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Invited Talk V

Development of functional hierarchy for actions and motor imageries: a synthetic neurorobotics experiment

Prof. Jun Tani

Korean Advanced Science and Technology (KAIST), Korea

Abstract: In this talk I introduce a neuro-robotics experiment on developmental learning of goal-directed actions. The robot was trained to predict visuo-proprioceptive flow of achieving a set of goal-directed behaviors through iterative tutor training processes. The learning was conducted by employing a dynamic neural network model which is characterized by their multiple time-scales dynamics. The experimental results showed that functional hierarchical structures emerge through stages of developments where behavior primitives are generated in earlier stages and their sequences of achieving goals appear later stages. It was also observed that motor imagery is generated in earlier stages compared to actual behaviors. Our claim that manipulable inner representation should emerge through the sensory-motor interactions is corresponded to Piaget's constructivist view.

Speaker Bio: Jun Tani received a B.S. in Mechanical Engineering from Waseda University, a dual M.S. in Electrical Engineering and Mechanical Engineering from the University of Michigan, and a Dr. Eng. from Sophia University. He started his research career in Sony Computer Science Laboratory in 1990. He worked as a PI of the Lab. for Behavior and Dynamic Cognition, Brain Science Institute, RIKEN in Tokyo from 2001 to 2012. He also held the position of Visiting Associate Professor at the Univ. of Tokyo between 1997 and 2002. He became a full professor in Electrical Engineering Dept. in KAIST 2012 where he started cognitive neurorobotics. He is interested in neuroscience, psychology, phenomenology, complex adaptive systems, and robotics.