naiding Yang Northwestern Polytechnical Univ.

In recent years, due to the blend of the ethnic minority areas multiethnic populations of the city are continuously liquidity, lack of trust and growing cultural conflicts bring huge hidden trouble to city security. This study examines the emotion and framework effect under the different cultural backgrounds on national communication intentions. The study found that cultural background, emotions, and expression of framework information influenced to the public communication intentions by influencing behaviors; the framework effect under different emotional states of the national communication also can produce different effects. Public communicative intention in national regions affect by the social security events and treatment effect.

9:00 - 17:00 ThP1.8

An Optimization Algorithm for Spatial Information Network Self-healing Based on Software Defined Network, pp. 369-374.

Zudong Fan Xiamen Univ.

Haijie Wu Xiamen Univ.

Jia Xu Xiamen Univ.

Yuliang Tang Xiamen Univ.

Spatial information network is an important part of the integrated space-terrestrial information network, its bearer services are becoming increasingly complex, and real-time requirements are also rising. Due to the structural vulnerability of the spatial information network and the dynamics of the network, this poses a serious challenge to how to ensure reliable and stable data transmission. The structural vulnerability of the spatial information network and the dynamics of the network brings a serious challenge of ensuring reliable and stable data transmission. Software Defined Networking (SDN), as a new network architecture, not only can quickly adapt to new business, but also make network reconfiguration more intelligent. In this paper, SDN is used to design the spatial information network architecture. An optimization algorithm for network self-healing based on SDN is proposed to solve the failure of switching node.With the

guarantee of Quality of Service (QoS) requirement, the link is updated with the least link to realize the fast network reconfiguration and recovery. The simulation results show that the algorithm proposed in this paper can effectively reduce the delay caused by fault recovery.

9:00 - 17:00 ThP1.9

Urban Night Bus Routes Planning With Taxi GPS Traces, pp. 375-379.

YANG Ling	Harbin Univ.
	Harbin Inst. of Tech.
JIANG Shou-xu	Harbin Inst. of Tech.
JIA Zong-fu	Harbin Univ.
REN Xiang-min	Harbin Univ.
ZHANG Fu-sheng	Harbin Univ.

Bus transportation system is out of service at late night, which brings a lot inconvenience to the people traveling at late night. To plan Urban night bus routes system, we should know the flow of people travel at night. We can use the taxi GPS data to plan the night bus routes system because taxi is the main transportation at late night.The night bus routes planning method that we described in this paper considers many aspects, such as construction and operating cost, the capacity of the night bus transportation system. Though we want the capacity of the bus system to be more, but it will bring more cost. If we just consider the capacity of the bus system, it may cause some waste. To trade off all aspects, we propose a multiply aspects night bus routes planning method to solve the problem. It is verified that our proposed method outperforms the Top-K approach in the planning of best multiply aspects trade-off bus route.

9:00 - 17:00 ThP1.10

Press Plus-Interactive Mobile Application for Effective News Reading, pp. 380-385.

N.D.U. Gamage	Sri Lanka Inst. of Info. Tech.
K.W.C. Jayadewa	Sri Lanka Inst. of Info. Tech.
K.L.A.D. Udeshitha	Sri Lanka Inst. of Info. Tech.
S.M.N.K.B. Senanayake	Sri Lanka Inst. of Info. Tech.
S.M.U.P. Samarakoon	Sri Lanka Inst. of Info. Tech.
T.M. Hennayake	Sri Lanka Inst. of Info. Tech.

Presently younger generation relies more on mobile applications to acquire information instead of traditional methods. Hence, customary approaches of information distribution required to reinforce by modern technology. Especially newspaper industry needs a certain technology enhancement to make the reading experience more interesting and pleasurable for readers. The "Press Plus" is an application to form an association between the newspaper and modern technology to promote newspaper reading by allowing the user to watch news related videos via their smartphone. This application uses scanning and retrieving data through QR code technology with the collaboration of mobile & web application. The mobile application provides three main facilities; Video playback controller; which allows users to scan printed QR code and play news related videos, Top list; which permit users to rate and view top rated videos and live stream; which facilitate users to watch live events independent from location and time. Additionally to the application, a separate survey was conducted to evaluate newspapers reading habits of youth in Sri Lankan context. Survey results indicate that a large number of individuals prefer newspapers reading via modern technologies such as mobile applications. “Press Plus” is beneficial to both newspaper readers and publishers in many ways. It helps to enhance a number of newspaper readers by making it more attractive and pleasurable. In addition, readers get a novel experience while reading newspapers. Publishers indirectly can gain revenue through branding, marketing and event promotions via this application.

9:00 - 17:00 ThP1.11

Safety Management System for College Students' Outdoor Activities Based on Mobile Terminal, pp. 386-391.

ZHANG Yi	Zhejiang Univ. of Sci. & Tech.
CEN Gang	Zhejiang Univ. of Sci. & Tech.
SHEN Liqiang	Zhejiang Univ. of Sci. & Tech.
HUA Yifeng	Zhejiang Univ. of Sci. & Tech.
LUO Junyan	Zhejiang Univ. of Sci. & Tech.
CHEN Xuan	Zhejiang Univ. of Sci. & Tech.

This system is invented under the circumstance that security incidents frequently occurs when contemporary college students taking into outdoor activities. It is constructed based on the central idea of exploiting a safety management system on mobile terminal to further introduce the over all layout, different sorts of capacity and technology data base. The primary goal is to ensure the security of university students when participating in outdoor activities while integrating other major functions together such as regional tracking and localizing, information interchanging, browsing, uploading and location guiding of the data. Meanwhile, it facilities the assembling and disperse of outdoor activities, providing convenience for university students by being aware of the location of other people in any given time.

9:00 - 17:00 ThP1.12

Research on Relation between Average Degree and Convergence Performance of Distributed Synchronization Algorithm in WSNs, pp. 392-396.

Xuan Zhang — Xiamen Univ.
Xiao Lin — Xiamen Univ.
Zhe Zheng — Xiamen Univ.
Qi Yang — Xiamen Univ.

The study of the synchronization problems in wireless sensor networks (WSNs) is increasingly significant. Some researchers found that the network topology has an important impact on the convergence performance of the synchronization in WSNs. According to the feature of WSNs, we use random geometric graph (RGG) to describe the model of WSNs. And the degree distribution in RGG is similar to binomial distribution without boundary effect. The relations between communication radius, the number of nodes and average degree are explored, revealing the effects of these factors on the network synchronizability of RGGs. We find the average degree depend on the total number of nodes and the nodes' communication radius. Later, we verify larger average degree and communication radius can improve the convergence rate of synchronization.

9:00 - 17:00 ThP1.13

Student Affairs Management System Design Based on Mobile Application Eaider, pp. 397-400.

Chen Bo — Zhejiang Univ. of Sci. & Tech.
CEN Gang — Zhejiang Univ. of Sci. & Tech.
Feng Tianxiang — Zhejiang Univ. of Sci. & Tech.
Shen Feixin — Zhejiang Univ. of Sci. & Tech.

This paper extends an application named "EAider" on student affairs management, including academic affairs and non-academic affairs. It breaks the traditional way of thinking and applies the latest technologies to manage the collection and distribution of students' information. Moreover, it integrates multiple functions and eases the load of instructors and teachers. The application features in its real-time, accuracy, convenience, innovation and productivity.

9:00 - 17:00 ThP1.14

A Resource Collaboration Scheduling Scheme in Ultra-dense Small Cells, pp. 401-405.

Zengxian Chen — Xiamen Univ.
Yuliang Tang — Xiamen Univ.

Ultra-dense network (UDN) is expected to be the main means of meeting the mobile traffic demands in 5G. Small cell is the main load of UDN to save energy and enhance coverage. However, the resource conflict become much more complicated than the conventional cellular system, because of the dense and random deployment of small cells, and they switch dynamically, and changeable users. Therefore, this paper proposes a resource collaboration scheduling scheme (RCS) in ultra-dense small cells. Simulation results show that proposed RCS scheme improves the network throughput and user satisfaction by dynamically allocating resources in ultra-dense small cells.

ThP2 Poster Session

Computer Science I

9:00 - 17:00 ThP2.1

Generation of Adaptive Learning Path based on Concept Map and Immune Algorithm, pp. 409-414.

Cunling Bian — Ocean Univ. of China
Shijun Dong — Ocean Univ. of China
Chunrong Li — Ocean Univ. of China
Zheng Shi — Ocean Univ. of China
Weigang Lu — Ocean Univ. of China

In recent years, the research of adaptive learning path has drawn a lot of attentions, which organizes the learning resources in accordance with the learner's attributes. As a result, it is quite necessary to find an efficient implementation approach for generating the adaptive learning path. In this paper, we first create a learner-centered concept map by graph theory. Then learning object (LO) is applied as an organization model for learning resource and we apply the immune algorithm (IA) into its selection to generate the optimal learning path. The simulation results show that the proposed approach is effective for adaptive learning path generation.

9:00 - 17:00 ThP2.2

Low-rank Representation for Single Image Super-resolution using Metric Learning, pp. 415-418.

