

Project Status Report: Drawing Robot

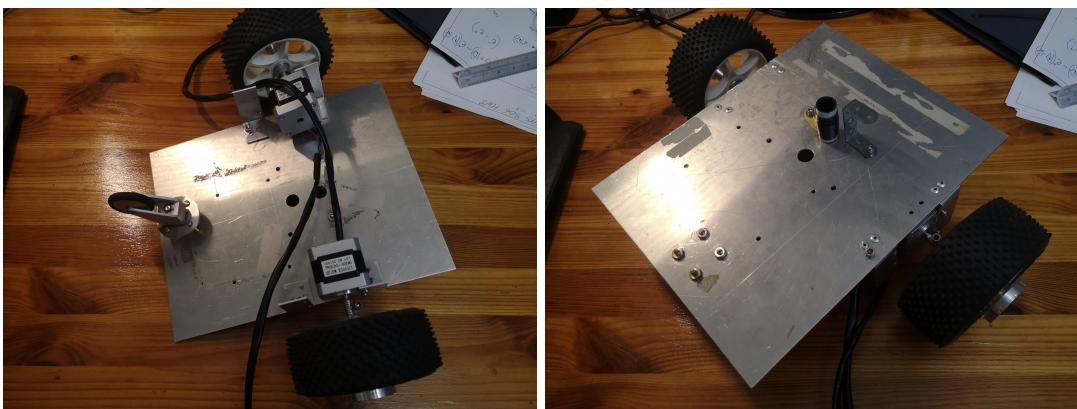
Introduction/Reminder

Originally, my intention was to create a CNC plotting machine that would use two stepper motors to move a drawing tool around a 2D grid to create a drawing. Following a discussion with Andrejez, I changed my project to instead create a drawing robot on 3 wheels (2 driving wheels using stepper motors and 1 driven wheel).

Below is the status of the 3 sections of my project.

1. Hardware

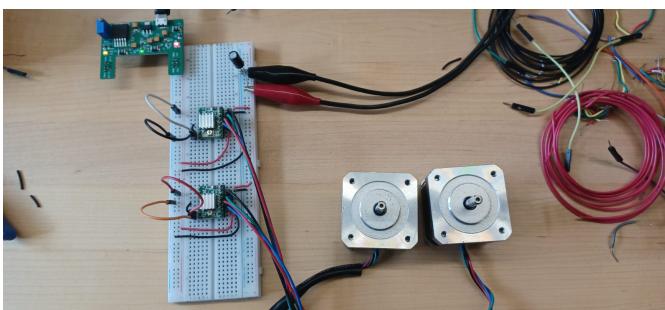
- All necessary hardware was acquired. All parts were available in lab, except for A4988 stepper motor drivers, which were purchased on Amazon.
- A platform with 3 wheels was acquired. Andrejez machined the axles of 2 wheels to fit the stepper motors.
- The majority of the robot was assembled in lab 2, with Andrejez's help for drilling/parts. Photos below:



Hardware to-do: Assembly of pen deployment system - the pen will be lifted off the drawing surface using a servo motor.

2. Circuitry

- A circuit for driving the 2 stepper motors using A4988 stepper motor drivers and a 15V voltage source (from the power supply on the lab desks) was created.
- The circuit was tested by manually sending pulses to it with the UBC power supply's 5V output.



Circuitry to-do: Test by sending pulses to the drivers using the Hantek. Then try to do the same with the MSP430 (see software section). Eventually, would be good to acquire a ~15V DC power supply (from a laptop or similar) to use instead of those on the lab desks.

3. Software

This section has not been started yet.

Software to-do:

1. Test sending pulses to each of the stepper drivers using the MSP430's PWM.
2. Test controlling the pen deployment/retraction system.
3. Determine the relationship between the rotation of each wheel and the position of the pen on the drawing surface.
4. Devise a system (library, set of functions, etc.) to easily send desired pulses to perform a certain movement (ex: what would the instruction "move 30 in X" correspond to in terms of stepper motor pulses?).
5. Write code to draw a simple shape.
6. (bonus) Figure out how to convert any 2D drawing (potentially even in g-code) into instructions for the robot.