The 1st TLU-Hosei International Joint Webinar

Recent Progress in Intelligent Robotics and Media Information Processing

November 5th (Thu), 2020

This webinar introduces advanced research projects on intelligent robotics and media information processing under the joint auspices of the engineering faculties of Thuyloi University and IIST: *Institute of Integrated Science and Technology*, Hosei University to promote international research and educational collaboration among their affiliated schools.

OPENING REMARKS
06:00-06:05 (UTC), 13:00-13:05 (VST), 15:00-15:05 (JST)
Prof. Dr. Nguyen Trung Viet,
Vice President of Thuyloi University, Hanoi

SESSION 1
TLU RESARCH PROJECTS
06:05-07:20 (UTC), 13:05-14:20 (VST), 15:05-16:20 (JST)

Robots and Intelligent Mechatronic Systems
Professor Nguyen Van Khang and Dr.-Ing. Nguyen Huy The
Department of Mechatronic Engineering, Thuyloi University

Some research results on Robot and UAV control and Application
Dr. Nguyen Dang Khoa and Dr.-Ing. Pham Duc Dai
Department of Control Engineering and Automation, Thuyloi University

Artificial Intelligence for Vietnamese Speech Applications
Dr. DO Van-Hai,
Faculty of Computer Science and Engineering, Thuyloi University

INTERMISSION
07:20 – 07:30 (UTC), 14:20-14:30 (VST), 16:20-16:30 (JST)
Robot Demonstration I (Hosei University)
07:30 – 07:40 (UTC), 14:30-14:40 (VST), 16:30-16:40 (JST)
Coffee Break
07:40 – 07:50 (UTC), 14:40-14:50 (VST), 16:40-16:50 (JST)
Robot Demonstration II (TLU)

SESSION 2
IIST RESEARCH PROJECTS
07:50 – 09:05(UTC), 14:50-16:05 (VST), 16:50-18:05 (JST)

Bio-inspired robot- How does intelligent behavior emerge?
Professor Kazuyuki Ito
Department of Electrical and Electronics Engineering, Hosei University

Towards intelligent robots operating in human environment
Professor Genci Capi
Department of Mechanical Engineering, Hosei University

AI based intelligent media processing
Assoc. Professor Jinjia Zhou
IIST: Institute of Integrated Science and Technology, Hosei University

CONCLUDING REMARKS
09:05-09:10 (UTC), 16:05-16:10 (VST), 18:05-18:10 (JST)
Dr. Kazuo Yana, Professor of Applied Informatics
Director of IIST: Institute of Integrated Science and Technology,
Hosei University, Tokyo

Robots and Intelligent Mechatronic Systems

Prof. Nguyen Van Khang and Dr.-Ing. Nguyen Huy The

(Department of Mechatronic Engineering, Thuyloi University)

ABSTRACT: Robotics plays a particularly important role in the 4.0 industrial revolution. Therefore, since 2018, Thuyloi University has opened a major in Mechatronics, including a sub-major in Robotics and intelligent mechatronic systems. From 2019, Department of Mechatronic Engineering was established at Thuyloi University to deal with students in Mechatronics. Currently, Thuyloi University annually enrolls about 200 to 300 students in Mechatronics. This report presents some research directions of the Department of Mechatronic Engineering and some key subjects of the major Mechatronics. In addition, some proposes to cooperate with Hosei University in training and research in robotics has been presented.

BIOSKETCH:

Nguyen Van Khang worked at Hanoi University of Science and Technology from 1965 to 2008, as a Professor and Head of Department of Applied Mechanics. From 2007, he joined at Hanoi University of Business and Technology, as a Professor and Head of Department of Mechatronics. He was an invited professor at Bremen University, Germany (1993-1995) and at Department of Mechatronic Engineering, Thuyloi University (2017-present). He is currently President of Vietnam Association of Dynamics and Control, Representative of Vietnam in International Federation for the Promotion of Mechanism and Machine Science (IFToMM). He has published over 200 scientific papers. His research interests include nonlinear dynamics and control of robots and mechatronics system.