Shaohui Li — Xiamen Univ.
Linkai Luo — Xiamen Univ.
Xiamen Key Laboratory of Big Data Intelligent Analysis & Decision-marking
Hong Peng — Xiamen Univ.
Xiamen Key Laboratory of Big Data Intelligent Analysis & Decision-marking

Neighbors embedding is a promising method for single image super-resolution (SR). However, the fixed number of neighbors for different kind of input low resolution (LR) patches may be improper. In addition, the assumption that low resolution space

and high resolution (HR) space has similar local geometry leads to improper HR patches are used for reconstruction. In this paper, we propose a novel single image super-resolution method based on low-rank representation and metric learning. Low-rank representation aims to exclude outliers in neighbors, and metric learning aims to learn a linear projection matrix so that LR space with the transformed metric and HR space have similar local structure. Experiments on fourteen images show that our method obtains the best results on most images compared with traditional methods, which illustrates the effectiveness and superiority of the proposed methods.

9:00 - 17:00 ThP2.3

A Recommendation Approach based on the Theory of Reasoned Action, pp. 419-422.

Xiaoqin Huang Xiamen Univ.

Linkai Luo Xiamen Univ.

Xiamen Key Laboratory of Big Data Intelligent Analysis & Decision-making

Hong Peng Xiamen Univ.

Xiamen Key Laboratory of Big Data Intelligent Analysis & Decision-making

Recommender systems generally provide potentially interesting items for users based on their preferences. In this paper, we propose a method to improve recommendation systems by incorporating the theory of reasoned action. Under the modified model, the behavioral intentions are used to generate recommendations. The results demonstrate that our approach considering users' behavioral intention is effective.

9:00 - 17:00 ThP2.4

Refined Composite Multivariate Multiscale Fuzzy Entropy Analysis of Horizontal Oil-water Two-phase Flow, pp. 423-428.

Yi Wang Northwestern Polytechnical Univ.

Yang Yang AVIC Xi'an Flight Automatic Control Research Inst.

Horizontal oil-water two-phase flow is widely encountered in power plants, chemical engineering and petroleum industry. Understanding the flow characterization of horizontal oil-water two-phase is significant to uncover the flow mechanics underlying oilwater flow, which will facilitate the safety design and optimization of the process engineering and facilities. Oil–water two-phase flow experiments were conducted with a 16-electrode Electrical Resistance Tomography (ERT) in a horizontal pipe of a multiphase flow facility. The ERT can measure the information of each flow condition from different directions along the cross-section of the pipe, where the electrodes are excited. We extracted the Refined Composite Multivariate Multiscale Fuzzy Entropy (RCmvMFEμ) of each flow condition by regarding the multichannel signal of ERT data as multivariate time series. It was found that RCmvMFEμ reflects the differences of flow structure between different flow patterns, such as Do/w&w, Dw/o&Do/w (DD), ST&MI to DD and o/w flow. The results indicate that RCmvMFEμ approach can characterize the structural complexity of dynamic flow behavior of oil–water two-phase flow and uncover the flow pattern transition when flow velocity changes.

9:00 - 17:00 ThP2.5

A HMM-based Content Forwarding Strategy in LEO Satellite System, pp. 429-434.

Weidong Liao Beijing Univ. of Posts & Telecommunications

Yong Zhang Beijing Univ. of Posts & Telecommunications

Tengteng Ma Beijing Univ. of Posts & Telecommunications

Da Guo Beijing Univ. of Posts & Telecommunications

Mei Song Beijing Univ. of Posts & Telecommunications

Haihao Li Beijing Inst. of Remote Sensing Equipment

Using the low earth orbit (LEO) satellite technology to provide high capacity and high speed data service for the users, has been one of the most popular research hotspots in LEO satellite communication system. Whereas, the traditional researches in the field of satellite communication mainly focus on the optimization of channel resource allocation, which is based on the improvement of data transmission rate and reliability. Different from the traditional research, this paper considers the popularity of content in different earth station (ES) from the user's perspective. Then we optimize the channel resources allocation between LEO satellite and ESs, and among ESs simultaneously, under the premise of maximizing the content forwarding capacity of the LEO satellite. In particular, the content forwarding of LEO satellite is modeled as hidden Markov model (HMM), and an optimal content forwarding algorithm based on Viterbi is proposed. At the same time, a multi-domain channel resource allocation algorithm based on HMM (MCR-H) is proposed to optimize the LEO satellite communication system. Numerical results demonstrate the performance and advantage of our new scheme.

9:00 - 17:00 ThP2.6

An Improved Binary Search RFID Anti-collision Algorithm, pp. 435-439.

Youjing Bai Xiamen Univ.
Lvqing Yang Xiamen Univ.
Guoxing Zhang Xiamen Univ.
Yezi Xu Xiamen Univ.

At present, radio frequency identification technology has been widely used in many fields, such as data acquisition, transportation, logistics management and so on. However, the collision problem in RFID technology seriously affects the performance of RFID system. Aimed at the shortcomings of search times and traffic by the traditional binary search algorithm, this paper propose an improved binary search algorithm based on the combination of dynamic binary search algorithm and backward binary search algorithm. Experimental results show that the improved algorithm greatly reduces search times and the amount of data transmission, thereby improving the recognition efficiency.

9:00 - 17:00 ThP2.7

Saliency Detection for RGBD Image Using Optimization, pp. 440-443.

Zhengchao Lei Beijing Inst.of Tech.
Weiyan Chai Beijing Inst.of Tech.
Sanyuan Zhao Beijing Inst.of Tech.
Hongmei Song Beijing Inst.of Tech.
Fengxia Li Beijing Inst.of Tech.

Saliency detection in images attracts much research attention for its usage in numerous multimedia applications. In this paper, we propose a saliency detection method based on optimization for RGBD images. To the RGBD image, we firstly generate the all new depth image by using the non-linear transformation. Then, we combine the previous cues such as color cue, location cue, with our depth cue. We introduce the saliency optimization framework to integrate the low-level cues and gain the final saliency map. We evaluate our methods on RGB1000 benchmark. The experimental results demonstrate our method are effective in saliency detection for RGBD Images.

9:00 - 17:00 ThP2.8

Smart Home System Design Based on Internet of Things, pp. 444-448.

Rui Liu Ningxia Univ.
Yongqi Ge Ningxia Univ.

With the development of Internet of Things and embedded computing technology, the smart home system has become a hot research spot of embedded systems. In this paper, through combining the Internet of Things, a smart home system based on zigbee and power line carrier communication technology is designed. In addition, the gateway is an important part of the smart home system, and its communication gateway is also mainly designed. The design method in this paper contributes to reduce the complexity of system management and improving the utilization of system.

9:00 - 17:00 ThP2.9

Interactive Smart Home Design Based on Internet of Things, pp. 449-453.

Yujun Han Jiangsu Vocational Inst. of Commerce
Baobin Liu Jiangsu Vocational Inst. of Commerce

This article focuses on interactive and holistic smart home design for two-bedroom architectural pattern based on Internet of Things. Integrated system over home devices and information exchange among human, machine and things can be realized by connecting the home devices together with ZigBee agreement. Moreover, information on the environment, devices and the family members in the home can be transferred with the ZigBee network. The feasibility and interactivity of the proposed smart home design is demonstrated through experiment results.

9:00 - 17:00 ThP2.10

Research on Text Mining Algorithm Based on Focused Crawler, pp. 454-457.

Qiusheng Zhang Hubei Business College
Mingyu Lin Hubei Business College
Jianping Jun Hubei Business College
Xingyun Zhang Hubei Business College

Internet has become the world's largest information repository, especially the explosive growth of the text data on the web, the disadvantages that it need much more time to acquire and update web pages, and is not high precision have become more obvious. The text mining algorithm based on focused crawler is proposed in this paper, it classifies and integrates the whole web pages by topic using topic crawler algorithm as much as possible, which greatly improves the retrieval ability of the web pages, naive bayes algorithm is adopted on this basis, which realizes the text mining processing of the web data.The experimental results show that the algorithm has good feasibility and higher recall ratio and precision ratio of the web pages.

9:00 - 17:00 ThP2.11

Research on Evaluation of Early Childhood Education Software, pp. 458-463.

Zhang Liqin Jiangxi Sci. & Tech. Normal Univ.

Huang Xiao Jiangxi Sci. & Tech. Normal Univ.

With the rapid development of educational information, the market demand for early childhood education software is increasing. But the evaluations of early childhood education soft-wares have fallen behind the development of software products. In this paper, we take the United States Haugland / Shade as evaluation criteria to evaluate those Apps with great download amount and with better feedbacks. Then, appropriate education Apps fitted for children's development are selected and specific analysis focused on the content of the index system is carried out. As a result of that, three research results are concluded. First, the proportion of appropriate developmental Apps to early childhood education Apps software is low. Second, the appropriate development levels of early childhood education Apps in different categories are uneven. Third, the scores of development suitability index are different, the independence index is the highest and the variability index is the lowest.

9:00 - 17:00 ThP2.12

Improved K-Means Algorithm Based on Hybrid Fruit Fly Optimization and Differential Evolution, pp. 464-467.

Jixiong Hu Hubei Univ. of Tech.
Chunzhi Wang Hubei Univ. of Tech.
Chuan Liu Hubei Univ. of Tech.
Zhiwei Ye Hubei Univ. of Tech.

