

Field:

Medical/Neuroscience

Session Topic:

Modeling Brain Circuits, Brain/Machine Interface - Learning

Chair:

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Robots, especially human-form robots that we call humanoids have been seen in some technological scene with interest for years. There were two major approaches to realize behaviors of these robots. One is to teach explicitly the robot what to perform by such as programming. And the other is to let the robot figure out what to do for oneself by some learning method such as reinforcement learning. Recently, a new approach of imitation related to the latter is proposed. In the approach, the robot learns novel behaviors by observing the behavior of others. Since the robot itself and the environment are complex, programming of robot is simply too hard. And, it is difficult to describe complicated behaviors for the robot in detail sufficiently. It is also difficult to specify how the robot should adapt to novel conditions. The learning based approach has the theoretical potential, however, it is too weak right now to learn from small information given to the robot. The trial of coordination learning of small sets of behaviors have shown some interesting results, but it exposed the lack of scalability to the higher level behaviors. The imitation learning approach may enable the robot to learn novel behavior by observing other intelligent agents. The new approach can be seen as teaching by showing i.e. programming by demonstration. Or the approach can be seen as slightly improved learning paradigm that gathers in much rich information. Imitation is an established and controversial subject in psychology, cognitive science and brain science as mirror neurons or empathy. This session may draw a picture of some reflections of these human-machine modeling and designing issues.