September 24-26, 2021 | Online | Beijing Time

Conference Program

WSSE 2021

The 3rd World Symposium on Software Engineering

With Workshops of

ICESS 2021- The 3rd International Conference on Education and Service Sciences

ICKIM 2021- The 3rd International Conference on Knowledge and Information Management

Organized By:

Co-Sponsored By:

Technical-Supported by

Scan to add us on Wechat

Welcome Letter

Dear distinguished attendees,

We are pleased to welcome you to the 3rd World Symposium on Software Engineering (WSSE 2021). This expectant event is going to be held virtually from September 24th to 26th, with workshops of the 3rd International Conference on Education and Service Sciences (ICESS 2021) and the 3rd International Conference on Knowledge and Information Management (ICKIM 2021).

During this special period, even though we are not able to meet onsite as planned. Over 80 manuscripts were submitted to the conference and only 41 manuscripts were accepted and invited to give presentations on the conference.

It is earnestly hoped that all the participants would enjoy the conference. Meanwhile, we cordially welcome you to the 4th World Symposium on Software Engineering and to make up this exciting journey in 2022.
Look forward to your attendance.

WSSE 2021 Organized Committees

September, 2021

Content

Conference Committees

Conference Chairs
Jin Gou, *Huaqiao University, China*

Kang Zhang, *University of Texas at Dallas, USA*

Conference Co-Chairs
Hui Tian, *Huaqiao University, China*

Yulin Wang, *Wuhan University, China*

Program Chairs
Wentao Fan, *Huaqiao University, China*

Yang Chen, *Harbin Institute of Technology, China*

Yonglei Tao, *Grand Valley State University, USA*

Program Co-Chairs
Jianhong Zhou, *University of Electronic Science and Technology of China, China*

Emanuel Grant, *University of North Dakota, USA*

Award Chairs
Jing Wang, *Huaqiao University, China*

Jialin Peng, *Huaqiao University, China*

Student Program Chairs
Yiqiao Cyai, *Huaqiao University, China*

Huizhen Zhang, *Huaqiao University, China*

Hongbo Zhang, *Huaqiao University, China*

Local Chairs
Tsung-Chih Hsiao, *Huaqiao University, China*

Yubiao Pan, *Huaqiao University, China*

Hanyu Quan, *Huaqiao University, China*

Ziyi Chen, *Huaqiao University, China*

Qing Lei, *Huaqiao University, China*

Chengzhu Sun, *Huaqiao University, China*

Hui Ying, *Huaqiao University, China*

Technical Program Chair Members
Xiaona Xia, *Qufu Normal University, China*

Online Presentation Guideline

Conference Time Zone

The conference is scheduled in **Beijing Time** (UTC +8).

Online Conference Platform

1. Join or install the APP ZOOM on **https://zoom.us/** or **https://zoom.com.cn/meetings**.

Room ID: 94153956205, or join via the link: **https://zoom.com.cn/j/94153956205**.

2. Learn to use ZOOM via help center: **https://support.zoom.us/hc/en-us**.

3. Name yourself in ZOOM:

For regular authors, please name as Session Number+Paper ID+Name as you join the room.

E.g.: S1+S1001+Lairyn Xu.

For Conference Committees, Keynote Speakers and Session Chairs, please name as CC/KN/SC+ Name.

E.g.: KN+ Lairyn Xu / SC+ Lairyn Xu.

4. If you are fresh on ZOOM usage, please join TEST Session on September 24th.

Presentation Requirement

1. English is the official language in the conference.

2. Mute yourself when entering the room.

3. Use headsets/Earphones to enhance the audio effect and avoid the speaker echo or howling.

4. Stay at a light and quite place.

5. Feel free to join all sessions especially Keynote & Invited speeches.

6. If your network is not stable enough to do presentation online, please record a video as a back-up and send it to the conference secretary at least 1 week before the conference.

Voice Controlling During the Conference

1. The host will mute all participants while entering the meeting.

2. The host will unmute speakers during their presentations.

3. Participants can unmute themselves and share ideas freely during Q&A part.

4. After Q&A part, the host will mute all participants.

Oral Presentation Guideline

1. A Keynote Speech duration: 40-minute speech and 5-minute Q&A.

2. An Invited Speech duration: 25-minute speech and 5-minute Q&A.

3. A Regular presentation duration: 10-minute speech and 5-minute Q&A.

4. Conference/Session Chairs will remind you when you are out of time.

5. The whole conference will be recorded. If you mind it, please inform our staff ahead of time.

6. One best Presentation will be chosen from each session and announced at the end of the session. Certificates and receipts will be emailed to you after the conference.

If you have any question on ZOOM usage, please email the conference secretary.

Program Overview

ROOM ID: 94153956205

September 24th, Friday

Test Sessions

9:30-9:40	**Prof. Yonglei Tao**, *Grand Valley State University, Allendale, USA*
9:40-9:50	**Prof. Gul A Agha**, *University of Illinois at Urbana-Champaign, USA*
9:50-10:00	**Prof. Witold Pedrycz**, *University of Alberta, Canada*
10:00-10:10	**Prof. Ke Zhou**, *Huazhong University of Science and Technology, China*
10:10-10:20	**Assoc. Prof. Yang Chen**, *Harbin Institute of Technology, China*
10:45-11:45	**Session 1 & Session 2** S1401, S2002, S2020, S2022, S3006, S3010, S3019, S1020, S2011, S3004, S2015, S3009, S2024, S3016, S3018
Lunch Break	
13:30-14:30	**Session 3 & Session 4** S1003, S1009, S1019, S1025, S1026, S2007, S1027, S2023, S1001, S2009, S2005, S2019, S2101, S2021
14:45-15:45	**Session 5 & Session 6** S1006, S1007, S1008, S1010, S1011, S1013, S1005-A, S1015, S1021, S1022, S1023, S2014

September 25th, Saturday

Keynote Speeches & Parallel Sessions

Chair: Prof. Hui Tian, *Huaqiao University, China*		
9:00-9:05	**Opening Address**	**Prof. Jin Gou**, *Huaqiao University, China*
9:05-9:50	**Keynote Speaker I**	**Prof. Witold Pedrycz**, *University of Alberta, Canada (IEEE Fellow)* **Title:** Machine Learning and Granular Computing as a Framework of Design of Models of Quantitative Software Engineering
Group Photo&Morning Break		
10:05-10:50	**Keynote Speaker II**	**Prof. Gul A Agha**, *University of Illinois at Urbana-Champaign, USA (IEEE Fellow & ACM Fellow)* **Title:** Preventing Concurrency Bugs through Temporal Coordination Abstractions

10:50-11:35	**Keynote Speaker III**	**Prof. Ke Zhou**, *Huazhong University of Science and Technology, China* **Title:** AI for Storage
Lunch Break		
13:30-15:15	**Session 1**	**Management and Service Science** S1401, S2002, S2020, S2022, S3006, S3010, S3019
15:45-17:45	**Session 2**	**Knowledge and Education Engineering** S1020, S2011, S3004, S2015, S3009, S2024, S3016, S3018

September 26th, Sunday

Invited Speeches & Parallel Sessions

Chair: Prof. Yulin Wang, *Wuhan University, China*		
9:00-9:30	**Invited Speaker I**	**Prof. Yonglei Tao**, *Grand Valley State University, Allendale, USA* **Title:** Integrating Adaptability into Interactive Applications
9:30-10:00	**Invited Speaker II**	**Assoc. Prof. Yang Chen**, *Harbin Institute of Technology, China* **Title:** Integrating Gamification into Language Learning Applications: Preferred Functions, Influences, and Design
Morning Break		
10:15-12:00	**Session 3**	**Software and Information Engineering** S1003, S1009, S1019, S1025, S1026, S2007, S1027
Lunch Break		
13:00-14:45	**Session 4**	**Teaching Mode and Method** S2023, S1001, S2009, S2005, S2019, S2101, S2021
15:00-16:30	**Session 5**	**Image Analysis and Application** S1006, S1007, S1008, S1010, S1011, S1013
16:45-18:15	**Session 6**	**Modern Information Theory and Technology** S1005-A, S1015, S1021, S1022, S1023, S2014

