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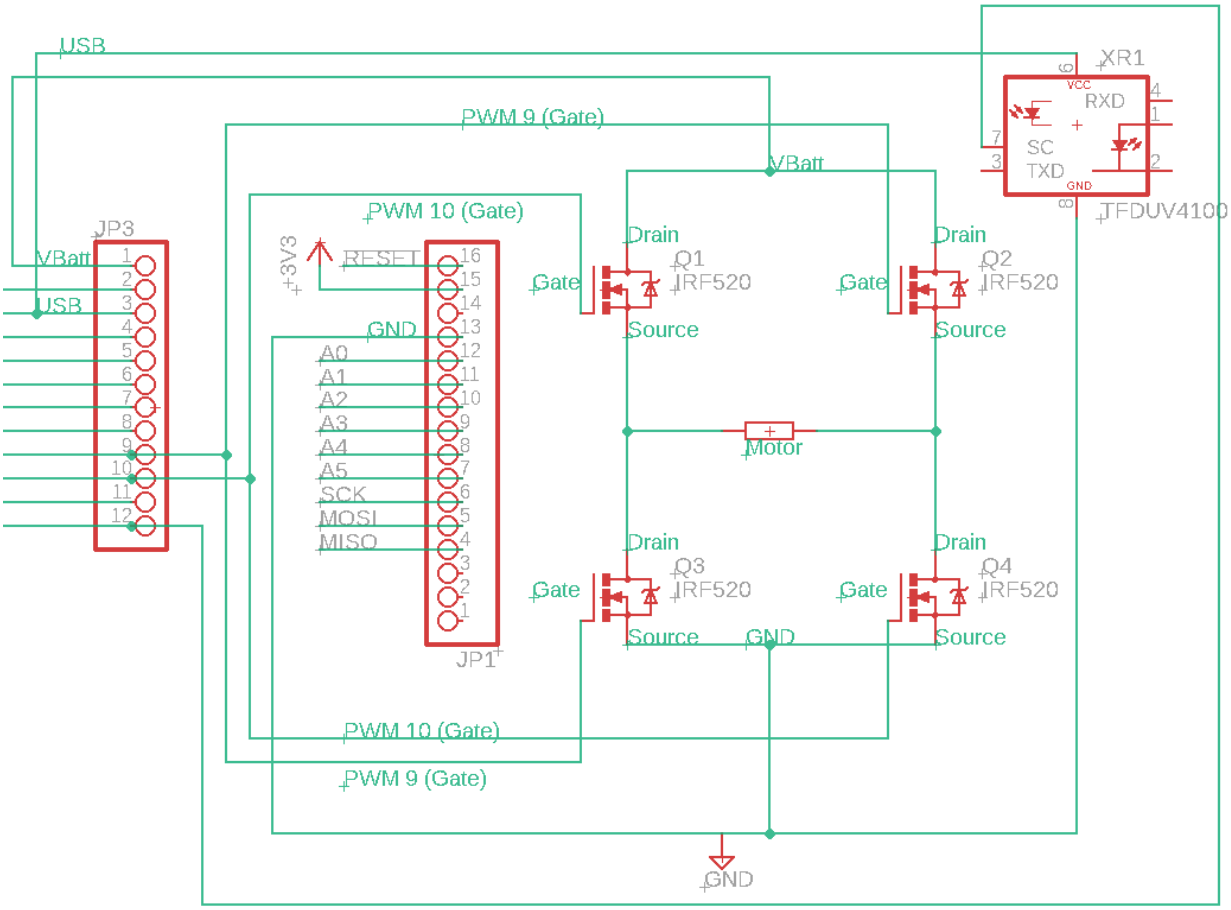
ECE 370 Lofaro

