Project Title: Pixel Bot
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Project Goal

We will create a robot that, when given a raster image, will generate a line-drawing version on a whiteboard using dry-erase markers.

Project Approach

The robot will have two armateurs holding markers. The attached dry erase marker will have two states, a lifted state and a drawing state. The robot will split the image it was given into sections, and draw out one section at a time on the whiteboard by moving in rows. If time permits, we will attach magnetic tank tracks onto the robot, letting it move on the whiteboard as it draws.

Resources

We intend to use the mbed as our controller. We will use stepper motors to drive the device forward as well as to position the armateurs that will hold the markers to write on the drawing surface. The main device will be a simple metal housing that will hold the processor, wheels, motors, and the armateurs to hold the markers. If possible, we would also like to devise a way to make the robot move across a whiteboard that is magnetized so it will be able to write while traversing a board that is already mounted on a wall. This additional implementation is considered by us to be 'optional' if time permits us to do so. In this way, we can develop the core mechanism to completion before considering this optional extension.

Schedule

- October 21st: Charter (this document).
- October 28th: Choice of platform and equipment proposal finalized.
- November 4th: Eclipse simulation model with controller logic
- November 11th: Eclipse code deployed onto robot.
- November 18th: *Mini project update:* Demonstrate stepper motor motion and robot drawing arms
- November 25th: Measure stepper motor and armateur sensitivity, modify simulation model
- December 2nd: Measure drawing effectiveness.
- December 9th: System testing, measure accuracy of drawings
- December 16th: Demonstration video and presentation made
- December 17th: Final presentation.
- December 19th: Project and video turned in.

Major Deliverables:

A drawing bot, control program, and image interpretation program.

Constraints:

The principal constraint for our project will be time. As such, the scale of the project will be limited by the time we are able to spend developing and testing it.

Risk and Feasibility

There are potential risks specific to our decision to invent our own hardware device versus using something off-the-shelf (e.g., an iRobot). Specifically, we recognize the concern of our limited timeframe to develop the three principal parts of our project: 1) The hardware device itself, 2) the software control for our custom hardware and 3) the algorithms to read a jpeg and produce a version compatible with our control software. Moreover, since we are designing the hardware device ourselves, this leaves us with limited capacity for simulation. To mitigate these concerns, we are allowing for the absence of some of our ambitions in the final project if time doesn't permit their implementation (e.g., the magnetized version).