Fruit fly optimization algorithm (FOA) is a new method for finding global optimization based on food finding behavior of the fruit fly. The original FOA can only solve problems that have optimal solutions in zero vicinity. To make FOA more universal for the continuous optimization problems, especially for those problems with optimal solution that are not zero. This paper proposes a hybrid fruit fly optimization and differential evolution (DEFOA) by modifying the expression of the smell concentration judgment value and by introducing a differential vector to replace the stochastic search. In this paper, we propose an improved K-Means algorithm based on hybrid FOA and Differential Evolution (DE).

9:00 - 17:00 ThP2.13

Automatic Diagnosing of Infant Hip Based on Graf Criteria, pp. 468-473.

Xiang Yu Xiamen Univ.
Dongyun Lin Xiamen Univ.
Weiyao Lan Xiamen Univ.
Bingan Zhong Xiamen Haicang Hospital
Ping Lv Xiamen Maternal & Children Health Care Hospital

In this paper, we proposed an automatic diagnosis method in detection of infants hips, and experimental results on real ultrasonic images have shown its fastness and capability in the field. Four procedures, pre-processing of raw images, segmenting, feature extracting and diagnosing, are included in proposed method. Pre-processing mainly focus on obtaining interested region from raw images. Segmenting, followed by features extracting from segmented images, proceeded at once after pre-processing. The algorithm of segmentation we used here is region-scalable fitting energy model. Finally, we obtain two most important reference indexes of Graf criteria, angles α and β, by fitting lines with least squares method applied. Accordingly, hips are classified into one of four types, including maturity, dysplasia, severe dysplasia and dislocation, accord- ing to aforementioned indexes. Accuracy on practical images reaches 80.4% with 93 images tested.

ThP3 Poster Session

Computer Science II

9:00 - 17:00 ThP3.1

Research on the Design of Teaching Service APP Based on User Experience – Taking "i Sino-Korea" as an Example, pp. 477-482.

Lu Geng Shanghai Univ. of Engineering Sci.

With the popularity of smart phones, the advent of 4G network era, and the establishment of the “Internet + education” ecosystem, the mobile terminal construction witnesses the high-speed development, especially the mobile education campus APP on teaching services centered on college students. This kind of mobile interactive application provides the teachers and students with a more convenient resource sharing and campus life of higher education. In this paper, the teaching service requirements of the School are analyzed, and the needs of the target users are explored. Based on the interactive process in conformity with the user’s behaviors, the user interface information architecture of the APP is constructed. Moreover, the visual design is created in accordance with the APP design requirements of iOS system, in order to design the interface prototype of APP “i Sino-Korea” launched by Sino-Korean School of Multimedia Design of Shanghai University of Engineering Science.

9:00 - 17:00 ThP3.2

A Research on Simultaneous Fault Diagnosis Based on Paired-RVM, pp. 483-488.

Wei Jiang City College of Wuhan Univ. of Sci. & Tech.
Liping Yang Huazhong Agricultural Univ.

This paper studies the simultaneous fault diagnosis of the main reducer in the automobile transmission system assembly based on vibration signals. A simultaneous fault diagnosis model based on Paired Relevance Vector Machine (Paired-RVM) is proposed for the simultaneous fault of the main reducer, and each binary sub-classifier is trained with single fault samples and then fused by a pairing strategy. With F-measure as a measurement indicator of diagnosis precision, the threshold set DThreshold is used to train a threshold optimization algorithm so as to generate the optimal decision threshold, thus converting the probability output generated by the classification model into the final simultaneous fault mode. A contrast experiment is made between Paired-RVM and some commonly used supervised learning models of SVM, ELM and KELM, and the experimental results show that the performance of Paired-RVM proposed in this paper is superior to that of other models in simultaneous fault diagnosis and single fault diagnosis, verifying the effectiveness of the proposed method.

9:00 - 17:00 ThP3.3

Peer to Peer Traffic Identification Using Support Vector Machine and Bat-Inspired Optimization Algorithm, pp. 489-495.

Liu Chuan Hubei Univ. of Tech.
Chunzhi Wang Hubei Univ. of Tech.
Hu Jixiong Hubei Univ. of Tech.
Zhiwei Ye Hubei Univ. of Tech.

Nowadays, Peer-to-Peer computing technology (P2P) is widely used on Internet, which has brought great challenges to effective management of the network. As a result, it is very important to recognize P2P applications as to maintain network. In essence, to identify traffic of P2P is a problem belongs to pattern recognition. However, the performance of SVM is largely dependent on its parameters and the traditional tuning methods are inefficient. Therefore, in the paper the bat algorithm is proposed to seek the optimal parameters for SVM. In the end, experimental results display that the proposed method outperforms SVM optimized by genetic algorithm, particle swarm optimization algorithm, which can effectively improve the accuracy of P2P network traffic identification.

9:00 - 17:00 ThP3.4

Research and Implementation of Laser Shooting System Based on Linux, pp. 496-501.

Dengyou Wang Xiamen Univ.
Shunxiang Wu Xiamen Univ.
Weiming Guo Xiamen Univ.

Laser shooting will gradually replace the traditional live fire shooting as the main shooting training method, this paper discusses the Linux environment based on laser shooting system server-side software design ideas and implementation of the program. The software uses a multi-threaded architecture, the use of message queues as a tool for communication between threads. Based on the V4L2 standard-driven USB camera to capture images, the introduction of third-party open source library OpenCV processing images, custom network data transfer protocol, the use of JSON string as a message carrier, server and client communicate through the socket interface based on the TCP protocol. This paper discusses in detail the communication between threads and synchronous access to shared resource methods.

9:00 - 17:00 ThP3.5

A Forensics Method for Android Devices Based on the Technique of Temporary Root, pp. 502-505.

Weiming Guo Xiamen Univ.
Shunxiang Wu Xiamen Univ.
Dengyou Wang Xiamen Univ.

Nowadays, Android devices become more and more popular, which attracts the attention of the forensics workers. As Android devices have a perfect security mechanism, the root privileges of Android devices are required to obtain electronic evidence effectively. The existing methods of obtaining the root privileges in Android devices mainly based on the third-party tool. Although the methods are widely used, the drawback of this root method based on the third-party tools is uncontrollable. In this article, a temporary root method is presented. It is based on the vulnerabilities of the Android system. Moreover, this root method is applied to the acquisition of the physical images for Android devices. This root method utilizes an appropriate strategy and the vulnerabilities of the Android system to acquire the root privileges effectively. In the course of practice, this root method has the advantages of completely controllable and convenient.

9:00 - 17:00 ThP3.6

Link Prediction Algorithm Based on Local Centrality of Common Neighbor Nodes Using Multi-Attribute Ranking, pp. 506-511.

Mingqiang Zhou Chongqing Univ.
Rongchen Liu Chongqing Univ.

Xin Zhao Chongqing Univ.
Qingsheng Zhu Chongqing Univ.

Link prediction has become an important research topic in the field of complex networks. The purpose of link prediction is to find the missing links or predict the emergence of new links that do not present currently in a complex networks. Considering that the local centrality of common neighbor nodes have an important effect on the similarity-based algorithm, but every centrality measure has its own advantage and limitation. We proposed a multi-attribute ranking method based on the Technique for Order Preference by Similarity to Ideal Object (TOPSIS) to evaluate the local centrality of common neighbor nodes comprehensively. In order to make the local centrality indicator based on TOPSIS achieve better results, we also proposed a new weight calculation method for the attributes normalization matrix. Experimental studies on 6 real world networks from disparate fields verified the superiority of the algorithm proposed in this paper.

9:00 - 17:00 ThP3.7

Research on the Error of the Fourier Algorithm with DC Filtering in Fault Current Calculation of Power System, pp. 512-515.

Zhou Shijie Guangzhou Power Supply Co. Ltd
Li Hongguang Guangzhou Power Supply Co. Ltd
Li Guangfa Guangzhou Power Supply Co. Ltd
Wen Weihong Guangzhou Power Supply Co. Ltd
Zhang Shijia Guangzhou Power Supply Co. Ltd
Cui Jian Xiamen Univ. of Tech.
Chen Li'an Xiamen Univ. of Tech.
Tian Hong Xiamen Univ. of Tech.
Chen Benbin Xiamen Univ. of Tech.

DC filtering is commonly used together with Fourier algorithm in the calculation of root-mean-square (RMS) values of fault current of power system, so as to eliminate the errors produced by the decaying DC component in the fault current. In this paper, theoretical derivation was conducted, showing that errors of sampling values could be amplified by the DC filtering itself, which could lower the accuracy. So the effect of DC filtering should be comprehensively considered when applied in such circumstance. Numerical simulations concerning different number of sampling points and different initial phase angle of the fault current were also conducted to verify the conclusion. Results indicated that within a certain range of the initial phase angle, the amplification of the sampling error is maximized by the DC filtering, weakening the improvement in accuracy brought by the elimination of DC component, or even worsen the accuracy with too few sampling points for DC filtering calculation.

9:00 - 17:00 ThP3.8

Cascaded Five-level Inverter System by Model-based Design, pp. 516-520.

Wenjuan Li Harbin Univ. of Sci. & Tech.
Zheda Ren Harbin Univ. of Sci. & Tech.
Chunfeng Yue Harbin Univ. of Sci. & Tech.
Yanbo Xu Harbin Univ. of Sci. & Tech.