Keynote Speaker I

Prof. Witold Pedrycz

University of Alberta, Canada

(IEEE Fellow & H-Index 119)

Time: **9:05-9:50, September 25th, Saturday**

Speech Title: **Machine Learning and Granular Computing as a Framework of Design of Models of Quantitative Software Engineering**

Abstract: It is evident that with the omnipresence of software systems and their diverse applications quite often concerning critical environments, efficient models of software artifacts, software attributes (for instance, software complexity and maintainability) and software processes (e.g., cost estimation) become of paramount importance with far-reaching practical impact. The nature of software data including their limited number, sparsity, distributed nature and associated with privacy and security constitutes a remarkable challenge when engaging effectively machine learning design framework.

We advocate that in light of the arguments raised above, it is highly desirable that suitable models of software products and processes: (i) are transparent and easily comprehended by users and stakeholders, (ii) exhibit logic fabric that contributes to the elevated level of interpretability, (iii) realize the design based on an orchestrated usage of data and available domain knowledge helpful to customize the key modeling agenda, and (iv) come with well-articulated credibility measures that help efficiently assess the relevance of the models, say associated quality of prediction outcomes.

It is demonstrated that the above-stated requirements are addressed by admitting a suitable level of abstraction of the model and the ensuing results. The detailed discussion is carried by concentrating on rule-based architectures. In this context, several representative conceptual and algorithmic developments in machine learning and Granular Computing are covered: federated learning, granular gradient boosting, and transfer learning (knowledge).

Biography: Dr. Gul Agha is Professor Emeritus and Research Professor of Computer Science at the University of Illinois at UrbanaChampaign, and CEO of Embedor Technologies. Agha is a Fellow of the ACM, and Fellow of the IEEE. He was a recepient of the 2019 ACM SigSoft Impact Paper Award. Dr. Agha served as Editor-in-Chief of IEEE Concurrency: Parallel, Distributed and Mobile Computing (1994-98), and of ACM Computing Surveys (2000-07). Dr. Agha is best known for his formalization of the Actor model which has been realized in industrial programming languages and frameworks such as Erlang, Scala/Akka, and Orleans. Agha and his research group developed Concolic Testing for programs with memory and concurrency. Concolic testing has been incorporated in industrial software testing tools such as KLEE, Microsoft SAGE, and S2E. Dr. Agha developed methods for Statistical Model Checking (SMC). SMC has been applied to biological systems and cyberphysical systems. Dr. Agha research also led to Euclidean model checking, a method to reason about the

evolution of probability distributions. Other research contributions include methods to harness computational learning for program verification; logical methods for automated decentralized, predictive runtime verification of programs; and distributed algorithms for wireless sensor networks (WSNs). Dr. Agha co-founded Embedor Technologies which is applying WSNs to continually monitor the structural health of bridges, buildings and railroad tracks. Embedor's technology was used to monitor the world largest Ferris wheel during construction.

Keynote Speaker II

Prof. Gul A Agha

National University of Illinois at Urbana-Champaign, USA

(IEEE Fellow & ACM Fellow)

Time: **10:05-10:50, September 25th, Saturday**

Speech Title: **Preventing Concurrency Bugs through Temporal Coordination Abstractions**

Abstract: In sequential systems, programmers are responsible for totally ordering events occurring in a system. This results in overly constraining when events may occur. In contrast, concurrent systems involve nondeterministic interleaving of actions at autonomous actors. Without additional constraints on the order of events at participating actors, an interleaving may lead to incorrect operation or deadlocks. The talk will describe constructs for temporal coordination of actors such as synchronization constraints, activators, session types, synchronizers and protocol description. I will then discuss the utility and limitations of these methods, including barriers to adoption. The talk will conclude with a perspective on open problems and research directions.

Biography: Dr. Gul Agha is Professor Emeritus and Research Professor of Computer Science at the University of Illinois at Urbana Champaign, and CEO of Embedor Technologies. Agha is a Fellow of the ACM, and Fellow of the IEEE. He was a recepient of the 2019 ACM SigSoft Impact Paper Award. Dr. Agha served as Editor-in-Chief of IEEE Concurrency: Parallel, Distributed and Mobile Computing (1994-98), and of ACM Computing Surveys (2000-07). Dr. Agha is best known for his formalization of the Actor model which has been realized in industrial programming languages and frameworks such as Erlang, Scala/Akka, and Orleans. Agha and his research group developed Concolic Testing for programs with memory and concurrency. Concolic testing has been incorporated in industrial software testing tools such as KLEE, Microsoft SAGE, and S2E. Dr. Agha developed methods for Statistical Model Checking (SMC). SMC has been applied to biological systems and cyberphysical systems. Dr. Agha research also led to Euclidean model checking, a method to reason about the evolution of probability distributions. Other research contributions include methods to harness computational learning for program verification; logical methods for automated decentralized, predictive runtime verification of programs; and distributed algorithms for wireless sensor networks (WSNs). Dr. Agha co-founded Embedor Technologies which is applying WSNs to continually monitor the structural health of bridges, buildings and railroad tracks. Embedor's technology was used to monitor the world largest Ferris wheel during construction.

Keynote Speaker III

Prof. Ke Zhou

Huazhong University of Science and Technology, China

Time: **10:50-11:35, September 25th, Saturday**

Speech Title: **AI for Storage**

Abstract: With the explosion of data, the storage system grows larger, and its internal composition becomes more and more complex. How to make it run efficiently, meet the requirement of service quality for each user, and guarantee the high reliability of the system, is a very challenging proposition. Traditional rule-based storage policies are increasingly unable to meet the complex and dynamic requirement of storage system. The operation data of the storage system, such as I/O trace data, disk SMART data, system parameters, and etc., records the whole process of system execution in real time from different sides. These operation data are large, and the hidden rules are not easy to be found. It has become a trend to use artificial intelligence technology to analyze the operation data and optimize the storage system. The speech will introduce some research work on using machine learning algorithms to optimize large-capacity caching, disk fault prediction, data content query and other aspects, and will also explore the new possibility of applying artificial intelligence technology to storage systems.

Biography: Ke Zhou, Ph.D, Professor, Ph.D Supervisor, New Century Excellent Talent in University of Ministry of Education of China. Mainly engaged in the research of cloud storage, storage security and big data processing. He won 1 Second Prize of National Technological Invention Award, 3 First Prizes of Provincial and Ministerial Award, 1 Second Prize of Ministerial Award, and 1 finalist award of SC'06. As the first accomplisher, he completed the establishment of 3 national standards and 1 industrial standard. He published more than 60 papers in famous academic journals and conferences.

Invited Speaker I

Prof. Yonglei Tao

Grand Valley State University, USA

Time: 9:00-9:30, September 26th, Sunday

Speech Title: Integrating Adaptability into Interactive Applications

Abstract: Adaptive user interfaces are an alternative to the traditional one-size-fits-all user interfaces. AUIs have the ability to adapt their structures, appearances, and behavior to a variety of objectives, aiming to provide highly usable applications for people with different needs and in different contexts of use. Successful design and development of adaptive user interfaces are one of the major research directions in the areas of human computer interaction and software engineering.

