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International Summer School

Leading Computer Science, Creating the Future

Aug 1st-Aug 14th, 2022

Harbin Institute of Technology, Harbin, P.R.China

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GENERAL INFORMATION

To thoroughly implement the requirements of "Opinions on Strengthening the Training of Talents in Basic Disciplines"; to take the road of independent training of talents in basic disciplines; to adhere to the world's scientific and technological frontier, main economic battlefield, major needs of country and well-being of people; to comprehensively carry on our Party's educational policy and implement the fundamental task of morality build and cultivation, basic research talents should be vigorously cultivated for national innovation and development. Relying on advantages of our department in domestic artificial intelligence technology, intelligent interconnection and solid foundation of teaching and scientific research, the International Summer School will be held by the slogan of "Leading Computer Science, Creating the Future". It is planned to be held from August 1st to August 12th, 2022 (for two weeks), which aims to focus on the frontier knowledge of International AI development and essential research directions of basic disciplines; stimulate students' interest in the field of AI; strengthen inter school student communication; help top students in basic disciplines; establish young academic partners, and lay the foundation for building an international academic community of basic disciplines ahead.

Artificial intelligence (AI) of Computing Department in HIT embodies the achievements of more than 60 years of professional development of computer professionals, carries decades of research results of computer application technology, and relies on the powerful research and teaching team to cultivate a new group of outstanding scholars who have returned from overseas (approved by the Ministry of education in 2019). Although this major is the "youngest", it is still powerful and possesses solid foundation. Also, AI has its own characteristics. As early as 1958, it developed Chinese first digital computer that can speak and play chess, and gradually formed a computer discipline with the characteristics of HIT. The computer science and technology discipline on which it relies is one of the first batch of national key disciplines. In 2011, it entered the top 1% of computer discipline ranking list of ESI World University. Since 2012, it has been ranked fourth in the national computer first-class discipline by the Ministry of education for many times, among which, once the quality of talent training ranked the third. In 2020, it was approved as a provincial

first-class undergraduate major construction site. This major possesses excellent teaching and practice conditions, three university enterprise joint laboratories, and various software and hardware practice platforms such as man-machine dialogue platform, UAV, intelligent perception, etc.

Summer school is open to undergraduates in HIT, C9/E9 universities, and universities cooperating with Russia, etc. On the basis of the experience of previous summer schools, we aims to enrich and refine the excellent tradition; closely follow the requirements and objectives of talent training in basic disciplines; highlight the distinct theme of artificial intelligence; design teaching links that improve knowledge and ability layer by layer; take the teaching of courses in the field of artificial intelligence as the guide; intersperse cutting-edge lectures that broaden international vision; and organize research on topics that integrate theory with practice; comprehensively improve students' practical ability.

COURSES AND LECTURES

1. Courses

Arrangement	Speaker	Title	University	Course	Credit	Credit Hours
Courses (1 out of 3)	Gaurav Sharma	Professor	University of Rochester	Graphical Models and Probabilistic Inference	1	16
	Francesco Amigoni	Professor	Polytechnic University of Milan	Multi-Agent and Multi-Robot Systems	1	16
	Karabulatova Irina	Professor	Lomonosov Moscow State University	Multimodal Communication Technologies of Manipulation in Mass Media and Mass Media and Issues of Information Security	1	16

2. Lectures

Arrangement	Speaker	Title	Lectures	Credit	Credit Hours
Technique Lecture	Joseph Sifakis	Turing Prize Winner Professor		1	
	Zhang Hongli	Professor	Cyberspace Security Issues and Challenges		4
	Wang Zhongjie	Professor	Evaluation of Software Engineering Technology Solutions from the Perspective of Sociology		4
	Liu Xianming	Professor	Trustworthy AI: Theory and Application		4
	Che Wanxiang	Professor	A New Paradigm of Natural Language Processing: A Method Based on Pre-training		4