In view of power electronic devices need to handle higher voltage grade and capacity grade, multilevel converter has become the key to solve the problem. Cascaded inverter type is widely used because of the light harmonic pollution, high input power factor, as well as good output waveform. This paper adopts the method of model design to study the five-level inverter PWM control method systematically, and better output waveforms are gotten. The results show that the method of model-based design has higher quality and efficiency, and it is suitable for the multilevel inverter.

9:00 - 17:00 ThP3.9

Curriculum Standards Development in China and Case Study, pp. 521-524.

Haiyan Lu Weidong Cloud Education Group
Defu Zheng Weidong Cloud Education Group

As the Information and Communication Technology is increasingly leveraged in education to advance education efficiency and effectiveness across the world, there came the need of new standards that could better support the integration of ICT into education. Standards for pure technology or for traditional teaching & learning resources such as Curriculum Standards have been published, but there seem to be a lack of Curriculum Standards particularly for Internet-based curriculum. So this paper brings a brief introduction of traditional curriculum standards and introduces one popular product developed according to National Curriculum Standards of China, to illustrate the latest use of Curriculum Standards in ICT field and initiate the discussion of why should we and how could we develop a set of new curriculum standards that could be applied to and provide guidance for the development of online curricula, which differs from the traditional curriculum standards in its technical accounts.

9:00 - 17:00 ThP3.10

Design of Software Structure for a Novel Pole Mounted Switch Controller Based on Embedded Linux, pp. 525-529.

Guo Minghai Guangzhou Power Supply Co. Ltd

Zhang Senhua Guangzhou Power Supply Co. Ltd
Ma Wenjing Guangzhou Power Supply Co. Ltd
Deng Ming Guangzhou Power Supply Co. Ltd
Gong Xiaodong Guangzhou Power Supply Co. Ltd
Tian Hong Xiamen Univ. of Tech.
Chen Li'an Xiamen Univ. of Tech.
Chen Benbin Xiamen Univ. of Tech.

A novel design of pole mounted switch controller is introduced in this paper, embedded Linux operating system was used to enrich the functions of the pole mounted controller and to enhance the intelligence of the controller. Software structure of this novel designed controller is presented in detail. Multiple processes design method was applied to split the software application into 3 processes, namely user interface, communication and fault treatment. Socket communication was re-designed and a shared memory method was adopted to realize interprocess communication.

9:00 - 17:00 ThP3.11

Software Reliability Evaluation Method based on Fault Propagation Testing, pp. 530-535.

He Ren-ya China State Shipbuilding Corporation
Tang Long-li China State Shipbuilding Corporation
Wang Xiao-liang China State Shipbuilding Corporation
Yu Zheng-wei Beihang Univ.
Wu Yu-mei Beihang Univ.

This paper presents a method to evaluate the reliability of software. First, failure mechanism and characteristics of failure propagation are analyzed, then the measurement method of the fault propagation characteristic attribute value is given. How to build the fault propagation graph, determine the fragile paths and the fragile modules are also studied.

9:00 - 17:00 ThP3.12

L1-regularization Logistic Regression for Event-driven Stock Market Prediction, pp. 536-541.

Si-Shu Luo Sichuan Univ.
Yang Weng Sichuan Univ.
Wei-Wei Wang Xiamen Univ.
Wen-Xing Hong Xiamen Univ.

This paper presents a machine learning method for stock market prediction based on event-driven. The listed companies is divided by market value size and industry to form sample sets. Then the specific events are extracted from the announcement. This paper studies the stock price movement after these events occurred based on a sample set. Finally combined with the fundamentals of data and technical indicators we establish a L1 regularization logic model. Experiments show that this model can be a good predictor of stock within one week after events occurred. And compared with the commonly used machine learning methods, our model has a better overall ability.

ThP4 Poster Session

Engineering Education I

9:00 - 17:00 ThP4.1

A New Marking Technique in Semi-Automated Assessment, pp. 545-550.

Selim Buyrukoglu Loughborough Univ.
Firat Batmaz Loughborough Univ.
Russell Lock Loughborough Univ.

The number of students learning programming languages in higher education and secondary schools has substantially increased, especially in the last decade. The increasing number of (novice) programmers makes code script assessment more important. Thus, this study proposes a new marking technique based on a semi-automated assessment approach. It advocates providing detailed and consistent feedback for novice programmers based on formative assessment. An experiment was carried out to check the feasibility of the proposed marking technique. The initial results and findings show that this is a potentially valuable approach.

9:00 - 17:00 ThP4.2

Seizing the SPOC Opportunity and Promoting Reform of University Computer Foundation Teaching in Independent Colleges, pp. 551-556.

Ran Juan Tianjin Univ. Renai College

Faced with the new reality of reform of university computer foundation and teaching, independent colleges have proposed reforms upon university computer foundation teaching in the content, model, methods and management, which are centered around computational thinking, targeted at “enhance foundation, application-orientation, and stress computational thinking and promote students’ creativity and innovation”. By constructing teaching contents which emphasize the application and practicality, and adopting SPOC integrated teaching model and emphasizing diversity of teaching methods, such reforms can not only spur students’ initiative and enthusiasm in learning, but also improve their problem solving and innovation.

9:00 - 17:00 ThP4.3

Integrated Experiment Design of Digital Logic Course and Computer Composition Principle Course, pp. 557-561.

Dongdong Zhang Tongji Univ.

Lisheng Wang Tongji Univ.

Yuchen Guo Tongji Univ.

Digital Logic course and Computer Composition Principle course are important professional basic courses. In the traditional teaching mode, the experiments of these two hardware course are mainly implemented to validate the theoretical knowledge by plugging wires in different experiment boxes, which leads to a lack of computer system design and development capability of computer major students. In this paper, we will present the integrated experiment design of these two courses based on Xilinx Nexy4 development board in Tongji University for computer system capability training.

9:00 - 17:00 ThP4.4

Design of Computer Network Experimental Course in Flipped Laboratory Mode, pp. 562-565.

Chen-zhi Guan Nanchang Normal Univ.

This paper puts forward a new flipped laboratory mode for the computer network experimental course. In this mode the experiment process is reformed and the experiment course is extended to outside of lab. Different experiment activities are designed according to different experiment categories. The paper presents that what constitute the framework of the mode, how the experiment activities of the mode are designed and the future research direction.

9:00 - 17:00 ThP4.5

Experimental Teaching Design and Practice on Big Data Course, pp. 566-569.

Xiaotao Huang Huazhong Univ. of Sci. & Tech.

Niannian Qin Huazhong Univ. of Sci. & Tech.

Xiaofang Zhang Huazhong Univ. of Sci. & Tech.

Fen Wang Huazhong Univ. of Sci. & Tech.

With the rapid development of big data technology and the rapid growth of big data industry market, big data talent demand has come to a substantial increase in China. In order to cultivate more talented people satisfying the needs of the community, we have designed the big data course for undergraduates. The big data course stresses not only on many theories but also lots of practice. The project of "trend analysis on big data talent development" is designed in the experimental teaching of big data. By doing this project, students can master all the technologies of big data processing lifecycle, including data collection, data preprocessing, data mining and data visualization. We evaluate students who master big data core technology with a multi-evaluation method and design the experiment evaluation system on big data. Through our two years' practice, the results show that all these designs have achieved the good effect and improved the teaching quality.

9:00 - 17:00 ThP4.6

Research on the Teaching Reform of Database Curriculum Major in Computer in Big Data era, pp. 570-573.

Lin Mingyu Hubei Business College

Jun Jianping Hubei Business College

Zhu Yi Hubei Business College

Zhan Cuili Hubei Business College

Big data as a current hotspot technology, has obvious impact on the professional curriculum in colleges and universities, it is an inevitable trend that it prompt the curriculum reform in colleges and universities. This paper expounded the problems of the database curriculum of computer major faced in big data era, and explored the teaching reform of database curriculum of computer major from two aspects of theory teaching and experimental teaching.

9:00 - 17:00 ThP4.7

The Application of Teaching Method Based on Project-driven in the Teaching of "Principle and Application of DSP", pp. 574-577.

Zhou Jingjing Hubei Business College

Zhan Cuili Hubei Business College

Zhu Yi Hubei Business College

Lin Mingyu Hubei Business College

This paper explores on principles and methods for teaching DSP, adopting project-based approach. The practicality and applicability of the curriculum are highlighted by optimizing teaching contents. Besides，classroom teaching is reformed by integrating the teaching of theories and the experiment，dividing the class into groups，and appropriately flipping the classroom to improve students' learning autonomy. Furthermore ， the assessment is reformed by using designing projects and students' report on their projects as assessment tasks to improve their practicalabilityof application.

9:00 - 17:00 ThP4.8

Research on the Blended Teaching Mode of "Basic Computer Science" Based on "MOOC + Virtual Experiment", pp. 578-581.

Wang Li-wen Xi'an Univ. of Sci. & Tech.
HUANG Xu Xi'an Univ. of Sci. & Tech.

With the rapid development of informatization and the popularity of computer application, higher requirements are put forward for computer teaching in university. As one of the basic courses in universitie, “Computer Sience” carried out some reforms in the teaching content, but the teaching method is still based on instruction, supplemented by the computer exercises. The paper puts forward the blended teaching model of "MOOC + virtual experiment". Moerover it expounds the main construction contents of the blended teaching mode from the aspects of theoretical teaching methods, experimental platform and teaching resources construction.

9:00 - 17:00 ThP4.9

Analysis and Reflections on Talent Cultivation of Profession Master's Degree in Modern Educational Technology, pp. 582-586.

