

CSC 714 Project Report 1

Team:

Daniel E. Huber dehuber@ncsu.edu
Joel J. Winegarden jjwinega@ncsu.edu

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.