Computer Science Colloquium

Autonomy and Interface Support for Human Robot Teams: Coping with Fan-Out

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Olsen 311
Refreshments at 2:30, Talk from 3:00-4:00

As the reliability of robot (both ground and air vehicles) autonomy increases, there is less need for a human to continuously interact with a single robot. It is natural to want to use the resulting "free time" available to the human to do other useful things. Perhaps the most compelling argument is that this free time should be used to manage multiple robots. Olsen defined fan-out as the maximum number of homogeneous robots that a single human can control. Although much work needs to be done to refine the fan-out model, the model can be used to determine an upper limit on the number of robots that a single human can control as a function of the robot's autonomy and the interface design. Within this upper bound are a number of open issues, such as:

- How much can be gained by improving the interfaces used to control the robot or support operator decision making.
- How much can be gained (and at what cost) by making robots more autonomous.
- How much can be gained by adding autonomy to support team coordination using, for example, team plays.
- How human coping strategies and lessons from human factors confound predictions from the model.

In this talk, I will present a survey of interface design techniques, autonomy support, and human factors studies that address some of these issues from the point of the fan-out model.

Bio. Michael A. Goodrich received his Ph.D. in electrical and computer engineering from Brigham Young University in 1996. His dissertation topic applied work by the Philospher Isaac Levi to intelligent control. From 1996-1998, he was a post-doctoral researcher at Nissan Cambridge Basic Research, a lab sponsored by Nissan Motor Company. His work during this time focused on identifying and modeling some of the human factors concerns associated with adaptive cruise control. Since 1998, he has been with the Computer Science Department at Brigham Young University where he is currently an associate professor. His primary research interests are in human robot interaction for both ground and air robots, and in multi-agent learning.