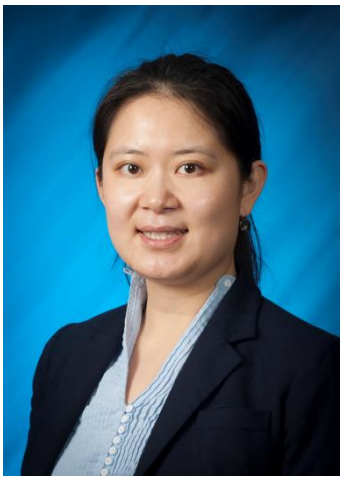
Noticeably the effectiveness of AUIs depends on how accurately adaptation satisfies user needs. As more information on the context of use is available, the AUI of an application evolves and changes in the application are inevitable. It is a great challenge to develop a reusable architecture to accommodate future changes.

Users make a sequence of decisions when they navigate a user interface. Such decisions are interdependent. Knowledge about activities that the user performs at runtime is crucial for adaptation decision making. It not only serves as a basis for evaluating relevance of the available information (such as user status, usage patterns, and context of use), but also facilitates reasoning about user needs. However, implementation of the user activity tracking capability often relies on intimate knowledge of the target application, which makes it difficult to develop loosely coupled modules to achieve reusability.

We propose a two-step approach to achieving reusability of software support for AUIs. Briefly, we use aspect-oriented instrumentation to capture user interface events and then conduct model-based analysis on event traces to identify user tasks. As our experiment shows, this approach provides reusable support for adaptability at the task level.

Biography: Dr. Yonglei Tao is a professor in the School of Computing and Information Systems at Grand Valley State University, Michigan, USA. He received his Ph.D. in Computer Science from the University of Iowa. His research interests include tool support for usability evaluation, software engineering, and computer science education.

Invited Speaker II



Assoc. Prof. Yang Chen

Harbin Institute of Technology, China

Time: **9:30-10:00, September 26th, Sunday**

Speech Title: **Integrating Gamification into Language Learning Applications: Preferred Functions, Influences, and Design**

Abstract: As gamified English vocabulary learning Apps are increasingly popular among Chinese English learners, this study explores how non-English major college students, who may lack initiatives in foreign language learning, perceive those Apps. Following a qualitative approach, this study analyzed interview data from fifty-three students who have used gamified English vocabulary learning Apps in latest 12 months. The major findings of this study include: (1) the preferred game settings included challenge, team, leaderboard, competition, coins, and badges; (2) students perceived the motivation activation effects of the apps by receiving instant feedback, enjoyment, and sense of achievement, and inactivation effects considering the attention distraction, additional competitive pressure, and imperfect words matching; and (3) students believed that the apps helped to form vocabulary learning habits because of its convenience, rewarding mechanism, and group setting, while others did not because they had fixed learning routines. Then, this study explained and discussed the findings considering factors from or related to both the gamified Apps and students. This study explored the potential of the popular vocabulary learning Apps in enhancing students' English learning motivation and learning habits and extended the scopes of research on gamification in foreign language education.

Biography: Yang Chen is currently an associate professor in the college of humanity and social sciences of Harbin Institute of Technology (Shenzhen), China. She received her bachelor's degree in mass communication from Communication University of China, master's degree in digital media from Harbin Institute of Technology, China, and doctoral degree in computer graphics technology with a concentration in human-computer interaction from Purdue University, USA. Her research interests include social media, user experience, environmental communication, and educational gamification. As principal investigator, she has undertaken funded research projects on gamified pro-environmental communication, gamification in second language acquisition, and big data and education resources, which were funded by national/provincial social science foundations. She has publications in international journals including International Journal of Human-Computer Interaction, sustainability, and International Journal of Language, Literature and Linguistics. She also published in international conferences such as ICBDE, ICESS, ICIET, WCEEE, and ELEARN. In addition, she serves as a reviewer for several prestigious international journals (such as Information, Communication & Society, Information Processing and Management, Social Media and Society, Behaviour & information Technology, and Interacting with Computers) and international conferences in the fields of social media, technology, and education.

Session 1

ROOM ID: 94153956205

September 25th | 13:30-15:15 | Management and Service Science

Session Chair: Asst. Prof. Santi Novani, School of Business and Management, Institut Teknologi Bandung, Indonesia

13:30-13:45	**S1401**	Research on Financial Risk Early Warning of Internet Financial Companies **Prof. Dr. Bin Liu**, Wanwan Wang, Yapeng Shi Jiangxi Science and Technology Normal University, China The 14th Five-Year Plan proposes to improve the financial risk prevention, early warning, disposal, accountability system. In the era of rapid development of the Internet, Internet finance occupies a place in the financial industry because of fast growth, high efficiency and wide coverage.As a method of financial risk management, early warning of financial risk can predict the financial risk of enterprises, find the problems that may exist in enterprises, and enable enterprises to take preventive measures in advance to avoid further expansion of risks. This paper selects Ant Group for financial risk early warning research. this paper comprehensively analyzes the financial data of Ant Group during 2017-2020 from the perspectives of profitability, debt paying capacity, operation capacity and cash flow capacity, and adopts factor analysis method to build a financial risk early warning model to deal with financial risks. According to the warning results, 2018 is at the high risk stage, 2019 and 2020 will still be at the significant risk level. Finally, according to the research conclusions, corresponding improvement measures are proposed to strengthen the financial risk coping ability of Internet finance companies and help them achieve sustainable development..
13:45-14:00	**S2002**	Exploration and Practice of Subject Service in Tianjin University Library under the Background of Supporting the Construction of "Double First Class" in Colleges and Universities **Mrs. Yuenan Wang**, Huang Fang, Danmei Wei, Lu Wang, Hongbin Liu, Xinyi Liu Tianjin University, China The original responsibilities of university library mainly focus on cultivating creative talents, scientific and technological innovation and knowledge discovery. The rapid development of new media application has brought unprecedented challenges to the traditional library information literacy education. Taking the library of Tianjin University as a

		case, this paper introduced the exploration and practice of subject service. In the face of multi-dimensional subject information needs and deep-seated knowledge service requirements in the digital scientific research environment, libraries should make use of their own advantages, take more methods to embed in the front line of scientific research, and provide a full range of subject services for teachers and students. At the same time, it also improves the level, ability and quality of subject services carried out by University Libraries in the new era.
14:00-14:15	**S2020**	Value Co-Creation Process in Agribusiness using Service-Logic Business Model Canvas Approach **Asst. Prof. Santi Novani**, Imas Chandra Pratiwi, Lisandy Arinta Suryana, Kyoichi Jim Kijima Institut Teknologi Bandung, Indonesia The agricultural sector in Indonesia is one of the important sectors for national food security, especially during COVID-19 pandemic. Unfortunately, Indonesia is currently facing a farmer regeneration crisis because most of the Indonesian farmers are approaching their maximum productive age. If this condition continues, Indonesia is projected to experience a crisis in the number of farmers for the next 10 years. Another problem arises because a lot of agricultural land has been turned into housing. Therefore, the government and many non-profit organizations encourage food self-sufficiency activities such as urban farming. However, to achieve national food security, involvement of various parties is needed to encourage innovation. Further, this study aims to explore the collaboration and innovation blueprint using a business model canvas based on service dominant logic. This initial business model canvas is proposed to provide a big picture of the value co-creation process based on a qualitative approach (i.e., literature review, observation, and interviews). Further studies are expected to validate the developed BMC by presenting various statistical analyses.
14:15-14:30	**S2022**	Principal Transformational Leadership Practices in Supporting the Implementation of the School Literacy Movement **Dr. Muh. Arafiq**, Bambang Budi Wiyono, Enny Zubaidah Malang University, Indonesia Principal leadership has a very important role in school management. Professional principals are shown with good performance and have an impact on the quality of the schools they lead. Answering the existence of the role of schools in implementing the school literacy movement, shows that schools as formal educational organizations are places or containers

