Abstract

Objective of my research is to build a robot with fuzzy logic to control its motion. The robot in discussion has to follow a predefined path with minimum of deviation. A Microchip PIC16F877 microcontroller is being used in this process integrated with a few ultrasonic sensors (to measure the distances).

The robot I initially designed had no motion controller built in it and thus was prone to some errors in its movements thus slowing it down. To avoid this I am working on trying to incorporate a fuzzy logic controller into it. The purpose of choosing fuzzy logic instead of a proportional controller was when I simulated my robot model I saw that fuzzy logic was giving me better results.

I initially built a Simulink model to simulate the robot and then I tested its performance using two different controllers (P and Fuzzy Logic). After it was clear that the fuzzy logic controller was working better I programmed my microcontroller. This was done using a PIC C compiler. Due to memory and speed constraints I had to add another microcontroller and I am testing the whole system right now.
This is the result obtained when comparing fuzzy and proportional controller. It is clear from the above graph that the system has reached a steady state lot faster using a fuzzy controller than a Proportional controller. The P-controller was tuned with Genetic Algorithms for optimum results.

**Plan for spring 2005**

As the research is in its final stages I would like to finish it and then defend my thesis at the end of this semester. Also if time permits I would like try to implement another controller in the PIC to compare with the fuzzy logic controller.