

IEEE ICUS 2022
Invited Session Summary

Title of Session

Cognitive Theory and Key Technologies for Educational Robots

Name, Salutation and Affiliation of Organizers

1. Prof. Donghui Hu

Hefei University of Technology, China

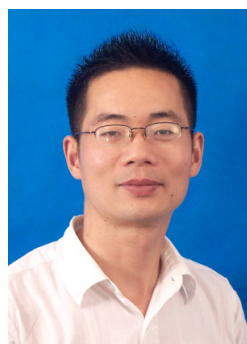
2. Prof. Zhuming Nie

Anhui Normal University, China

3. Prof. Fulong Chen

Anhui Normal University, China

Biosketches of Organizers



Donghui Hu is the director of Network Center of Hefei University of Technology, the vice chairman of Network Security and Information Association of Higher Education in Anhui Province, the deputy director of Education and Scientific Research Computer Network Center in Anhui Province, the member of a council of the Professional Committee of Educational Informatization of Chinese Society of Educational Development Strategy. He is a Professor and PhD Supervisor in the School of Computer Science and Information Engineering, Hefei University of Technology. He has served as the dean of the Computer Department of the School of Computer and Information, and the director of the Institute of Network and Information Security. He received the BS degree in mathematics from the Anhui Normal University, in 1995, the ME degree in computer science and engineering from the University of Science and Technology of China, in 2004, and the PhD degree in information security from Wuhan University, in 2009. He has visited Study Abroad at the University of North Carolina at Charlotte, USA, August 2013-August 2014. He has presided over 2 projects of the Natural Science Foundation of China, 4 projects of a national ministry, 1 major special project of science and technology of Anhui Province, 1 project of Natural Science Foundation of Anhui Province, and more than 20 cooperative projects of various enterprises. His current research interests include intelligent teaching and its privacy security, blockchain and applied cryptography, Internet of vehicles security and forensics, big data security and

privacy protection. He has published more than 100 papers in important journals and conferences at home and abroad, and applied for 14 national invention patents. He serves as a reviewer for many academic journals at home and abroad.



Zhuming Nie is a professor and PhD Supervisor of the School of Educational Science at Anhui Normal University, the executive dean of the Institute of Intelligent Education of Anhui Normal University, the deputy director of Information Management Center of Anhui Normal University, and a visiting scholar of Southwest College in the United States. He has also served as the director of Global Chinese Conference on Inquiry Learning (GCCIL), the standing director of the Information Technology Education in Primary and Secondary School Professional Commission of China Education Association and the Artificial Intelligence Professional Committee of Educational Technology Association, and the deputy director-general of the Education and Training Committee of the China Command and Control Association. His research interests focus on the policy of educational informatization and the construction of mobile and online learning environment. He has published more than 40 papers, edited more than 10 textbooks and presided over more than 20 projects and twice been awarded the National Master of Education Excellent Teaching Management Worker, the Second Prize for National Teaching Achievements and the Provincial Prize for Teaching Achievements. He also been employed as a consultant of the Expert Group on Informatization Teaching Guidance of Vocational Colleges in Anhui Province, an invited expert of the Expert Bank of Education Informatization in Shandong Province, a member of the Expert Group of the Construction Committee of "Strengthening and Reinforcing" in Guangdong Province, and an editorial board member and external review expert of journals such as Open Education Research and Journal of Higher education. He has also successively served as the judges of the National Teaching Achievement Award, the National Post-doctoral Research Fund, the National Normal Students' Micro-Course Competition and the National Master of Education Teaching Competition.



Fulong Chen is a professor and doctoral supervisor of Anhui Normal University, reserve candidate for academic and technical leaders in Anhui Province, and Wenjin scholar and famous teaching teacher of Anhui Normal University. Now he is the vice dean of School of Computer and Information of Anhui Normal University, the director of Anhui Engineering Research Center of Medical Big Data Intelligent System, and the vice director of Anhui Key Laboratory of Network and Information Security. His interests include Cyber-Physical System and its security. In recent years, he has presided over 2 National Natural Science Foundation projects and more than 10 scientific research projects such as Anhui Natural Science Foundation projects, Anhui key R & D projects and Anhui Science and technology plan projects, and so on. He has published more than 100 academic papers in TCSS, WWW, MICPRO, MSN and other journals or conferences. He obtained 18 invention patents, 28 utility model patents and 23 software copyrights. He edited or deputy edited 15 books.

Details of Session

The educational robot is a representative of the application of robotics in the field of education and is a typical application of artificial intelligence, speech recognition and bionic technology in education. It is aimed at developing students' analytical, creative and practical skills. The future goal of educational robots is to think, act and interact like 'real people'. Cognitive theory, artificial intelligence, speech recognition and bionic technology are the underlying theories and key technologies for the future development of educational robots and the criteria for assessing the applications of educational robots for implementation. However, educational robots are in the early stages of development, facing many problems such as insufficient teaching, poor feedback and lack of perceptiveness. There is an urgent need to build educational cognitive maps, improve learner models, innovate question-and-answer and dialogue systems, accurately describe key state information such as learners' emotions and concentration, and design typical application models based on key supporting technologies in the field of artificial intelligence. It also uses the basic theories of cognitive science and disciplines such as psychology and education to strengthen research in knowledge mapping, machine learning, natural language processing and affective computing to help learners achieve their learning goals at different stages and meet their core needs such as a sense of autonomy, competence and belonging.

The invited session invites original papers of innovative ideas and concepts, new discoveries and improvements, and novel applications relevant to the following selected topics of “Cognitive Theory and Key Technologies for Educational Robots”.

- Cognitive Theory of Educational Robotics
- Educational Cognitive Map
- Learner Models
- Educational Question and Answer and Dialogue Systems
- Robot Teachers
- Special Education and Safety Education Robots
- Educational Robot Application Models