		for a group of people (principals, teachers, staff, students, school committees, and the community) to achieve the desired goals. The purpose of this study was to determine the principal's transformational leadership practices in supporting the School Literacy Movement Program at SD Kauman 1 Malang City. It employs a qualitative approach by using a case study research design. Data are gathered by interviewing, observing, and documentation study. Then data are analysed by using qualitative descriptive analysis. Support for the implementation of the School Literacy Movement (SLM) has been carried out by the Principal of Elementary School (SD) Kauman 1 Malang City, including 1) the purpose of literacy practices in the school's vision and mission, 2) structuring infrastructure and a literate environment, 3) fiction and non-fiction reading books to support learning 4) improving the quality of literate teachers and educators, 5) public involvement (school committees, communities, businesses, and reading communities) to support the SLM program. The implementation of the SLM should be implemented based on statements of vision and mission of the related school and it should be a planned, continuous, and sustainable effort to improve students reading interests.
14:30-14:45	**S3006**	Research on the consumption of different user populations **Dr. Yu Xiaohong**, Yu-Che Huang Shandong Management University, China Different user groups will bring different lifestyles, and will also result in different economic entities, including personal financial management and real estate, and various social activities. However, consumer behavior is inherently multidisciplinary, with psychology, sociology, social psychology, marketing and economics being the most important. Therefore, consumer behavior research methods are more or less influenced by these more mature disciplines, of which psychology has the greatest impact. Each of us may be a consumer in life, and we build our own unique "lifestyle" through different "consumption experiences", so that everyone has different "consumption behaviors." Therefore, the main purpose of this research is to investigate the antecedents of different users' ethnic lifestyles, with unmarried users as the main body of the research, and to understand how this lifestyle and consumer awareness or cognition affect these consumers' subsequent purchases Different external behaviors in the process. Through the literature survey method, systematically collect the true or historical situation of the research object, collect relevant academic monographs, academic journal articles, official statistics, etc., read extensively, analyze and summarize consumer psychology, lifestyles, and consumer behaviors of different single groups, looking for this The new business opportunities of the era and the establishment of AI artificial intelligence data are provided, so

		that marketers have more time and energy to explore the insights behind the data.
14:45-15:00	**S3010**	Comparative Study on Epidemic Prevention and Control in Taiwan and Guangdong Provinces Tang Xinfa, **Ms. Zhong Tian**, Chen Zhihao Jiangxi Science and Technology Normal University, China Novel Coronavirus Pneumonia (COVID-19) has ravaged the world since 2019, seriously affecting human production and life. Although my country has controlled the epidemic on the whole, there are still local outbreaks. To this end, a classic infectious disease SEIR model was established to study the spread of the new coronavirus pneumonia epidemic. The population was divided into four categories: susceptible population, exposed population, infected population and removed population. After the parameters of the SEIR model were determined, Python was applied to conduct drills on the SEIR model, and simulation analysis was conducted on the epidemic transmission in Taiwan and Guangdong provinces with and without control measures. The results show that there are significant differences in the number of exposed, infected, and removed numbers between the two provinces. It shows that early and timely strict prevention and control measures can effectively control the spread of the new coronavirus pneumonia epidemic.
15:00-15:15	**S3019**	Visual Analysis of Chinese Rural E-commerce Research in Recent Ten Years **Ms. Xiongna Deng**, Jiandong Zhao, Tingting Lu, Lirong Dong, Peng Huang Guangdong Polytechnic Normal University, China In order to understand the research status and trends of rural e-commerce in China, this paper takes the literature related to rural e-commerce in PKU and CSSCI journals included in CNKI database from 2011 to 2021 as research samples, and uses CiteSpace software for visual analysis. The results show that the research of rural e-commerce in China is on the rise. China Academy for Rural Development of Zhejiang University, College of Economics & Management of Northeast Agricultural University and School of Economics of GuiZhou University of Finance and Economics are the main research institutions. There are fixed cooperation groups among the authors, but there are also some scholars who carry out research independently. Research hotspots and trends include e-commerce poverty alleviation, supply side reform, agricultural products upward and other application fields.

Session 2

ROOM ID: 94153956205

September 25th | 15:45-17:45 | Knowledge and Education Engineering

Session Chair: Dr. Patricia Haydeé Cárdenas, National University "San Luis Gonzaga", Peru

15:45-16:00	**S1020**	The Framework Design of Question Generation based on Knowledge Graph **Mr. Hengzhang Zhang**, Huazhen Wang, Jianxuan Zhao, Xiaofeng Wang Huaqiao University, China This paper proposes a systemic design framework GTQG (Graph Transformer Question Generator), which generates questions based on the combination of knowledge graph and graph neural network. We use graph Transformer to capture semantic relations, and incorporate into multi-dimensional external information such as question types and external question libraries to present knowledge graph. Thus, a series of questions can be generated based on an n-hop subgraph. In the application of educational scenarios, our approach GTQG serves for questioning teaching help improve students' reasoning and logic skills in text reading practice.
16:00-16:15	**S2011**	Characterization of the Curricular Plans of a Faculty in a Public University in the Licensing Process Associated with Quality Indicators. **Dr. Patricia Haydeé Cárdenas**, José Carlos Rodríguez, Anselmo Magallanes, William Eberth Ríos National University "San Luis Gonzaga", Peru The objective of the study was to determine the relationship between curricular plans and quality indicators of a faculty in a public university in the process of licensing. Material and methods: Non-experimental transectional descriptive correlational study. Applied method: inductive. Sample: 60 teachers selected by convenience sampling technique. Data processing: descriptive statistics were used in the presentation of results and inferential statistics. Instrument used: questionnaire. Results: Reflected a Pearson correlation coefficient of r=0.661 which indicates that there is a significant relationship between the curricular plans and the quality indicators of a faculty in a public university in the process of licensing, that is to say that good curricular plans correspond to high quality indicators and vice versa.

16:15-16:30	S3004	A Survey on Knowledge Graph Representation Learning with Text Information **Mr. Ling Wang**, Jicang Lu, Gang Zhou State Key Laboratory of Mathematical Engineering and Advanced Computing, China Knowledge graph representation learning provides a lot of help for subsequent tasks such as knowledge graph completion, information retrieval, and intelligent question answering. By representing the knowledge graph as low-dimensional dense vectors, these tasks can improve efficiency significantly. However, limited by the sparseness and huge scale of the actual structure, representation learning only from a structural perspective can no longer meet the research needs. To improve the performance, researchers introduced auxiliary information into representation learning. This paper focuses on models using text as auxiliary information, dividing all text-combined models into two categories: Closed-world assumption models and Open-world assumption models. The former is limited by the model's demand for the structural representation of the graph itself, and can only predict the entities and relationships that already exist in the knowledge graph. The latter can handle entities that have not previously been seen during model training, and connect brand-new entities to the knowledge graph, which is more in line with the dynamic trend of the knowledge graph in real world. Open-world assumption models can be further subdivided into multiple types according different joint functions, such as alignment function, fusion function, score function and transformation function. This paper summarizes existing methods in detail and looks forward to future possible research directions.
16:30-16:45	S2015	Attention Distribution Graph: Visualizing Student's Attention Transition in Error-finding Tasks **Ms. Ying Zhou**, Wei Liu, Huitong Liu, Jing Xu, Wenqing Cheng Huazhong University of Science and Technology, China Eye-tracking measurement has been adopted in the research of programming education. Most of existing research focus on the measurement of behavior throughout the programming process, and the visualization of specific thinking task is a few. In this paper, we focus on the scenario of web-based error-finding test, in which participants are required to finish several tasks in the way of clicking checkbox. We visualize the specific process details for each task. A novel visualization tool, namely Attention Distribution Graph (ADG), is proposed to describe

