The Department of Mechanical Engineering/College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar

Professor Il Hong Suh
Intelligence and Communications for Robots Laboratory (InCorl)
Hanyang University, Korea

"Challenges for Gregorian-level Robot Intelligence"

Friday, Feb 4th, 2011, 2PM, Room 173 Engineering Building

Abstract

One of the most renowned philosophers of our day, Daniel Dennett, said in his book "Kinds of Minds" that our minds are complex fabrics, woven from many different stands and incorporating many different designs. Dennett has classified minds into four different types in evolutionary perspective and the Gregorian creatures is the highest level of mind, using language as a tool of both modeling and acquiring information for survival.

Now a day, robots such as Sony's AIBO and Honda's ASIMO, has reached a high level of development stage in a sense of reaction or regulation technology. Even in areas requiring the most complicated understanding of interaction world, such as expertise and planning, which are believed to be part of the Gregorian creatures, the level of development has reached a high level stage. However, the intelligence in this area is not applicable to all robots and tasks in its current stage but is restricted to specialized areas such as the Deep Blue, which is a professional system that wins against world chess champions, or STRIPS, a task planning system. This kind of Gregorian intelligence within a restricted area can be seen as a narrow AI. Thus, we can say that General AI abilities have not yet been developed; therefore interaction, common sense, and vision, the intelligence of Gregorian creatures, are in a relatively low stage of technological development. This area of intelligence is easily used by humans, but it is extremely difficult for robots to realize this area of intelligence. This is because in the case of humans and other intelligent animals, they have various computational modules considered as cognitive substrates being utilized for various objectives that have been evolved over a long time and which are all embedded in the brain. Unfortunately, such specific modules that being currently used are not clear, and even if we specifically know what modules are used, there are insufficient specific knowledge on why those modules are used, and in particular how to model such modules.

In this talk, some necessary conditions for Gregorian-level robot intelligence are discussed by considering four levels of intelligence arising from evolution. There will be discussed what are key features of intelligence at each level of evolution, what has to be considered to implement each level of intelligence, and what difficulties are expected in achieving Gregorian-level robot intelligence. In addition, there will be shared some design experiences for challenging Gregorian-level intelligence at InCorl, Hanyang University.

Biography

Il Hong Suh received the BS degree in Electronics Engineering from Seoul National University, Seoul, Korea, in 1977, and the MS and PhD degrees in electrical engineering from the Korea Institute of Science and Technology (KAIST), Seoul, in 1979 and 1982, respectively. He is a full professor at Department of Computer Science and Engineering, College of Engineering, Hanyang University, Seoul, Korea. In 2009, he has founded a National Robotics-Specialized Education Consortium (RoSEC), and is now serving as leader of RoSEC to foster professionals for intelligent robot industry.

Dr. Suh has been involved in a number of Korea National Projects such as Intelligent Robotics Frontier Research Program for 21st Century, and CASPER (Context-Adaptive Synthetic Perception and Learning for Robots) under support of Ministry of Knowledge and Economy. His research interests lie in the area of communications and intelligence for robots including semantic robot intelligence, action-coupled perception and learning, and robot software platform for cognition and control. He has published more than 170 contributions in robotics, intelligence and control. He was President of Korea Robotics Society for 2008. And, he has served as a Regional Editor for Intelligent Service Robotics, Springer since 2007, and has served as an associate Editor for IEEE Transactions on Robotics since 2010.

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