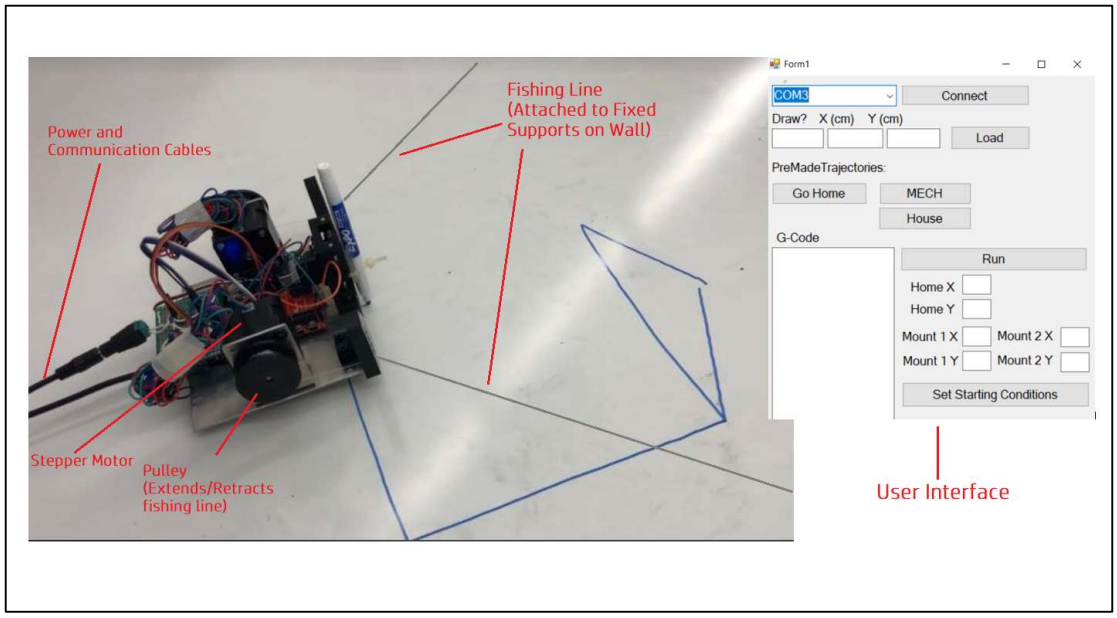
Wall Drawing Robot

MCU Firmware Development, C#, GUI Development, Mechanical Design

Description:
In this project, myself and a partner designed a wall-drawing robot which could autonomously draw any shape or text on a vertical surface such as a wall or a whiteboard. The rationale behind creating such a device was that even though there are many pen-plotters available on the market which function similar to a 2-axis CNC, in some applications it is desirable to have a device which can draw on vertical surfaces. These applications include creation of murals, menu displays at restaurants/cafes, and drawings/text on classroom whiteboards.

We independently conceptualized the idea of this robot and then designed all aspects of the device from scratch. This involved the overall mechanical design, motor selection, electrical design, firmware development for MCU, and GUI development using C#.

A video demonstration of the device can be seen here: https://youtu.be/2GK8COWo1Lo



Key Specifications:

- MCU – MSP430 by TI
  - Programmed in C++ using Code Composer Studio IDE
- User Interface – Created using C# .NET Framework
  - Allows user to jog robot to specific positions and traverse custom trajectories
  - Commands sent in pseudo-G-Code
  - UART packet communication between PC and MCU
- Mechanical Design – Modelling done in Solidworks
  - Parts manufactured using Waterjet Cutting, 3D Printing, and Drill Press