		the line-level temporal transition of student's visual attention. We divide one student's test duration into equal-size time slot, count the fixation duration on each code line, and color the time-code block according to its proportion of visual attention in the current time slot. The student's click event is also plotted in ADG, enabling us to observe the relationship between student's thinking and decision. Experiment results show that, ADG can clearly demonstrate the change of student's visual attention during the test, reflect details of finishing this task and the impact of previous tasks on current task, helping us to tell whether the student's attention is scattered or concentrated. In summary, the ADG can provide a reference for describing students' cognitive process.
16:45-17:00	**S3009**	Upgrading of academic database: acceptance or resistance **Ms. Hanghua Lian**, Zhaorong Huang, Jieying Zhou, Quande Qin Shenzhen University, China This study examines the factors that influence people use intention of the upgraded Academic literature databases (ALD) based on the dual-factor concepts of "enablers" and "inhibitors". This paper proposed a new model that considers the continuance intention from two pathways of acceptance and resistance and further integrates inertia and experience of new version. The results demonstrated the impact that inertia has on perceived loss of control and resistance intention as well as the impact that experience of new version and perceived usefulness on acceptance intention. It was also indicated that observability, compatibility and testability are the main factors of perceived usefulness, which in turn lead to subsequent consumer acceptance intention. Such consideration will help decrease the mismatch between ALD design and users' needs, and further facilitate the adoption of the newer ALD. Furthermore, this study provides a universal database conceptual upgrade model in the field of information system upgrading and enriching knowledge management system research.
17:00-17:15	**S2024**	A Tentative Study of Using the Social Interaction Model to Improve the Effectiveness of Literary Visits and Writing **Mr. Shu-Chuan Cho**, Sheng-Chieh Chou, Tsui-Feng Huang, Chih-Hung Chou Chaoyang University of Technology, China Scholars believe that group learning activities derived from social interaction theory can accumulate positive learning experiences. This research takes first-year university students in central Taiwan as the research object. It is divided into experimental classes and control

		classes. In the course of Chinese literature, we learn about the learning units of local literature. Special arrangements are made for visits to community literary museums to enhance the learning benefits of the visit activities. During the visit, the controlled class adopts individual free-visit learning methods; the experimental class is designed to design game-like teaching activities to enhance the interaction of group members, and at the same time encourage students to have a good understanding of the content of the visit, to get a deeper impression. Through the writing assessment of students' learning experience and related questionnaire surveys, it is shown that the game-based teaching activity design helps to improve the students' experience writing performance and willingness to write.
17:15-17:30	**S3016**	A Framework of Digital Marketing Through Knowledge Management **Ms. Aying Shuotie**, Jirapat Wanitwattanakosol Chiang Mai University, Thailand The marketing channels have been transformed by the presence of the internet and online platforms. The influence is profound, especially for the digital marketing sector. In the context of the global epidemic, the frequency of offline purchases by customers has decreased. Digital marketing strategies are of great importance for SMEs. With the aid of knowledge management tactics, the digital marketing process can be accessed more systematically. This research aims to develop a digital marketing framework through knowledge management tactics by taking a Thai dairy company context. To fulfill the objective, this study uses focus groups, text mining, and the RACE digital marketing planning model.
17:30-17:45	**S3018**	Research Context and Trend of Knowledge Spillovers at Home or Abroad: A Bibliometrics and Social Network Analysis Ruifeng Hu, **Ms. Yalin Yang**, Rui Chen Xihua University, China To characterize the home or abroad research context of knowledge spillovers and to forecast its future development trajectory. Bibliometrics and social network analysis methods are used based on the CNKI and WoS data. Results show that: the number of domestic and foreign literature is increasing by years, and foreign literature has a higher rate of co-authorship than domestic one; the analysis of the keyword co-occurrence network reveals that domestic and foreign literature shares a similar set of core keyword nodes, indicating that knowledge spillover literature could be classified according to its connotation and type, as

		well as its influencing factors and spillover effects; the analysis of the centrality index reveals that the nodes that can become domestic research trends are FDI technology spillovers, knowledge spillovers, spillover effects, and technology innovation, whereas the nodes that predict foreign research trends are not immediately apparent.

Session 3

ROOM ID: 94153956205

September 26th | 10:15-12:00 | Software and Information Engineering

Session Chair: Prof. Liang Xiao, Hubei University of Technology, China

10:15-10:30	**S1003**	A Group Decision Description Language and its Clinical Application **Prof. Liang Xiao**, KanYi Hu, John Fox Hubei University of Technology, China Group decisions are crucial in solving complex problems successfully across many socio-technical contexts. The development of distributed group decision systems are problem-specific, literally with no systematic support and so a high level of variability in terms of their effects. There is a lack of generic and comprehensive manner that can support the description of the actual decision-making processes precisely. In this paper, we propose a group decision description language. The language consists of the constructs of agent, protocol, decision rule, and constraint for representing group decisions generically, flexibly, while maintaining local autonomy. A protocol of Triple Assessment for breast cancer has been used as an example to demonstrate its application. The language has been further applied to a Consensus Protocol and a Coordinator Election Protocol to demonstrate its expressiveness.
10:30-10:45	**S1009**	Research on the application of low-polygon design to Chinese chess --Take the Chinese chess "knight" as an example **Mr. Wenjie Bai**, Yang Cao, Dong Jia Nanjing Normal University, China In order to promote and protect the Chinese traditional culture of chess, this paper compares the Chinese chess pieces with the Western chess pieces in three modules: the origin of Chinese chess, the contemporary status of the culture, and the philosophical ideas in chess. Using the modern universal design concept, the Chinese chess "knight" is realistically designed by referring to the design of the "Eastern Han Dynasty Bronze Prancing Horse", and adding low-polygonal design elements in MAYA modeling. The support of 3D printing technology and engine technology allows Chinese chess designs to be both physically produced and easily used in the information internet era.

10:45-11:00	**S1019**	Handwritten Grapheme Recognition Using CutMix-Based Data Augmentation **Mr. Zhenrong Zhang**, Xiaolu Zheng University of Manchester, UK used in various challenging images classification tasks. In our paper, we describe Bengali handwritten grapheme classification based on deep learning. We take advantage of a deep learning architecture called convolutional neural networks (CNNs) due to its splendid performance, effectiveness of convolutional operations on many different visual recognition tasks. In addition, we propose Cutmix-based data augmentation to virtually enlarge the training dataset size and avoid over-fitting in performing the further recognition tasks. Comparisons have been made between Cutmix-based data augmentation and other data augmentation techniques (such as flipping, distorting, rotation, mixup) on four widely-used CNN architectures: Inception, ResNet50, DenseNet169 and EfficientNet B1. During experiments, CutMix consistently outperforms the other augmentation strategies on Bengali handwritten grapheme classification tasks, by making efficient use of training pixels and retaining the regularization effect of regional dropout. Unlike previous augmentation methods, our CutMix-trained EfficientNet classifier results in consistent performance gains in Bengali handwritten grapheme detection and handwritten image captioning benchmarks. Moreover, CutMix improves the model robustness against input corruptions and its out-of-distribution detection performances. Therefore, Cut- Mix proved to be a naturally enhanced augmentation strategy with superior concision and effectiveness in classifying Bengali handwritten grapheme.
11:00-11:15	**S1025**	A Query Expansion Method Oriented Sentence Component Similarity Calculation **Ms. Jiwei Yang**, Zenghua Liao, Chunhui He, Bin Ge National University of Defense Technology, China Using short sentences as input for information retrieval can obtain richer semantic features than keywords and their combination. On the basis of Sentence trunk extraction, a Query Expansion Oriented sentence-Component Similarity Calculation (QE-SCSC) is proposed. In this method, keywords of different components in query statements were extracted, and the semantic extension of keywords was carried out from similarity and relevance based on ontology, and the weight of extended keywords is adjusted by comprehensively considering the original weight, relation weight, component weight and proportion. Experimental results show that the QE-SCSC method can greatly improve the query accuracy under

