Out of Reach and Out of Sight: Examples of autonomous tool use in robots
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Abstract

The ability to use tools is one of the hallmarks of intelligence. Tool use is fundamental to human life and has been for at least the last two million years. A large number of animals have also been observed to use tools. This suggests that the ability to use tools is an adaptation mechanism used by many organisms to overcome the limitations imposed on them by their anatomy. Despite the widespread use of tools in the animal world, however, studies of autonomous robotic tool use are still rare. This talk will describe two studies in which a robot was able to overcome the sensorimotor limitations of its own body through the use of tools. The first study describes how a robot can learn the functional properties (i.e., affordances) of stick tools and later use them to solve extension of reach tasks. The second study describes how a robot can achieve video-guided behaviors, i.e., how a robot can use a real-time TV image as a feedback mechanism to guide its own reaching actions toward an object that can only be seen in the TV image.

Biography

Alexander Stoytchev joined the Iowa State faculty in August, 2005. Stoytchev's research interests are in the areas of Developmental Robotics, Autonomous Robotics, and Computational Perception. In the fall of 2005, he designed and taught the first-ever graduate class in Developmental Robotics. Stoytchev has won prestigious awards from both his undergraduate and graduate institutions. He won the Best Student in Computer Science award at the American University in Bulgaria. He also won the Outstanding Technical Paper Award at the Georgia Institute of Technology’s student paper contest sponsored by SAIC. Currently, he is a Co-PI on several research grants funded by the Air Force Office of Scientific Research and the John Deere Company.

Thursday, March 29, 2007 at 3:30pm
223 Atanasoff Hall
Refreshments will be served!