CSC 714 Project Report 1

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Motion Tracking with the RCX and Quickcam

Project URL: http://www4.ncsu.edu/~jjwinega/714proj.html

Solved Issues

• Joe: Built a rotating RCX, complete with rotation sensor and webcam mounted on top. This was more difficult than expected due to the added weight balancing on a single pivot point and the drag of the stiff camera cable.
• Joe: Wrote a program to test accuracy of rotation sensor. It is pretty accurate down to a resolution of 22.5 degrees. Slightly off sometimes due to momentum of turn when motors are shutoff, but much more accurate than guessing a delay time as in previous projects.
• Joe: Designed a message type for sending actuator commands from tower to RCX. To optimize, each message will be a single char value, with the first bit indicating the direction (right/left), and the other 7 bits the angle. This only allows for a maximum angle of 127 degrees, but this is well beyond the field of view of the camera so that shouldn't be a problem.
• Dan: Evaluated Improv software for work with webcam, but found that it did not work very well and does not meet our needs for image processing.
• Dan: Wrote software to grab frames from the webcam at a periodic rate. The images are displayed in a window using the QT windowing toolkit.
• Dan: Developed framework for passing control information to a communications layer to communicate with the RCX.

Open Issues

• How to best deal with the heavy, stiff camera cable dragging behind the RCX when it is turning?
• What turning speed to use to balance quick reaction time with accuracy?
• Which image processing routines to use to track motion of an object.
• How to control RCX based on results from image processing, i.e. how far to turn the camera if the target object is on the left side of the screen.

**Next Steps**
• Joe: Write code to implement the message protocol and convert it into actuator commands by 4/14.
• Joe: Figure out how to send IR messages from the tower to the RCX, and write code to do so by 4/21.
• Dan: Finish image processing routines by 4/14.
• Dan: Finish controller routines by 4/21.
• Both: Merge IR communication code with motion-tracking code and test by 4/27.