He Yang Hubei Univ. of Education
Si Xiong Hubei Univ. of Education

With the advancement of educational informationization and growing support for the cultivation of professional master's degree, the cultivation scale of modern educational technology specialty increases rapidly. This paper analyzes the current situation of the cultivation of the degree of modern educational technology in China from the perspective of geographical distribution, school style, category of institute undertaking the training task and training direction, and then puts forward reflections on the direction of modern educational technology master training under the current situation.

9:00 - 17:00 ThP4.10

The Monitoring and Early-warning System of Students' learning Based on the Campus Cloud, pp. 587-590.

Zhang FuSheng Harbin Univ.
Yang Ling Harbin Univ.
Jia ZongFu Harbin Univ.
Qi XinJun Harbin Univ.
Zong MingKui Harbin Univ.

It discusses the necessity of building college Students’ Learning Monitoring and Early Warning System (SLMEWS) as well as points out the importance of parents’ participation and assistance considering college students’ social environment and background with information acquisition media of digital campus as its method and the school cloud as its technology kernel. It also puts forward a dynamic SLMEWS reference model which has bidirectional early warning threshold value. It provides an organization and system safeguard mechanism monitoring beforehand prevention, in the matter intervention and afterward evaluation of this system. At the same time, it suggests methods of early warning procedure, classification and grading.

9:00 - 17:00 ThP4.11

Practice and Study of the Flipped Classroom Based on Active Learning Ability Enrichment, pp. 591-594.

Leng Junqiang Harbin Institue of Tech. at Weihai
Zhai Jing Harbin Institue of Tech. at Weihai
Li Jianghua Harbin Engineering Univ.

As a blended teaching strategy, the flipped classroom model has shifted the teaching task from traditional knowledge instruction to ability enrichment. Based on the main future of it, this report illustrates advantages of the flipped classroom and gives suggestions, including establishing the instruction structure and designing every process, of the model implement. Finally, a conclusion is given as utilizing the flipped classroom model is good for both teachers' and students' development.

9:00 - 17:00 ThP4.12

Teaching Mode Reform of Computer Major Oriented by Engineering Ability Training, pp. 595-599.

Dongdong Zhang Tongji Univ.
Lisheng Wang Tongji Univ.
Zhihua Wei Tongji Univ.
Guofeng Qin Tongji Univ.
Chen Ye Tongji Univ.
Yuchen Guo Tongji Univ.

Computer Science and Technology is a creative major with strong engineering. We should pay equal attention to the engineering practice teaching as well as theoretical teaching. In this paper, we introduced “multiple coupling and through type” teaching mode reform of computer major oriented by engineering ability training in Tongji University. Through the implementation of our proposed teaching mode, the engineering application and innovation ability of our students has been improved.

9:00 - 17:00 ThP4.13

Exploration of Teaching Method of Python Programming Based on the Case of Technical Problem, pp. 600-603.

Guanghui Zhao Wuhan Univ. of Tech.
Shumin Zhao Wuhan Univ. of Tech.
Chengming Zou Wuhan Univ. of Tech.
Zhaoxia Wang Wuhan Univ. of Tech.

In this paper, a series of programming cases are designed which can be used to solve the technical problems of material science and engineering. These cases can provide a bridge between the teaching of Python Programming and the solving of engineering technical problems. The results showed that the wide application of these case in the teaching can improve the study efficiency and foster autonomy.

9:00 - 17:00 ThP4.14

The Feasibility and Prospect of University Education Reform Based on the Integration of Education and Industry, pp. 604-607.

Lei Li Harbin Finance Univ.

Jingjia Qi Harbin Finance Univ.

For one hand, graduates students from university cannot find a job. For another, enterprises cannot find a proper employee. This embarrassing situation needs university make reform from traditional structure of education in China. We need to do something to change this phenomenon. This article focuses on integration of education and industry, it is one method try to solve this problem.

ThP5 Poster Session

Engineering Education II

9:00 - 17:00 ThP5.1

The Course Interest Analysis of Extracurricular Scientific Practical Activity of Students in Grade Seven, pp. 611-616.

Wei Yungang Beijing Normal Univ.

Shi Lina Beijing Normal Univ.

Sun Bo Beijing Normal Univ.

Zhu Xiaoming Beijing Normal Univ.

This paper proposes (the number of course selecting/the number of course browsing) to be a new indicator to evaluate the popularity of the course through analyzing the course selection results of Beijing Extracurricular Scientific Practical Activity. The main conclusions of analyzing relevant factors are as follows: 1. The higher star one course gets, the more popular the course is. And word of mouth and teaching experience play important part in course selecting. 2. Some districts like Mentougou and Tongzhou are lack of course resources, resulting in the popularity of these courses are higher than other areas with rich curriculum resources. 3. The courses offered by museums are more popular than those offered by scientific research institutions, which may have something to do with the packaging of the course. 4. The most popular course is about Astronomy, closely followed by Electronics, Information Technology and Physics. And students have less interest in courses related to Geography and Data and Information. 5. The curriculum of Information Technology is a kind of new course comparing to other curricula, which is regarded as STEAM course in a narrow sense. This kind of course is popular which indicates that students accept new type of curriculum well.

9:00 - 17:00 ThP5.2

Flipped Classroom Teaching Design based on SPOC in Ordinary Undergraduate College, pp. 617-620.

Guihua Han Hubei Business College

Mingyu Lin Hubei Business College

Cuilin Li Hubei Business College

Jianping Ju Hubei Business College

With analyzing contrastively the characteristics of SPOC classroom teaching based on MOOC, combining with the characteristics of the students in ordinary undergraduate colleges, this paper puts forward the basic principles of SPOC classroom teaching design, means the short and brevity videos, personalized resources, online and offline teaching activities, equally important between the process evaluation and summative evaluation for teaching.

9:00 - 17:00 ThP5.3

Research on the Reform of Flipped Classroom in Computer Science of University Based on SPOC, pp. 621-625.

Sufang An Hebei GEO Univ.

Wenbin Li Hebei GEO Univ.

Jichao Hu Hebei GEO Univ.

Lixiao Ma Hebei GEO Univ.

Jiwei Xu Hebei GEO Univ.

SPOC (Small Private Online Course) originated from MOOC is a blending learning combined MOOC resources with traditional campus teaching for small-scale groups students, and that is a hot issue of current researches in global well-known institutions. In this paper, we propose a new flipped classroom model based on SPOC, and take the basic course of computer science and technology in university (C programming language) as a design case. In this model, we establish three types of class task list in teaching process: list before, in and after class, and then analyze the effect and results of teaching model. The results show that this model improve the effect of teaching and learning, extending the bound of education research and providing a valuable reference for practice research on SPOC and flipped classroom in higher education.

9:00 - 17:00 ThP5.4

Study on Influence and Revelation of Flipped Classroom on University Education, pp. 626-628.

Yang Lin Sanya Univ.
Li Huiyan Sanya Univ.

With the development of new ideas and new technologies, the teaching design pattern has also undergone tremendous changes. The flipped classroom is an important direction of the current reform of university education model. This article expounds the development, characteristics, requirements and revelations of the reform of classroom teaching mode in university education, and puts forward some experiences for the reform of university education.

9:00 - 17:00 ThP5.5

Comparative Study of Innovation and Entrepreneurship Education, pp. 629-633.

Chengjiang Lu Guangdong Inst. of Sci. & Tech.
Hongming Zhu Harbin Univ. of Sci. & Tech.

Innovation and entrepreneurship education in China has been developed rapidly. In this paper, Five aspects were analyzed including concept and position, organization setting, faculty construction, teaching content and subject support and external support system by comparing innovation and entrepreneurship education of the United States, Britain, Germany, Australia, Japan and Singapore. We guide innovation and entrepreneurship education based on foreign advanced development model and indicate existing problems and the direction of innovation and entrepreneurship education reform in china.

9:00 - 17:00 ThP5.6

Research on Design and Development of High-quality Micro-lecture Resources, pp. 634-638.

Dan Dan Wei Jiangxi Sci. & Tech. Normal Univ.
Le Xing Qiu Nan Chang Army College
Hua Hua Yu Jiangxi Sci. & Tech. Normal Univ.

With the rapid development of modern information technology, the society has entered the micro-era, the short and pithy, the theme is clear, the targeted micro-lecture has came into being, which brings great convenience for the mixed learning. Although the domestic research on micro-lecture to a certain extent, achieved good results, but in practice still lack a lot of practical high-quality micro-lecture resources. Based on the basic theory of micro-lecture, this paper designs and develops the high-quality micro-lecture resources as the main content of the Instructional System Design course to provide reference.

9:00 - 17:00 ThP5.7

Research on the Improvement of Python Language Programming Course Teaching Methods based on Visualization, pp. 639-644.

Xiaoyan Kui Central South Univ.
Weiguo Liu Central South Univ.
Jiazhi Xia Central South Univ.
Huakun Du Central South Univ.

Reform of teaching content, teaching methods and evaluation of examination system is an urgent issue of current teaching reform in higher education. The article discusses how to reform and optimize the teaching methods of Python language programming course based on visualization; students can change the learning method under the guidance of teachers, promote self-exploration, and form a proactive and personalized learning habit. The paper proposes the establishment of “visualization teaching mode”. By dynamically adjust the curriculum, scientifically plan teaching contents and efficiently use of the different teaching cases, teaching can better comply with the law of high education’s development, and then effectively improve the quality of teaching and promote the development of higher education.