		the premise of ensuring the recall ratio.
11:15-11:30	**S1026**	Research on Full-Chip Programming for Sunway Heterogeneous Many-core Processor **Dr. Wei Wu**, Hong Qian, Qi Zhu, Jue Wang, Xingjian Fan Jiangnan Institute of Computing Technology, China Programming on many-core processors is a challenging task. It's a difficult topic to program and compile on heterogeneous many-core architectures in high-performance computing area. The bottom-level programming support on Sunway many-core processors is insufficient and can hardly satisfy the growing need in applications. This paper conducts an thread accelerated programming model and a multi-mode accelerating thread library on Sunway architectures. A fast thread group mode is proposed, which can reduce the consumption of thread spawn and join according to hardware's features. Compared to GPU, it achieves a speedup of 24.88. We also designs a globally sharing executing mode, which supports many-core acceleration programming from the view of full-chip. Evaluation results on the Parboil benchmark shows that, the average performance is 1.16 times as NVIDIA V100 GPU.
11:30-11:45	**S2007**	The Research and Implementation of Intelligent Reading Assistant System Framework Based on Knowledge Graph **Mr. Jianxuan Zhao**, Huazhen Wang, Xiaofeng Wang, Jin Gou Huaqiao University, China As an significant form of language skills,reading comprehension teaching frequently requires educators to invest a great deal of energy in analysising and designing exercises for articles.Educators aren't capable of analyzing the reading comprehension ability or making personalized plan for every student just relying on manpower.In this paper,we propose an intelligent reading assistant system which provides learners with cognitive assistance in the reading process through the automatic generation model of article knowledge graphs and able to generate exercises through the question chain model based on text knowledge graphs.The system also can construct a learner's reading ability report based on the learner's profile and make a personalized learning path.The system promotes the efficiency of reading comprehension teaching,realizes personalized education and brings new research trends to reading comprehension teaching.

11:45-12:00	**S1027**	Unlucky Explorer: A Complete non-Overlapping Map Exploration **Mr. Mohammad Sina Kiarostami**, Saleh Khalaj Monfared, Mohammadreza Daneshvaramoli, Negar Yousefian, Mahsa Massoud, Aku Visuri, Simo Hosio, Dara Rahmati, Saeid Gorgin Faculty of ITEE, University of Oulu, Finland In this work, we introduce the Maze Dash puzzle as an exploration problem where the agent must find a Hamiltonian Path visiting all the cells with a minimum number of turnings for most cases. We also discuss the real-world application of the problem, such as 8 ball billiards and Snooker games. We investigate different methods by a focus on Monte-Carlo Tree Search (MCTS) and SAT to get an overview of which class of solutions solves the puzzle quickly and accurately. Also, we perform optimization to the proposed MCTS algorithm to prune the tree search. Also, since the prefabricated test cases of this puzzle are not large enough to assay the proposed method, we employ a technique to generate solvable test cases to evaluate the approaches. Eventually, our comparison indicates that the MCTS-based approach is an up-and-coming method that could cope with the test cases with small and medium sizes with faster run-time than SAT. However, for specific discussed reasons, including the features of the problem, tree search organization, and also the approach of MCTS in the Simulation step, MCTS takes more time to execute in Large size scenarios. Our results can be employed to choose a proper approach to create an AI to solve the Maze Dash, 8 ball billiards, and Snooker games.

Session 4

ROOM ID: 94153956205

September 26th | 13:00-14:45 | Teaching Mode and Method

Session Chair:

13:00-13:15	**S2023**	Research on the Design of Task-based Online Learning in Implementing the Flipped Classroom Teaching **Assoc. Prof. Kunping Zhu** East China University of Science and Technology, China Compared with the traditional classroom, the flipped classroom turns from teacher-centered teaching to student-centered teaching for teachers, and from passive learning to active learning for students. The behavior of students' online learning is different from that in the classroom and is affected by the internal factors of learning. Based on the teaching practice of flipped classroom, the statistical characteristics of students' online learning are illustrated. Then, the influence of online activities on the performance learning is analyzed in terms of the stepwise regression. By the curve of platform visits, it reveals that the students' online learning is basically driven by the learning tasks, and the implementation of segmented quizzes is of significant effects on students' learning. Combined with the technical support of the platform, a task-based design for students' online learning is proposed finally, which is conducive to facilitating students' active learning.
13:15-13:30	**S1001**	Exploring the Teaching Reform of Production and Operations Management Course in the Context of New Business Studies **Dr. XU Tiantian** Nanjing Audit University, China The rapid development and extensive use of science and technology have promoted the transformation and upgrading of traditional business, and put forward new requirements for the cultivation of business talents. Under the background of new business studies construction, the curriculum teaching reform of Production and operations management as a core course is imminent. This paper first analyzes the problems in the traditional teaching mode, based on which corresponding reform strategies by combining with the training objectives of the new business studies are put forward to improve the teaching effect of the course. Optimizing teaching content, reforming the teaching methods, cultivating the faculty members and examination method reform based on process

		monitoring are beneficial to improve the teaching effect of the course, so as to train the talents to adapt to the contemporary business environment.
13:30-13:45	**S2009**	Exploration and Practice of Effective Implementation of Online Teaching during the Epidemic Period **Ms. Ming Fan**, Yuwei Yun Xi'an Jiaotong University, City College, China During the epidemic period, teachers will not only be affected by the network environment and teaching software, but also face the challenge of how to improve the classroom teaching effect of online teaching. Taking the course of international business document practice as an example, PDCA is applied The circulation concept is introduced into online teaching. According to the four links of planning, implementation, inspection and feedback, it is carried out through the "vocational education cloud" platform, and combined with the individual entrance test, multi-dimensional interaction, exit test, after-school remedial exercise, challenge questions and group work, the accurate assessment method is adopted to improve the quality of classroom teaching and students' learning effect. Some suggestions are put forward The direction of online and offline hybrid course teaching in the future is discussed.
13:45-14:00	**S2005**	The Historical Review and Future Outlook of Public Administration Degree Programs in Macao——Based on the Comparative Analysis of Three Schools **Dr. Li Jiagui**, Lam Fat Iam, Wang Wan Li Macao Polytechnic Institute, China For more than 30 years, higher education institutions in Macao have offered public administration programs, and among Macao's 10 higher education institutions, the majority of these programs are held in three, namely the University of Macau (UM), Macau Polytechnic Institute (MPI), and Macau University of Science and Technology (MUST). The article analyzes the text of the Official Bulletin of the Macao SAR Government and compares the history of public administration education in Macao between undergraduate, postgraduate, and doctoral levels. This historical review will help promote better development of the discipline. Finally, based on reflective analysis, the article puts forward prospects for the future of the discipline in Macao, such as further improving Macao's higher education public administration programs, exploring the interdisciplinary elements of these programs, expanding and diversifying the enrollment of students in these programs, specifically by increasing master and doctoral programs for Mainland Chinese students, and

