Human-Robot Dynamic Social Interaction
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Project Overview

NTT researchers are interested in the question of whether a physical robot produces a more direct emotional coupling with human beings than does a computer generated graphical image of a similar robot. At MIT we are building a robot that has human-like facial expressions and shoulder and neck gestures, and that perceives human motion and facial expressions. This is coupled to an emotional system so that the person and the robot naturally follow normal human communication social dynamics. This robot will be installed at the NTT Communications Science Laboratories in Kyoto where the response of human subjects will be measured and compared to their response a graphical face interface.

Progress Through June 2001

After initial experience with the Kismet 2 delivered to NTT in the second half of 2000, and with our own version of that robot (Lazlo), we realized that there needed to be some redesign of the robot before the final version was constructed. We have completed that redesign and commenced fabrication of the final pair of robots (one for NTT and one to stay here at MIT). The parts have all been completely designed and have been sent to subcontractors for fabrication. As with the earlier version of the robot there are many metal parts which are being machined. We have also made extensive use of rapid prototyping techniques for the exterior parts of the head.

In addition we started work on a new set of vision and control libraries for NTT. These all run under the QNX operating system. We have made them somewhat robot independent and have tested them on three robot platforms at MIT—Cog, Lazlo, and the original Kismet. The motor control libraries allow for the control of both the robot already delivered to NTT and the new one under fabrication. The vision libraries provide a number of capabilities not currently available at NTT. They include a log-polar based vision system, a visual attention mechanism, visual capabilities such as smooth pursuit and the vestibular-ocular reflex, and face finding.

Research Plan for the Next Six Months

During the period from July 2001 to December 2001 we will fabricate the final version of Kismet, and the new facial system. We will carry out extensive mechanical and control testing of this robot and then deliver it to NTT.

We will finalize the motor control and vision libraries and deliver them to NTT.

We will begin work on a better face finder, a new gaze detector, and some rudimentary facial expression classification. This will give the robot further capabilities not available to the graphics robot simulation developed at NTT.