3. Project Practice

Arrangement	Speaker	Title	Course	Credit	Credit Hours
Subject Research (1 out of 9)	Wang Yadong	Professor	Research on Big Data Analysis Algorithm of Chinese Genome Based on Deep Learning Model	1	1 week
	Liu Bo	Professor	Research on Efficient Encoding and Decoding Methods for DNA Data Storage	1	1 week
	Wang Hongzhi	Professor	Paxos Algorithm Implementation	1	1 week
	Wang Hongzhi	Professor	Automatic Recommendation of Machine Learning Algorithm	1	1 week
	Wang Hongzhi	Professor	Storage and Indexing of Graph Data	1	1 week
	Ding Xiaoou	Assistant Professor	Indexing Large-scale Knowledge Maps Using AI Dynamics	1	1 week
	Zou Zhaonian	Professor	Using AI to Dynamically Select Storage Structure for Large-scale Knowledge Map	1	1 week
	Liu Shaohui	Associate Professor	Video Target Detection and Tracking	1	1 week
	Liu Shaohui	Associate Professor	Design of Image and Video Information Hiding Algorithm	1	1 week

INVITATIONAL TOURNAMENT OF AI INNOVATION

The competition adopts the method of proposition: given a task, students can use the zero-threshold AI development platform easyDL provided by Baidu, to develop and modify the model. Finally, all works will be ranked according to the effect of the task. This Invitational tournament enables students to have a deeper understanding of AI-related technologies through competitions.

INTRODUCTION TO COURSES AND LECTURERS

1. Prof. Joseph Sifakis, Emeritus Research Director at Verimag laboratory. His current research interests cover fundamental and applied aspects of autonomous system design focusing on self-driving cars.

2. Prof. GAURAV Sharma, IEEE fellow, Professor of the Department of computer science, biostatistics, computational biology, electrical and computer engineering, University of Rochester, and outstanding researcher in the field of scientific data science. Prof. GAURAV Sharma mainly majors in color imaging, image processing, multimedia security, bioinformatics, genomic signal processing, etc.

3. Francesco Amigoni, Prof. of Politecnico di MILANO, a senior member of IEEE, member of AAAI and AI*IA, studies autonomous mobile robots, multi-agent systems, etc.

4. Prof. Karabulatova Irina, chief researcher of machine learning and Semantic

Analysis Laboratory of Advanced Institute of artificial intelligence and intelligent systems at Lomonosov State University in Moscow. Prof. Karabulatova Irin won the honorary title of the Republic of Kazakhstan and also is known as "Russia's leading psycholinguist".

5. Zhang Hongli, Dean, professor and doctoral advisor of Cyberspace Security faculty, Department of computing, Harbin Institute of technology. Prof. Zhang was selected into the national high-level talent program and the distinguished professor of Longjiang scholars.In order to meet national needs of network and information security, she majors in information content security, network security, data security, etc.

6. Wang Zhongjie, deputy director of computing Department in Harbin Institute of technology, Dean, professor and doctoral supervisor of the national exemplary software faculty, as well as deputy director of service computing committee of Chinese Computer Federation. Prof. Wang majors in service computing, software engineering, business analysis and optimization, cloud computing and edge computing.

7. Liu Xianming, tenure professor, doctoral supervisor and assistant dean of computing in Harbin Institute of technology, has won National Natural Science Foundation of China Fund for Young, and an academic leader of the Young Scientist Studio of Harbin Institute of technology.

8. Che Wanxiang, tenure professor, doctoral supervisor, vice president of Artificial Intelligence faculty, the deputy director of Social Computing and Information Retrieval Research Center, Young National High-level Talents, the young scholar of "Longjiang scholar" of Heilongjiang Province, and visiting scholar of Stanford University.

ATTENDANCE REQUIREMENTS
International summer school welcomes sophomores and juniors of relevant majors (computer science and technology, software engineering, Internet of things, big data, artificial intelligence, information security, bioinformatics, communication engineering, automatic control, electrical engineering, etc.) from overseas cooperative colleges and domestic well-known universities. Courses are taught in English, which requires students to have relatively strong English listening and speaking skills.