		strengthening program cooperation in the Greater Bay Area.
14:00-14:15	**S2019**	Perspectives of Chinese Undergraduates in the US towards Advanced Placement High School Curriculum in China **Ms. Yaxuan Chen**, Liying Xiao Shenzhen Art High School, China The Advanced Placement (AP) curriculum program is a rapidly growing university preparation program that is being adopted by high schools in China. Despite the fast growth of AP high school curriculum programs, and high expectations from students and parents in China, empirical studies exploring the Chinese AP learners' perceptions of their university preparation are limited. This study aims at exploring the AP learners' perspectives on the AP high school curriculum program in equipping them for universities when they are studying in the US. Students' responses to the Chinese AP program were collected through a questionnaire and individual semi-structured interviews. The findings show that students generally felt positive about the AP academic courses, which prepared them for their transition to universities. They also expressed that the English learning environment in the AP program developed English competence. However, they felt disappointed about the lack of teaching of paraphrasing skills, and were frustrated about not gaining much intercultural communicative competence in casual communication. This result sheds light on the under-researched area of the Chinese AP high school curriculum for the AP administrator and curriculum designers.
14:15-14:30	**S2101**	Constructing the Teaching Model of Flipped Classroom for Professional Courses **Prof. Xin Gao** Southwest Minzu University(Airport campus), China A flipped classroom teaching model of Electrical Lighting Technology course is built on the basis of Robert's flipped classroom structure model in this paper. According to the characteristics of the course and students' ability to accept, the teaching content can be divided into three sections and 16 learning topics. Every learning topics include such as pre-class micro-class video, question introduction; class flipped, discussion, Q&A and comment; after-class report submission. The research shows that the teaching model can ravel out the relationship between teaching and learning of specialized courses, and is beneficial to the application of flipped classroom in the teaching of specialized courses.

14:30-13:45	**S2021**	Study on the Application of Information Technology in College Social Science Curriculum **Dr. Jinghan Zeng** Beijing Normal University, China This paper discusses the utilization and application of information technology in the college social science curriculum by studying the practical teaching process of social science courses. We aim at establishing an interactive-experiential classroom that enhances the teacher-student and student-student interaction. We find out that the information technology used in the college social science curriculum consists of traditional method and emerging one. Both of these two methods can effectively improve online and offline classroom interactions. Meanwhile, we argue that the design and reasonable assessment method of a course are also important in achieving an interactive classroom. Integrating advanced technological methods into the traditional teaching mode can attract students' learning interests and improve their study efficiency. This integration can also help improve the quality of college courses, and it is an irresistible trend with the development of times and improvement of the needs of contemporary college students.

Session 5

ROOM ID: 94153956205

September 26th | 15:00-16:30 | Image Analysis and Application

Session Chair:

15:00-15:15	**S1006**	Research on the Cultural Relic Restoration of the Tomb of Xiao Hong in the Southern Dynasties **Mr. Ali Dayoub**, Yang Cao, Dong Jia Nanjing Normal University, China This paper describes the purpose and importance of digital restoration of stone carvings from Xiao Hong's tomb, the characteristics, patterns and structures of these stone carvings, as well as the difficulty of computer repairing the stone carvings and how to make breakthroughs. This paper describes how to progress in the process of digital restoration, the data collection, and the author's views on Xiao Hong's stone carvings. In order to restore the integrity of stone carvings from Xiao Hong's tomb, 3D Max, rhino and other electronic computer technologies are used in the process. The results show that this kind of electronic computer technology combined with the collection of materials can achieve the effect of repairing stone carvings from Xiao Hong's tomb on data, which can give great help in the actual restoration.
15:15-15:30	**S1007**	Research on Three-dimensional Digital Technology Displaying Material Cultural Heritage-- A Case Study of Haechi in Xiaoling Mausoleum of Ming Dynasty **Ms. Zijin Qian**, Yang Cao, Dong Jia Nanjing Normal university, China Ming Xiaoling Mausoleum, as the head of the Ming and Qing imperial tombs in China, represents the highest achievement of stone carving art in the early Ming Dynasty. In order to satisfy the desire of contemporary young tourists to visit material cultural heritage remotely, to fully break through the limitations of the time and space of immovable cultural relics, and to increase the user's immersive experience, this case study uses the stone statue living in the Ming Xiaoling Shinto as the research object. Research on 3D digital technology from the perspective of protecting immovable material cultural heritage, so that 3D digital technology in computer information technology can better shine in the field of cultural relics protection.

15:30-15:45	**S1008**	Research on the Application of VR Animation Technology in Traditional Folk Game Demonstration—— Take the traditional game pyramid in Dunhuang fresco as an example **Ms. Sujuan Zou**, Yang Cao, Dong Jia Nanjing Normal university, China Traditional folk games are often rooted in time-honored local culture and customs. As intangible cultural heritages, many traditional folk games are of great significance to the study of national will and local customs and culture. With the development of VR digital technology, people's research on traditional folk games is no longer limited to local investigation and literature research. This paper will take the traditional game pyramid in Dunhuang fresco as an example to show the research advantage of VR animation technology on traditional folk games. In this way, we can think about the innovative utilization of VR animation technology on intangible cultural heritage and traditional folk games.
15:45-16:00	**S1010**	Research on the Application of VR Animation in the Materialized Display of Traditional Mythological Images--A case study of dragons in the Classic of Mountains and Seas **Ms. Ziwei Song**, Yang Cao, Dong Jia Nanjing Normal University, China In the rapidly changing political and economic structure, the rise of a new generation of animation is accompanied by the loss of the artistic background of animation producers and the continuous exploration of national aesthetics. Reviewing this specific stage, it is not difficult to find that with the reform and development of the new market economy, Chinese animation products have brought penetration growth, but the precious traditional cultural deposits have not been effectively preserved and spread. This paper takes the dragon in the Classic of Mountains and Seas as the research object, aiming to study the advantages of VR animation in the materialized display of traditional mythological images. One of the advantages of VR animation is that it has a higher sense of immersion. Compared with traditional video content, VR animation makes more effective use of existing images and transforms them into dynamic three-dimensional visual effects. It breaks the limitation of time and space to restore the true feelings of ancient Chinese people and achieve the desired visual effects. No matter from the technical or artistic point of view, VR animation provides infinite possibilities for the materialization of Chinese traditional mythological images.

16:00-16:15	**S1011**	The Application and Research of Ink Painting Artistic Characteristics in Ink Animation—— Taking Xu Beihong's Galloping Horse as an Example **Mr. Ruimin Ren**, Yang Cao, Dong Jia Nanjing Normal University, China In the 1960s, ink animation was born in Shanghai Art Film Studio.There is a deep-rooted inheritance relationship between ink animation and traditional art of ink painting.As a form of audio-visual art, ink animation will not be separated from the theme, aesthetic taste and artistic conception of traditional ink painting.The 1950s and 1960s were the "golden age" of Chinese animation, and the title of "Chinese School" also came into being.However, after the 1990s, due to the the separation of artistic value and commercial value, and the impact of foreign commercial animation, ink animation has stagnated. With the rise and development of digital technology and information technology, the application of three-dimensional digital technology expands the expressiveness of ink animation, enriches its audio-visual language, and greatly improves its production efficiency.This paper takes Xu Beihong's galloping horse as an example to study the application of ink painting effect in three-dimensional digital technology. This paper studies the application of ink painting effect rendering technology based on the ramp shader node of Maya platform.In order to achieve the effect of traditional ink painting's artistic features in three-dimensional digital technology, it provides research text for the production of three-dimensional ink animation in the future.
16:15-16:30	**S1013**	Research on the Application of University Map Design Based on GIS Technology **Ms. Xiuying Liu**, Siyu Jia, Yang Cao Nanjing Normal University, China The application development of campus map is a manifestation of the continuation of campus culture. With the development and expansion of the campus, the map is not only practical but also aesthetic, highlighting the cultural heritage of the university and showing the soft power of the university culture. In the emerging cultural and creative industries under the background of economic globalization, the image of colleges and universities has great room for creativity. Therefore, electronic media has become the mainstream development trend and communication channel of cartography. This article takes university buildings as an example to study the application and practice of 3D technology in university maps. Use GIS technology to show the advantages of the building, on the basis of satisfying the positioning accuracy, use the Unity engine to finally realize the effect display.