9:00 - 17:00 ThP5.8

Statistical Graph Classification in Intelligent Mathematics Problem Solving System for High School Student, pp. 645-650.

Yafei Shi Central China Normal Univ.
Yantao Wei Central China Normal Univ.
Ting Wu Central China Normal Univ.
Qingtang Liu Central China Normal Univ.

In recent years, intelligent mathematics problem solving has aroused the interest of researchers. In the intelligent mathematics problem solving system related to high school, the classification of statistical graph is a key step. Consequently, the classification of statistical graphs has become an urgent problem to be solved. In this paper, a new method is proposed for statistical graphs classification. Firstly, the image features of statistical graphs are obtained by spatial pyramid matching using sparse coding (ScSPM). The extracted features are then fed into classifier: support vector machine (SVM). In this paper, a new statistical graph dataset was established to evaluate the proposed method. It contains 400 statistical graphs including line graphs, histograms, scatter plots, and pie charts. Experimental results on the established dataset demonstrate that the proposed statistical

graphs classification method achieves better performance.

9:00 - 17:00 ThP5.9

The Construction of Undergraduate Data Mining Course in the Big Data Age, pp. 651-654.

Xiaofang Zhang Huazhong Univ. of Sci. & Tech.

Xiaotao Huang Huazhong Univ. of Sci. & Tech.

Fen Wang Huazhong Univ. of Sci. & Tech.

Data mining technology is the key technology and core content of big data age. The undergraduate data mining course introduces the basic concepts, basic principles and application techniques of data mining, as well as the characteristics and new technologies of data mining under the background of big data. According to the characteristics of undergraduate students, the curriculum should weaken the theory and algorithm as much as possible, and emphasizing the application. Through analysis and experiment on various examples, to enable students to face the specific application problems, can use the SPSS Modeler to designing a data processing, select the appropriate data mining method, and finally get the ideal results of data mining.

9:00 - 17:00 ThP5.10

A Visualization Knowledge Peer Network (VKPN) Approach to Scaffold Social Learning, pp. 655-658.

Jinju Duan South West Univ.

This study developed a system with knowledge peer which stimulate students to social learning quickly and scaffold them to seek for help from the experts and other peers easily, results showed the efficiency of it.

9:00 - 17:00 ThP5.11

Automatic Testing Scheme of Hardware Description Language Programs for Practice Teaching, pp. 659-662.

Lisheng Wang Tongji Univ.

Hang Zhou Tongji Univ.

Dongdong Zhang Tongji Univ.

At present, with the reform of teaching experiments of computer science in colleges and universities, many colleges and universities have designed a variety of experiment teaching courses for students. In our university, we set up experiment teaching courses based on FPGA (Field－Programmable Gate Array) development board for students in both digital logic and computer organization courses. Aiming at how to test a large number of HDL (hardware description language) program modules submitted by students in the experiment courses, we propose an automatic testing scheme of hardware description language programs for practice teaching.

9:00 - 17:00 ThP5.12

MIPS CPU Test System for Practice Teaching, pp. 663-666.

Lisheng Wang Tongji Univ.

Jianhong Ruan Tongji Univ.

Dongdong Zhang Tongji Univ.

With the teaching experiment reform of computer science, designing CPU with HDL (Hardware Description Language) as a curriculum experiment becomes more and more extensive. In the meantime, many problems also follow. In order to solve the problems in the process of designing MIPS CPU with HDL, in this paper, we propose a MIPS CPU test system for practice teaching, which simplify the test process in the CPU design experiment and improve the completeness of the stages of test process through the automated test system.

9:00 - 17:00 ThP5.13

The Exploration of Interactive Software Engineering Training Model, pp. 667-672.

Xiubo Liang Zhejiang Univ.

Yanlei Chen Zhejiang Univ.

Qichun Huang Zhejiang Univ.

In view of the problems of the current teaching content being out of touch with social needs and students' poor practical abilities and other issues, this paper analyzes the new international software engineering training model. Based on the iterative optimization method of updating the teaching idea, optimizing the curriculum system, strengthening the school-enterprise cooperation and improving teachers' qualities, this paper puts forward an interactive training model, which is suitable for training domestic software engineering masters. The training model could cultivate compound application talents, who are good at theory and practice at the same time and with abilities to analyze independently and solving practical problems.

9:00 - 17:00 ThP5.14

Design and Implementation of Software Outsourcing Talent Training Public Service Platform, pp. 673-675.

Jiang Li Hangzhou Normal Univ.

Zhan Guohua Hangzhou Normal Univ.

Niu Chengming

Yu Ge

Xu Yonggang

Li Zhihua

In recent years ,there is a rapid development in the software outsourcing industry. The most important problem we currently need to solve is talent shortage. So, it is very necessary for us to build up a platform ,which focus on training software outsourcing talent. We provide a platform to contact the government, university, enterprise and professional training institutions together. This platform can improve the scale and quality greatly.

ThP6 Poster Session

Engineering Education III

9:00 - 17:00 ThP6.1

Research on the Influence Factor of Kindergarten Teachers' Information Technology Use Behavior, pp. 679-683.

Zhang Liqin Jiangxi Sci. & Tech. Normal Univ.

Wan Chunhui Jiangxi Water Resources Inst.

To study the mechanism of preschool teachers information technology use behavior ,this article based on the task characters of early childhood teachers, constructed the use behavior model. With 385 preschool teachers as the research object, using self-made questionnaire to survey. the results show that: (1) the individual factors through the perceived usefulness and ease of use to influence preschool teachers' information technology use behavior; (2) external factors directly decide preschool teachers' information technology use behavior; (3) the task technology fit degree through perceived usefulness and perceived ease of use to affect the use of intention ,then to affect the use of the preschool teachers' behavior.

9:00 - 17:00 ThP6.2

Exploration and Research on the Construction of MOOC + SPOC Platform based on Internet Data Center, pp. 684-689.

Bo Chen Hubei Univ. of Sci. & Tech.

Chun-hui Wu Hubei Univ. of Sci. & Tech.

Hong-sheng Chen Hubei Univ. of Sci. & Tech.

There are many problems in the current massive open courses (MOOC) platform construction, such as high cost, high energy consumption, long construction period and poor reusability. In order to solve the above problems, a new platform construction schema of MOOC+Small Private Online Course(SPOC) based on Internet Data Center(IDC) is proposed. This platform can help users to quickly create their own SPOC, which has high modularization, reliability, scalability, and reusability.

9:00 - 17:00 ThP6.3

A Lifelong Learning System Based on School-enterprise Cooperation, pp. 690-693.

Baobin Liu Jiangsu Vocational Inst. of Commerce

Wei Zhou Jiangsu Vocational Inst. of Commerce

School-enterprise cooperation has become an important guiding ideology for developing vocational education in China. This paper introduces a successful experience to build a lifelong learning system for employees. The developed lifelong learning platform has worked in the following way. Senior engineers of the enterprises train college teachers. Using rich teaching experience, the teachers can transform complex new theories and knowledge into detailed skills, and then teach skilled workers. Seven years of practice and perfection show that lifelong learning system constructed by senior engineers, teachers and employees works well. The proposed school-enterprise-cooperation-based learning platform overcomes the enterprise limitation of contradiction between expansion domestic market and lack of skilled workers. Lifelong learning practices with many enterprises show that the proposed system is effective.

9:00 - 17:00 ThP6.4

Education Data Mining: How to Mine Interactive Text in MOOCs using Natural Language Process, pp. 694-699.

Feng Yu Harbin Univ. of Commerce

Dequan Zheng Harbin Univ. of Commerce

This paper proposes a combination of data mining and natural language processing technology, try to analyze students' learning behavior and content in MOOCs interactive part, to dig their learning interest, difficulty, tendencies, to evaluate their homework effect, through the interaction between teachers and students, students posting, homework or answer content, preventing of cheating behavior, and so on. So that, teachers optimize the course structure, establish of incentive mechanisms to stimulate students' learning desire, improve the completion rate of the courses. This method can dig valuable information from the seemingly random mass data, optimize the corresponding key elements in the teaching model, so that, teaching works go in a virtuous circle.

9:00 - 17:00 ThP6.5

Discovering Learning Behavior Patterns to Predict Dropout in MOOC, pp. 700-704.

Bowei Hong Ocean Univ. of China

Zhiqiang Wei Ocean Univ. of China

Yongquan Yang Ocean Univ. of China

High dropout rate of MOOC is criticized while a dramatically increasing number of learners are appealed to these online learning platforms. Various works have been done on analysis and prediction of dropout. Machine learning techniques are widely applied to this field. However, a single classifier may not always perform reliable for predictions. In this work, we study dropout prediction for MOOC. A technique is proposed to predict dropouts using learning activity information of learners. We applied a two-layer cascading classifier with a combination of three different machine learning classifiers — Random Forest (RF), Support Vector Machine (SVM), and MultiNomial Logistic Regression (MLR) for prediction. Experimental results indicate that the technique is promising in predicting dropouts with achieving 97% precision.

9:00 - 17:00 ThP6.6

Reform of Teaching Mode for Computer Specialty Based on MOOCs, pp. 705-708.