Project 1 Report

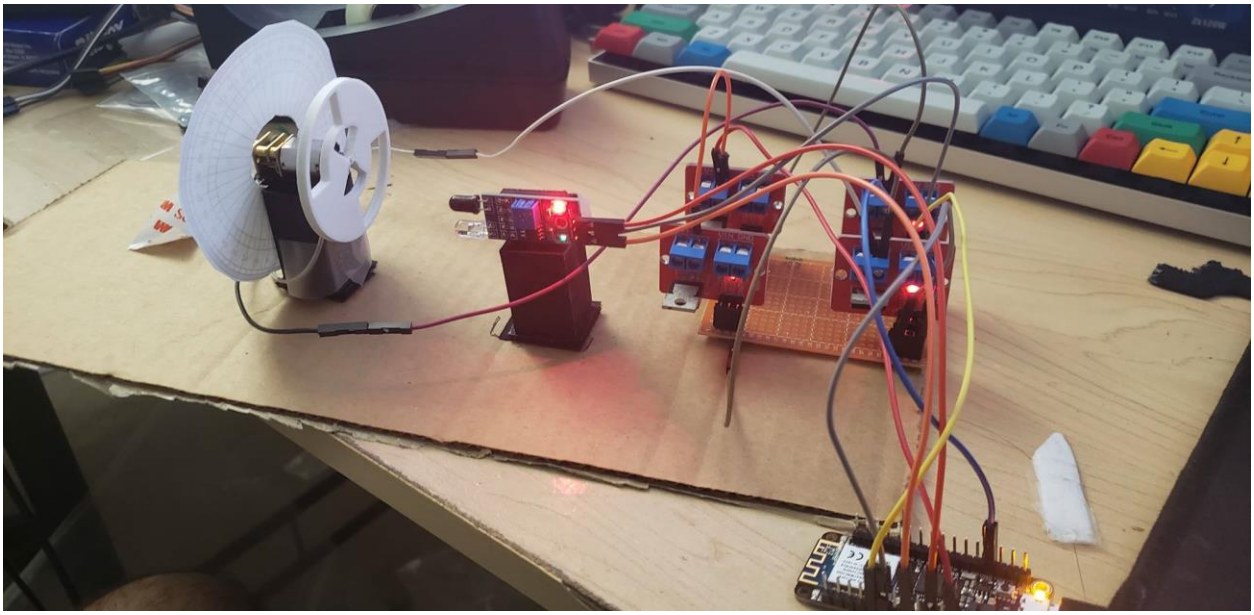
In this project we aim to achieve servo-like functionality from a dc motor connected to an h-bridge.

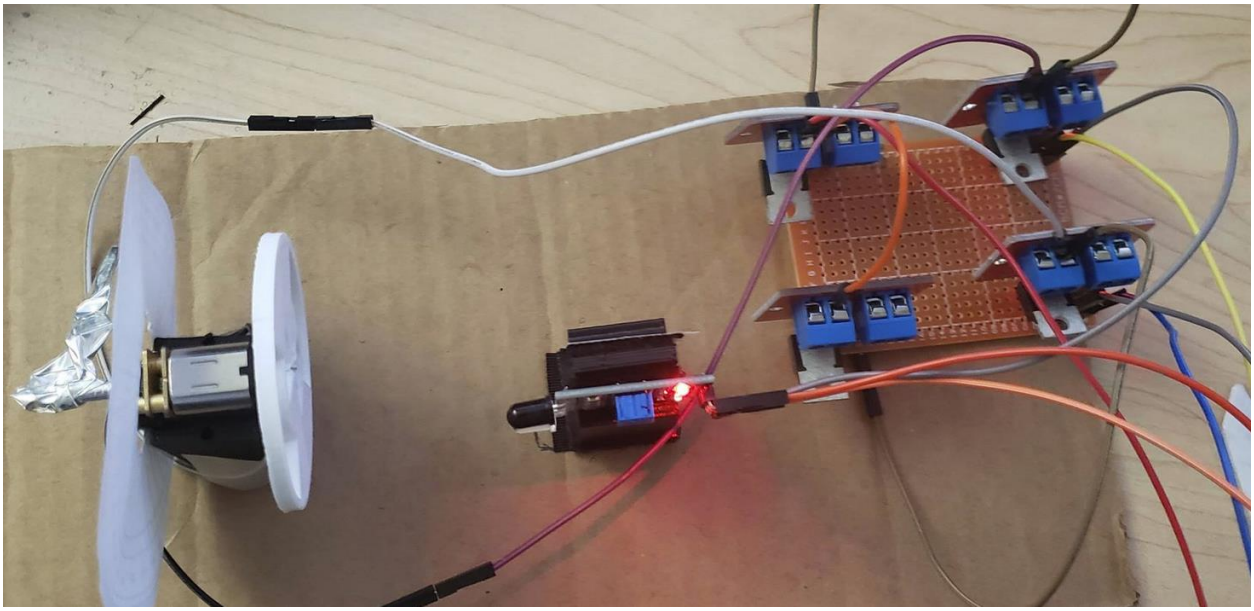
Video Link: https://www.youtube.com/watch?v=j5QY9VoIu1I

Schematic:



Images of setup:





Pseudocode:

Check if serial input is given,

Read int given by serial input and convert that to number of rotations that angle represents

Stop motors if the current tick number and number of ticks is equal, resetting them as well

Otherwise, if the number of ticks is nonzero move the motors in the desired direction.

Read from the IR sensor while the total number of ticks to complete is nonzero, incrementing whenever an obstacle is detected

When two obstacles have been detected in total, one tick has been completed and increment current tick number. Reset obstacle detection count.

Results Table:

Expected Angle (Degrees)	Actual Angle (Degrees)
0	0
45	30
90	50
180	185
360	370
720	950
-45	-35
-90	-60
-180	-175
-360	-340
-720	-930
-721 (err)	Error
721 (err)	Error

These results are within expected range of the actual values, and large angle measures given to the servo produce larger errors as the wheel has too much inertia at high speeds for a longer period. Additionally, very small angle measures produce smaller amounts than required as the encoder wheel does not have enough time to spin up to the desired speed, and thus have too many detections over a short period of time by the IR sensor, making the wheel turn to a much shorter angle than required.