Session 6

ROOM ID: 94153956205

September 26th | 16:45-18:15 | Modern Information Theory and Technology

Session Chair: Dr. Yuanlin Gu, University of Roehampton, UK

16:45-17:00	**S1021**	Medical Assistant Diagnosis Method based on Graph Neural Network and Attention Mechanism **Prof. Wanchun Yang**, Shurui Zhang, Bozheng Zhang Shandong Jiaotong University, China The electronic medical record contains the patient description information, which can help doctors quickly make the initial clinical diagnosis when facing similar patients. Aiming at the problem of clinical intelligent aided diagnosis, a method based on graph neural network and attention mechanism is proposed. The graph neural network is used to model the label space, and then label classifier based on attention mechanism is used to classify. In the label space modeling, combined with the hierarchical structure of international classification of diseases (ICD), the structure information of label space is integrated into the model. The experimental results show that, compared with the traditional text classification modeling method, the proposed method has a significant improvement in classification performance.
17:00-17:15	**S1005-A**	Data Modelling of the Relationship between Sleep Breathing Disorders and Bioimpedance Signal **Dr. Yuanlin Gu**, Baihua Li, Qinggang Meng, Francesco Lucarelli University of Roehampton, UK Sleep breathing disorders can affect sleep quality, timing or duration and may bring a negative impact on human health. Investigation of the causes of sleep breathing disorders is crucial for the optimisation of the clinical treatment. This Innovate UK funded work aims to establish a quantitative relationship between bioimpedance signal and sleep breathing disorders using data-driven modelling method, and to identify the key impact factors causing sleep breathing disorders. The data was collected from a number of patients using biosensors by UK industrial partner. In particular, apnea-hypopnea index (AHI) index was measured to indicate sleep breathing disorder, and bioimpedance signal of multiple frequencies from 2000Hz to 100000 Hz were recorded. This work proposes a new framework based on nonlinear autoregressive moving average model with exogenous inputs (NARMAX) model, to pre-process the raw bioimpedance signal, extract and generate a number of features, and identify a number of key explanatory

		features that have significant effect on AHI index. These identified features provide a meaningful parsimonious representation of the relationship between sleep breathing disorders and bioimpedance signal. For example, the experimental results show that variance of phase angle of 2000Hz, 16000Hz, 38000Hz, 90000Hz, and variance of impedance at 100000Hz are significant related to sleep breathing disorders. These results are validated by mean square error of AHI prediction. This is the first work to analyse the relationship between sleep breathing disorders and bioimpedance signals. The future work includes investigation of the importance of interaction feature and their effect on AHI index, and further development of the system using more data samples. Moreover, additional machine learning methods such as deep neural network will be applied.
17:15-17:30	**S1015**	Dynamic Allocation Consistent Hashing Algorithm based on Virtual Node Ranking **Mrs. Zeyun Sun**, Zhenghe Liang, Yingying Wu Hohai University, China In the Internet environment, e-commerce and other information enterprises are developing rapidly, and data information is growing exponentnently. Because of the fixed structure, poor scalability, uneven load, low resource utilization and other problems, the traditional database cluster can not bear the load pressure caused by sudden data surge, which may lead to cluster collapse and business paralysis. In order to solve the problem of load imbalances caused by the random calculation of hash function and the difference performance of each node, this thesis proposes a dynamic allocation algorithm based on virtual node ranking (VNRCH) of consistent hash. According to the CPU, memory and bandwidth of the current node, the comprehensive load of the node is calculated, and then the number of corresponding virtual nodes is calculated according to the load. The dynamic distribution of virtual nodes combined with the improved allocation with virtual node ranking can not only promote the cluster load balance, but also avoid the excessive access of nodes. Experiments show that the algorithm improves the performance of load balancing, response time and fault tolerance, and enhances the stability and robustness of the cluster.
17:30-17:45	**S2014**	Testing a design-based Learning Approach to Enhance Elementary Students' Computational Thinking with Experience-Sampling Method **Dr. Xing Li**, Yi Zhang, Jing Huang Jianghan University, China Computational Thinking (CT) is regarded as a key competency for k-12 children in the 21st century. In this project, a design-based learning (DBL) approach was proposed to improve elementary school students' CT. This

		approach included programming skills learning and STEM practices with authentic real-life contexts. We assessed CT in a more accurate manner with experience-sampling methodology (ESM). A quasi-experiment study was carried out to assess how the intervention was associated with students' self-perceived CT skills using event-based experience-sampling methodology. Forty sixth graders engaged in the curriculum units to create artifacts that solve specific real-world problems using Arduino electronic kits and Mind+ programming software. Results revealed that students' self-perceived CT skills increased to a greater extent statistically. Using the experience sampling method, students' self-perceived CT skills has different fluctuations in different stages of DBL, at the third phase of designing artifact, there is a significant decrease because learners are unfamiliar at the beginning of complicated cooperation in depth, which is likely to produce discourse conflicts and reduce efficiency. With the intervention of teachers, learners begin to improve greatly in the later stage. Learners have the highest CT in the iteration and improvement phases of prototype making and the final demonstration stage. In addition, collaboration plays an extremely important role in DBL, especially in the design phase. This study contributes to research in DBL teaching approach, CT instruction, its application in STEM education in particular, and how it can be used in elementary level education in general.
17:45-18:00	**S1023**	Blockchain-based Data Control for Complex Product Assembly Collaboration Process Hongxia Cai, **Ms. Qiqi Tan** Shanghai University, China The collaborative development model of complex products brings the challenge to the data interaction management. There are many manufacturers and suppliers involved in the whole life cycle of the assembly process, which makes it difficult to ensure the data security and traceability. The Hyperledger-Fabric architecture in blockchain technology has modular design, pluggable architecture, complete authority control and security, which can well solve the data security and traceability management in the collaborative development of complex products. Therefore, this paper proposes a framework based on the Hyperledger-Fabric architecture of blockchain for the whole life cycle data management of complex products. We also demonstrate the effectiveness of our proposed new framework integrating blockchain technology through the case of quality data control during the aircraft final assembly collaborative process.

18:00-18:15	**S1022**	Traffic Travel Service Selection based on Hybrid Optimization Algorithm **Prof. Wanchun Yang**, Chenxi Zhang Shandong Jiaotong University, China With the development of information technology in transportation industry, it becomes an important application of intelligent transportation system to provide real-time and effective travel services. The existing traffic travel service composition model is based on the assumption of single request, and it can not build composition according to granularity. Aiming at the problem of requests and granularity, from the two dimensions of transaction and quality of service (QoS) , this paper presents an evaluation model of service composition which considers concurrent requests and multi-granularity. Based on the model, the paper proposed a method based on hybrid optimization algorithm. The proposed algorithm combined particle swarm optimization, crossover and mutation operators with priority, simulated annealing algorithm to get the optimal value. Experimental results show that our approach can guarantee QoS of service selection with low time cost.

Note