Xinlu Zong Hubei Univ. of Tech.
Hui Xu Hubei Univ. of Tech.

The development of MOOC brings opportunities and challenges to higher education. Based on the analysis of MOOC and traditional classroom teaching, a teaching mode based on MOOC for computer specialty is presented to improve the teacher-centered and rigid teaching mode in traditional education. The proposed teaching mode promotes the teaching reform in favor of the advantages of MOOC and classroom teaching and extend the teaching activities to the student-oriented process both online and offline, so that the situation lack of initiative can be improved. This MOOC-based teaching mode can cultivate the basic application ability, comprehensive design ability, engineering ability and innovation ability are cultivated gradually. The teaching mode and the hierarchical evaluation mechanism helpful to train engineering talents of computer major under new situation.

9:00 - 17:00 ThP6.7

The Design and Implementation of Generic Practice Evaluation Platform for iStudy, pp. 709-712.

Pan Tingting Hangzhou Normal Univ.
Zhan Guohua Hangzhou Normal Univ.
Zhang Liang
Yu Ge
Xu Yonggang
Li Zhihua
Qi Bin

"Internet + intelligent education" is the inevitable trend with the development of the education industry. iStudy, a Generic practice platform is a kind of practical curriculum evaluation platform for teachers and students, which combines operation, practice, evaluation, examination and item bank management with comprehensive teaching system and management system and is being accepted and enjoyed by more and more teachers and students.

9:00 - 17:00 ThP6.8

Teaching Reform and Practice of the Basic Computer Course based on Flipped Classroom, pp. 713-716.

LiXiao Ma Hebei GEO Univ.
JiChao Hu Hebei GEO Univ.
YiYing Chen Hebei GEO Univ.
XueJing Liu Hebei GEO Univ.
WenBin Li Hebei GEO Univ.

In view of the teaching actual situation of the basic computer course, taking C language programming as an example, this paper analyzes the characteristics of the course, and puts forward the reform program of the blended teaching mode combined with flipped classroom. The teaching effect improved significantly; it strengthens the students' ability of computational thinking, self-learning ability and innovation ability. Finally, this paper carries on the thinking and the summary to the teaching reform work, in order to continuously improve the course quality.

9:00 - 17:00 ThP6.9

The Design and Implementation for Automatic Evaluation System of Virtual Experiment Report, pp. 717-721.

Yufeng Chen Beijing Inst. of Tech.
Xuemin Liu Beijing Inst. of Tech.
Panpan Huo Beijing Inst. of Tech.
Lin Li Beijing Inst. of Tech.
Fengxia Li Beijing Inst. of Tech.

This paper designs and implements an automatic evaluation system for experimental reports in the field of university computer virtual experiment. The evaluation type is divided into three types: the only answer type, the rule-related type and the subjective short answer type. For the problems of the subjective short answer, a simple and effective method based on the participle of the standard answer and the multi-level semantic similarity is proposed in this system. The application of this system in the university computer virtual experiment platform shows that it not only facilitates the mastery of the experimental knowledge points,

but also ensures the accuracy rate and greatly improves the efficiency of judging.

9:00 - 17:00 ThP6.10

Multi-Dimensional Computer Basic Education Practice and Research, pp. 722-725.

Yizhi Wang Beijing Jiaotong Univ.

Wei Zhou Beijing Jiaotong Univ.

Lingyun Lu Beijing Jiaotong Univ.

In order to meet the needs of Chinese higher education of training students with strong foundation ability and innovation in the filed computer science, in recent years, the computer basic teaching team of Beijing Jiaotong University has carried out a series of scientific and effective educational reforms research and practice: 1.Carrying out “MOOC + SPOC + Flipped classroom” practice; 2.Construction of series of quality teaching resources; 3.Building training and experimental platform; 4.Internet + innovation practice and makerspace construction; 5.Cooperating with multi-school and enterprise alliance. Through these activities, multi-dimensional computer basic education has achieved good results.

9:00 - 17:00 ThP6.11

Teaching Practise of Blended Learnig on Computer General Courses for Undergraduates, pp. 726-729.

Chunli Chen China Univ. of Sci.s(Beijing)

Xinqi Zheng China Univ. of Sci.s(Beijing)

This paper presents a case study based on the experience of implementing a blended learning (BL) approach by SPOC to a Computer General course for all the first year undergraduates in China University of Geosciences (Beijing). It introduces ubiquitous learning environment (ULE), teaching preparation for student-centered learning, and teaching practice of the BL. The study shows that BL approach has a positive effect on enhancing students’ engagement and perception.

9:00 - 17:00 ThP6.12

Integrating MOOC and SPOC into the Physical Classroom for Fundamentals of Computer Course, pp. 730-733.

Yanling Shao Nanyang Inst. of Tech.

Qingji Xue Nanyang Inst. of Tech.

Xuejian Sun Nanyang Inst. of Tech.

Haiquan Yuan Nanyang Inst. of Tech.

The single teaching mode will do harm to students’ interest in learning for some reasons. This study presents a novel hybrid teaching method that integrating Massive Online Open Course (MOOC) and Small Private Online Course (SPOC) into the physical classroom on fundamentals of computer courses in college. Firstly, the authors present a framework of problem-driven learning methods for fundamentals computers using MOOC and SPOC. And then the authors design use cases oriented for the learner’s major. Finally, the study discusses collaborative learning by grouping mechanism on practical classroom and SPOC platform. The evaluation result shows that the proposed learning framework outperforms the traditional learning methods clearly.

9:00 - 17:00 ThP6.13

Research on the Model of University Computer Innovation Teaching in MOOC + SPOC under Deep Cooperative, pp. 734-739.

Zhang Chunying North China Univ. of Tech.

Liu Ying North China Univ. of Tech.

he large-scale construction of MOOC curriculum is an opportunity and a challenge to the teaching mode reform of university computer in ordinary colleges and universities. This paper first analyzes the urgency of the "basic requirement" proposed teaching content reform to promote the needs of MOOC courses in ordinary colleges and universities; Second, leveraging the elite, build MOOC courses in collaboration with Beijing Institute of Technology in depth, the course structure featured design, has greatly attracted the active participation of teachers and students learning initiative; Third, carefully build our school SPOC curriculum, research and design of the MOOC+SPOC based teaching model, to enable students through SPOC online learning to complete the virtual experiment report, design work documents and PPT etc. Practice shows that the colleges and universities by leveraging Elite schools, build MOOC collaboration with other universities in depth, can save financial, material and human, but also greatly enhance the level of teachers, improve the teaching quality.

9:00 - 17:00 ThP6.14

A Real-Time Virtual Piano Based on Gesture Capture Data, pp. 740-743.

Wei Qiao Beijing Inst. of Tech.

Rui Wei Beijing Inst. of Tech.

Sanyuan Zhao Beijing Inst. of Tech.

Da Huo Beijing Inst. of Tech.

Fengxia Li Beijing Inst. of Tech.

Human-computer interaction (HCI) continues to be a significant field of computer industry. Researchers are looking for the next

generation human-computer interaction which is more natural and more efficient. As a new device of high precision real-time, Leap Motion could track the movement of hands and fingers, which attracts many researchers' attention. In this paper, a new entertainment application – virtual piano – is implemented combined with Unity which is one of the famous game engines, and Leap Motion. The virtual piano in this paper allow users play piano in real-time by moving theirs' hands above the Leap Motion controller. Finally, the practice shows that this virtual piano application has a good performance.

9:00 - 17:00 ThP6.15

A Virtual Experiment Platform Based on OpenStack, pp. 744-749.

Yu Sheng Central South Univ.

Hulei Fan Central South Univ.

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As a most important part of students majoring in computer science related areas, experiments contribute to not only better understanding the theoretical knowledge but also enhancing the ability of hands-on. However, traditional laboratories re-quire a high-cost investment on both site and equipment, especially experiments of computer network. In order to address these problems, we design a virtual ex-periment platform based on OpenStack which enables users to select virtual ex-periment resources like PC, router and servers as well as building network topol-ogy and accessing these devices. Our platform renders teachers and students a perfectly functional experiment system making it possible to do experiments in classroom and dormitory which guarantees usability and simplicity for students to better practice.

ThP7 Poster Session
Interdisciplinary

9:00 - 17:00 ThP7.1

Electronic Medical Record System based on Augmented Reality, pp. 753-756.

Minghui Weng Xiamen Univ.

Lianfen Huang Xiamen Univ.

Chao Feng Xiamen Univ.

Fenglian Gao Xiamen Univ.

Hezhi Lin Xiamen Univ.

Electronic medical record can greatly improve work efficiency of the hospital and medical quality in the clinical application. Meanwhile with the rapid development of virtual reality (VR) and augmented reality (AR) technology, people's life will adopt a new way. In this paper, Electronic medical record system (EMRS) based on augmented reality is proposed. The system consists of server, Android device and data glove. User can not only check the relevant medical information on the Android device, but also operate the 3D organ model based on AR through gestures. In addition, users can also wear AR/VR glasses and data gloves to operate the 3D organ model in order to get a stronger sense of immersion. Through this system, we can show more pathological information, which can not only help the communication between doctors and patients, but also can be used in medical teaching.

9:00 - 17:00 ThP7.2

Fault Diagnosis of Wind Turbine Planetary Gear Box Based on EMD and Resonance Demodulation, pp. 757-762.

