Robotics Program Documentation

Introduction

The purpose of this document is to document good-to-know information about the robotics program. Information on the robot itself and the robot's environment can be expected to be documented here. For example, documentation can include the battery life of the robot, maximum speeds of the robots, and the robot's performance. More detailed documentation on the robot can be found in the 3pi robot official documentation at Pololu's website at https://www.pololu.com/.

Battery life

When the 3pi robot power level reads at about 2.3 volts has the m3pi expansion kit (mbed and xbee), the robot will shut off printing battery level every 0.2 secs.

The 3pi robot power level will read at about 5.3 volts when freshly recharged batteries are used. In this case, the batteries were only recharged a few times, so they were practically new.

Speed

The speed the robot can reliably track lines is determined by its PID control variables and coefficients. The 3pi robot can track lines smoothly with PID control. PID stand for proportional, integral, derivative. These are variables that are used with coefficients in a formula to determine the speed at which the robot must turn to stay in a good position along the line. Different coefficients affect how reliably the robot can track lines at different speeds and at different tracks (like a grid or a big circle).

- `The robot can track lines reliably at a max speed of 40 on a grid with PID control formula: power = proportional/20 + integral/10000 + derivative*3/2;`

- `The robot can track lines reliably at a max speed of 70 on a grid with PID control formula: power = proportional/20 + integral/10000 + derivative*3/2;`

Links to support for 3pi robot

Support found on Pololu's website

- Product page of 3pi robot - https://www.pololu.com/product/975
- Resource page of 3pi robot; collects links to 3pi starter guides, reference to library commands, sample projects, videos, and more - https://www.pololu.com/product/975/resources
- Pololu 3pi Robot User's Guide; a guide introducing the robot and how to program it - https://www.pololu.com/docs/0J21
- Pololu AVR Programming Quick Start Guide; a guide on getting, installing, and using software needed to program the 3pi robot - https://www.pololu.com/docs/0J51
- Pololu AVR C/C++ Library User's Guide; a guide on use of the AVR C/C++ library - https://www.pololu.com/docs/0J20
- Pololu AVR Library Command Reference; a reference to the Pololu AVR library commands - https://www.pololu.com/docs/0J18

Atmel support

- Atmel Tools Documentation - http://www.atmel.com/webdoc/

Mbed support

- Mbed Handbook; home page for mbed documentatoin - https://developer.mbed.org/handbook/Homepage

AVR support

- AVR Libc Home Page - http://www.nongnu.org/avr-libc/