Nguyen Huy The received the B.E. degree and M.Sc. degree from Hanoi University of Science and Technology, in 2003 and 2005, and the Dr.-Ing. degree from Technische Universität Berlin, in 2011. He was a lecturer and researcher at the Department of Theoretical Mechanics, Hanoi University of Mining and Geology, during 2003-2015 and 2017-2019. From 2015 to 2017, he was research assistant at the Department of Mechatronics and Machine Dynamics, Technische Universität Berlin. In 2019, he was joined as a Head of the Department of Mechatronic Engineering, Thuyloi University, Hanoi, Vietnam. His research interests include energy harvesting systems, robot with flexible joints and flexible links.

Some research results on Robot and UAV control and Appliaction

Dr. Nguyen Dang Khoa and Dr.-Ing. Pham Duc Dai

(Department of Control Engineering and Automation, Thuyloi University)

ABSTRACT: The Unmanned Aerial Vehicles (UAVs) have been well-known as an automatic robot helping people carry out the hard and dangerous works. Their applications attracted significant interests of researchers. And we consider the flight control algorithms for UAV, special the quad-rotor UAV. Firstly, all UAVs will be tested in the simulation as software in the loop simulation (SILS) and hardware in the loop simulation (HILS) to ensure that the UAV can work well with the design platform, control algorithm and under different condition environment. Secondly, the design UAV system will be demonstrated for the real flight. The goal of control is to achieve a safe flight for the UAV. And the UAV can do particular missions from the users such as: the tracking waypoint in the outdoor environment, position control in the indoor environment, tracking target with some recognizations. Besides, the integrated system with more sensors as well as the internet of things are also considered in our field.

BIOSKETCH:

Nguyen Dang Khoa M.Sc. degree in Information technology from Hanoi University of Science and Technology, in 2011 and 2012, and the Ph.D. degree in Aerospace Engineering program from Ulsan University, Korea, in 2018. He worked at Thuyloi university since 2018, as a lecturer in the Faculty of Electrical and Electronic Engineering. His research interests include the control algorithm of robots and special UAV.

Pham Duc Dai received the B.E. degree and M.Sc. degree from Hanoi University of Science and Technology, in 2002 and 2004, and the Dr.-Ing. degree from Technische Universität Ilmenau, Germany, in 2015. He was a lecturer at Thuyloi Univesity since 2004. From 2016 to present, He worked as a vice Dean of the Faculty of Electrical and Electronic Engineering and as a Head of Department of Control Engineernng and Automation. His research interests include: Optimization for large scale systems, Optimal control for processes; Model predictive control; robot control.

Artificial Intelligence for Vietnamese Speech Applications

Dr. DO Van-Hai (Faculty of Computer Science and Engineering, Thuyloi University)

ABSTRACT: Speech recognition and speech synthesis have been developed for decades, so why are they just now hitting the mainstream? The main reason is that deep learning made speech recognition accurate enough and speech synthesis be asymptotic to the human voice. In this talk, I will give a brief introduction of speech related applications. After that, several case studies in Vietnam will be presented which include: phone call monitoring for customer service call center, social listening for audio/video sources, call-bot and virtual assistance, etc. Finally, I will show several challenges and opportunities for speech technology.

BIOSKETCH:

Dr. DO Van-Hai received the Ph.D. degree in computer engineering from the Nanyang Technological University, Singapore, in 2015. He was a Postdoctoral Researcher with the Advanced Digital Sciences Center, Singapore. He is currently a Lecturer with Thuyloi University, Hanoi, Vietnam, and a Senior Scientist with Viettel Group, Vietnam. He has authored or coauthored more than 20 international journal and conference papers. His research focuses on speech and speaker recognition, speech synthesis.

Bio-inspired robot- How does intelligent behavior emerge? -

Prof. Kazuyuki Ito, (Department of Electrical and Electronics Engineering, Hosei University)

ABSTRACT: The goal of our Laboratory is to answer the question "What is intelligence?". In the conventional framework of Artificial Intelligence, we assume that intelligence is realized by our brains, and it can be replicated by huge computer programs. However, there is much rebutting evidence in the real world. For example, some lower creatures have no brains, nevertheless their adaptive behavior looks intelligent. This fact implies that apart from the brain, there is another mechanism that produces intelligence. To explore this mechanism, we focus on the interaction between the body and environment, and we are developing various bio-inspired robots that produce complex intelligent behaviors using very simple control algorithms. In this talk, I explain our framework to produce intelligent behavior, and show you various bio-inspired robots that was developed in our laboratory.