Junshan Si Harbin Univ. of Sci. & Tech.

Yi Cao Harbin Univ. of Sci. & Tech.

Xianjiang Shi Harbin Univ. of Sci. & Tech.

Planetary gearbox of wind turbine works under changed load and speed and the vibration signal is nonlinear, non-stationary, this make it difficult to extract the weak fault characteristic frequency. In this paper, a new method of fault feature extraction and separation based on empirical mode decomposition (EMD) and resonance demodulation is proposed. The method uses EMD to decompose the vibration signal and gets the intrinsic mode function (IMF) which can represent different frequencies. Then, the IMF component of the structure resonance frequency which is caused by the fault gear impact is selected to demodulate and analyze, and the weak fault information is extracted.The experimental results show that it is feasible to denoise the fault information and extract the fault characteristic frequency components by using EMD and structural resonance demodulation technique.

9:00 - 17:00 ThP7.3

Simulation Study on Gear Fault Diagnosis Simulation Test-bed of Doubly Fed Wind Generator, pp. 763-768.

Xianjiang Shi Harbin Univ. of Sci. & Tech.

Qingkang Gao Harbin Univ. of Sci. & Tech.

Wantao Li Harbin Univ. of Sci. & Tech.

Hua Guo Harbin Univ. of Sci. & Tech.

In order to study the theory and characteristics of the mechanical drive system fault in the current signal of the wind turbine generator better, the fault simulation experimental platform of

double fed wind generator drive gear is used as the research object, and the simulation model of double motor torque and rotational speed coupling is established by a motor and a doubly fed wind generator according to the mathematical model of AC asynchronous motor. Moreover, a detailed simulation analysis is carried out to the situation that the experiment platform is difficult to realize or test. The results show that the fault characteristic information in generator stator current is mainly transmitted by the speed fluctuation, and due to the influence of the system inertia and the harmonic components of the rotor excitation converter, it is more difficult to identify and diagnose the fault characteristic information. Therefore, how to remove the harmonic component to improve the ability of fault feature recognition is a problem to be solved for doubly fed wind generator.

9:00 - 17:00 ThP7.4

Energy Harvesting System and Circuits for Ambient WiFi Energy Harvesting, pp. 769-772.

Xuelin Chen Xiamen Univ.

Lianfen Huang Xiamen Univ.

Jianli Xing Xiamen Univ.

Zhiyuan Shi Xiamen Univ.

Zuosheng Xie Xiamen Univ.

RF energy harvesting holds a promisinge future for generating a small amount of electrical power to drive partial circuits in wirelessly communicating electronics devices. This paper presents an energy harvesting system based on LTC3108, which can effectively collect the surrounding WiFi energy. Two rectifier circuit, the Villard cascade circuit and the Greinacher circuit, were analyzed. In this paper, the Schottky diode HSMS-2852 was used to form the RF-DC rectifier circuit When the input voltage of the LTC3108 power management circuit is higher than 30mV, the output of the power management circuit can achieve at 3.29V.

9:00 - 17:00 ThP7.5

Experimental Study on Heat Transfer and Resistance Performance of Corrugated Tube, pp. 773-776.

Zhengchong Hu Hubei Business College

Yiming Chen Hubei Business College

Wei Pi Hubei Business College

Experimental research of heat transfer and resistance characteristic of three sizes of corrugated tube and straight tube was done. The results show that the shape of the corrugated pipe enhances disturbance of liquid，and strengthens heat exchange ability of corrugated tube.Corrugated tube heat exchange ability increases while the ratio of corrugation pitch and external diameter of corrugated tube decreases. The?ratio of heat transfer coefficient and pressure drop of corrugated tube is 1.38～3.36 times more than that of straight tube.The experimental results contribute to some reference value for heat transfer calculation of corrugated tube.

9:00 - 17:00 ThP7.6

EMC Design of Intelligent Pole-mounted Switch Controller, pp. 777-781.

Li Bingkun South China Univ. of Tech.

As an important part of the smart grid, the intelligent pole-mounted switch controller is widely used in medium voltage distribution network. It is a highly integration switch gear of sensing measurement, computer networks, communications and other technologies. The pole-mounted switch controller uses weak power to control strong power, and it can run in complex environment. So its stability is directly related to the security of the whole grid. According to the industry standard of DL/T721, a EMC design of pole-mounted switch controller is based on the aspects of ESD immunity design, fast electrical pulse train design, surge immunity design and voltage sag. So that the switch can not only resists the external interference such as thunder and lightning, but also resists the internal interference, and accurately gets the grid data and makes the correct action, and keeps the safety of power system.

9:00 - 17:00 ThP7.7

Hardware Scheme of a Universal Intelligent Pole-Mounted Switchgear Controller, pp. 782-786.

Lin Yapei Guangzhou Power Supply Co. Ltd

Li Hongguang Guangzhou Power Supply Co. Ltd

Guan Junle Guangzhou Power Supply Co. Ltd

Wang Xuefeng Guangzhou Power Supply Co. Ltd

Qin Huanxin Guangzhou Power Supply Co. Ltd

Zhang Kai Xiamen Univ. of Tech.

Chen Li'an Xiamen Univ. of Tech.

Tian Hong Xiamen Univ. of Tech.

Chen Benbin Xiamen Univ. of Tech.

The need for an intelligent controller which is universally compatible to both pole-mounted circuit breakers and switch disconnectors with different automatic controlling logics in fault isolation has been promoted in recent years. A novel design of universal intelligent pole-mounted switch controller is introduced in this paper. Hardware scheme of the design is presented in detail. The hardware circuit is controlled surrounding i.MX6UL,

and the design idea of man-machine interface, communication and power supply module are presented. Data acquisition is completed by using AD7606. Through the design of the hardware platform, a debugging and working basis for the software platform is provided.

9:00 - 17:00 ThP7.8

A Design of Multi-vision Localization and Navigation Service Robot System, pp. 787-790.

Jia Guo Xiamen Univ.
Xingyu Xiao Xiamen Univ.
Panwang Pan Xiamen Univ.
Xiaotong Luo Xiamen Univ.

Using machines to save manpower has always been the core concept of technological development. For some time, the process of replacing the brain has made great progress in the development of decision-making, such as identification, and has made a wide range of applications. The self-driving car as the representative of the intelligent robot has become a hot topic. Based on the scene of the use of small indoor service robots, this paper puts forward a kind of application scheme based on the combination of global visual localization and robot vision localization, and designs a set of management system suitable for catering service, so as to promote the further development of robot application.

9:00 - 17:00 ThP7.9

A Novel Underwater Localization Algorithm Fusing AHRS with Altimeters, pp. 791-794.

Yang Luo Harbin Inst. of Tech.
Jianguo Tao Harbin Inst. of Tech.
Zhandong Li Harbin Inst. of Tech.
Liang Ding Harbin Inst. of Tech.
Zongquan Deng Harbin Inst. of Tech.
Chenjian Zhao Shanghai Marine Equipment Research Inst.

This paper presents a novel underwater localization algorithm fusing the Attitude and Heading Reference System (AHRS) with underwater altimeters to localize the underwater welding vehicles (UWV) in the spent fuel pool of the nuclear power station. The SFP is divided into multi regions according to the attitude of the UWV and the coordinate of the UWV is calculated by corresponding method in each region. Furthermore, the UWV localization of three different motion trails are simulated to validate the accuracy of the algorithm, and the results show the satisfactory precision. The localization algorithm proposed in this paper provides certain theoretical foundation for localization in confined water area in future.

9:00 - 17:00 ThP7.10

Classified Research on Epilepsy Electroencephalogram of RBF Neutral Network Based on Particle Swarm, pp. 795-799.

Kunsen Li Xiamen Univ.
Weizhen Luo Xiamen Univ.
Tingxi Wen Xiamen Univ.
Huailin Dong Xiamen Univ.

Epilepsy is a kind of common diseases and frequently-occurring diseases damaging human health, and has a big impact on patient's body and mental health due to its attack at any place and any time, which has been the valued neutral network disease with high incidence in many countries. This paper proposes the mixed feature extraction to extract the feature by mixture of time-domain method and nonlinear analysis method, and then make optimization selection by applying particle swarm optimization, and finally train the epilepsy classifier by utilizing the optimized features through the RBF neutral network algorithm. In the experiment, the accuracies of two-classification problems and three-classification problems respectively reach 99.% and 98.1%, The results of cross-over experiment for many times show that, the method is of effectiveness in the classified feature extraction aiming at epilepsy brain wave.

9:00 - 17:00 ThP7.11

Design and Simulation of Hollow Rotating Lamp Frame for Stage, pp. 800-803.

Yanling Zhao Harbin Univ. of Sci. & Tech.
Jingwei Zhang Harbin Univ. of Sci. & Tech.
Wenjuan Li Harbin Univ. of Sci. & Tech.

According to the functional requirements for the hollow rotating lamp frame on the stage, its working principle is analyzed in the paper. The overall structure design is determined. The structure designs for body parts, connecting parts, power supply, hanger and rotating parts composed to the lamp frame are completed. The theory analysis and calculation to the power of rotating part are finished so as to select the transmission way of the power and the drive device. In terms of the principle of electric slip ring, a kind of device getting the electricity is designed, which has compact structure and high safety performance. 3D solid model of the rotating lamp frame is established by using Pro/E 3D design software.