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ENEL 351 Project Proposal

Purpose: To operate as a delivery robot for UR Housing Services. Made prevalent during Covid-19 period when students were required to self isolate for 14 days. Previously, housing staff was required to make these deliveries and while masked and taking correct precautions there is still a potential risk of contamination. This will reduce and potentially negate this risk.

Microcontroller: STM32F103RB

Actuators/Sensors/Batteries: Distance sensor, Line sensor, light sensor. Potentially 9V batteries. Will also make use of DC motors and PWM most likely and potentially servo motors for turning 180 degrees.

Chassis: Ordered from a Tomons robot parts kit.

For my ENEL 351 Design Project, I plan on creating a self-directed delivery robot that will be controlled from our STM32F103RB microcontroller. It will follow a course that will make of a dark line/tape that will guide the robot along the course leading to each door. When it detects that a room door has a line as well, it will rotate and make use of both a distance and line sensor to be able to detect a QR code on each door to detect that this is the room to be delivered to. It will be able to detect the correct distance to be able to snapshot a picture of the QR code for the light sensor. The light sensor will likely have to make use of a servo motor rather than a DC motor which will be used for the wheels. PWM is something that will also have to be implemented for the DC motors as well. I will make use of 5V DC motors that will be powered from the Nucleo board that operated at a max RPM of 6000.

Some additional features I may look to implement is a speaker on the robot that will detail its current status. Ranging from Delivery in Progress, Idle and Package Delivered. Another, potential inclusion are LEDs to highlight its status such as Green LEDs detailing that a Delivery is in Progress and Red LEDs to detail it is currently dropping off a package and a Purple LED to showcase that it is scanning the QR code.

As for the chassis for the robot, I will be ordering a robot kit from Tomons that will serve as the body of the chassis. Sensors will be provided from various vendors.

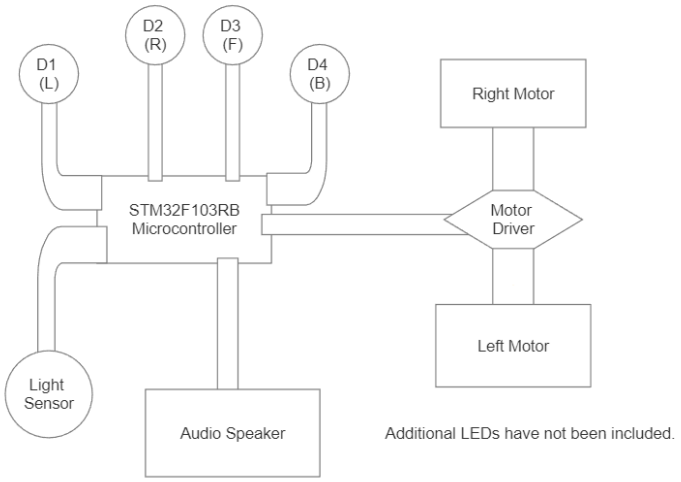

Figure 1. Block Diagram for a Delivery Robot