BIOSKETCH:

Kazuyuki Ito received his PhD from the Tokyo Institute of Technology in 2002. In 2002, he joined the Department of Systems Engineering, Okayama University as a Research Associate. In 2005, he joined the Department of Systems and Control Engineering, Hosei University as an Assistant Professor. He is currently working as a Professor at the Department of Electrical and Electronics Engineering, Hosei University. He received the Young Investigator Excellence Award from the Robotics Society of Japan in 2003, the Funai Information Technology Award for Young Researchers in 2004, the Science and Technology Award from the Okayama Foundation for Science and Technology in 2004, the IEEE Intelligent Systems Best Paper Award in 2012 and 2020, and the Kisoi Motohiro Award (Academic Achievement) from the International Rescue System Institute in 2013.

Towards intelligent robots operating in human environments

Prof. Genci Capi, (Department of Mechanical Engineering, Hosei University)

ABSTRACT: Due to the ageing problem and man power shortage, robots are, or soon will be, used in such critical domains as search and rescue, hospital care, mine and bomb detection, scientific exploration and law enforcement. Such robots must coordinate their behaviors with the requirements and expectations of human team members. In addition, they must integrate and process sensor readings in order to perform the desired tasks, autonomously. However, the real deployment of autonomous robots in everyday life environments is still a challenge due to the unpredictable changes in the environment, the robustness of the performance, and time required to learn new tasks. This talk will address recent results obtained in the Human Assistive Robotics Lab, Hosei University. Particular attention will be put on the following issues: Brain Machine Interface; Deep Learning for robot operation in human environments; and rehabilitation robotics.

BIOSKETCH:

Genci Capi received the B.E. degree from Polytechnic University of Tirana, in 1993 and the Ph.D. degree from Yamagata University, in 2002. He was a Researcher at the Department of Computational Neurobiology, ATR Institute from 2002 to 2004. In 2004, he joined at the Department of System Management, Fukuoka Institute of Technology, as an Assistant Professor, and in 2006, he was promoted to Associate Professor. In 2010, he was joined as a Professor at the Department of Electrical and Electronic Systems Engineering, University of Toyama, Toyama, Japan. He is currently a Professor at the Department of Mechanical Engineering, Hosei University, Tokyo, Japan. His research interests include intelligent robots, BMI, multi robot systems, humanoid robots, learning and evolution.

AI based intelligent media processing

Assoc. Prof. Jinjia Zhou, (IIST, Hosei University)

ABSTRACT: Recently, deep learning brings promising approaches for media processing such as super resolution, video frame interpolation, video/image colorization, style transfer, etc. In this talk, I will overview the exiting AI based intelligent media processing works. And then, some proposed learning based video compression and quality enhancement technologies will be introduced. Finally, I will show experimental results and comparison with the state-of-the-art literature.

BIOSKETCH:
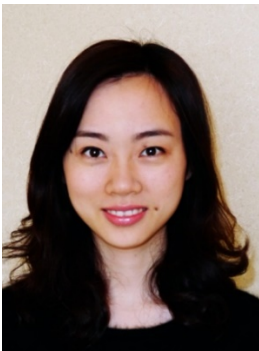
Jinjia Zhou received B.E. degree from Shanghai Jiao Tong University, China, in 2007. She received M.E. and Ph.D. degrees from Waseda University, Japan, in 2010 and 2013, respectively. From 2013 to 2016, she was a junior researcher with Waseda University, Fukuoka, Japan. Currently, she is an Associate Professor and a co-director of the English based graduate program at Hosei University. She is also a senior visiting scholar in State Key Laboratory of ASIC & System, Fudan University, China. From 2020, She is also a specially appointed Assoc. Prof. with Osaka University. Her interests are in algorithms and VLSI architectures for multimedia signal processing. Dr. Zhou was selected as JST PRESTO researcher during 2017-2021. She received the research fellowship of the Japan Society for the Promotion of Science during 2010-2013. She is a recipient of the Chinese Government Award for Outstanding Students Abroad of 2012, and received the Hibikino Best Thesis Award in 2011. She was a co-recipient of ISSCC 2016 Takuo Sugano Award for Outstanding Far-East Paper, the best student paper award of VLSI Circuits Symposium 2010, and the design contest award of ACM ISLPED 2010. She participated in the design of the world-first 8K UHDTV video decoder chip, which was granted the 2012 Semiconductor of the Year Award of Japan.