Enel 387 Project Proposal – Jan 22, 2020

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For my ENEL 387 project, I intend to develop a small autonomous robot controlled by an STM32F100 microcontroller. The robot will navigate a course by following fixed walls and navigation lines . It will use ultrasonic and infrared distance sensors to maintain a separation of approximately 5 cm from the walls. It will have the ability to detect openings or obstacles in its path. It will have the ability to sense its home location and halt when that location is detected. The ultrasonic sensor will be mounted on an R/C servo and will be able to rotate through a 180 degree arc. The R/C servo will require a PWM output from the microcontroller. The drive motors will operate at 12V. They will require an appropriate motor controller to interface to the outputs of the STM32F100.

Additional features may include, but are not limited to, an audible warning device to alert users to the presence of the robot or to indicate emergency or return to home conditions, flashing lights for the same purposes, motor encoders for additional velocity feedback, and the ability to map the corridor and offload the data at the home location.

The chassis of the robot will be constructed using Lynxmotion robotics parts from Robotshop.ca. Sensors and actuators will be sourced from various suppliers as required. The system will be powered by a 12V rechargeable battery with appropriate regulators as required.
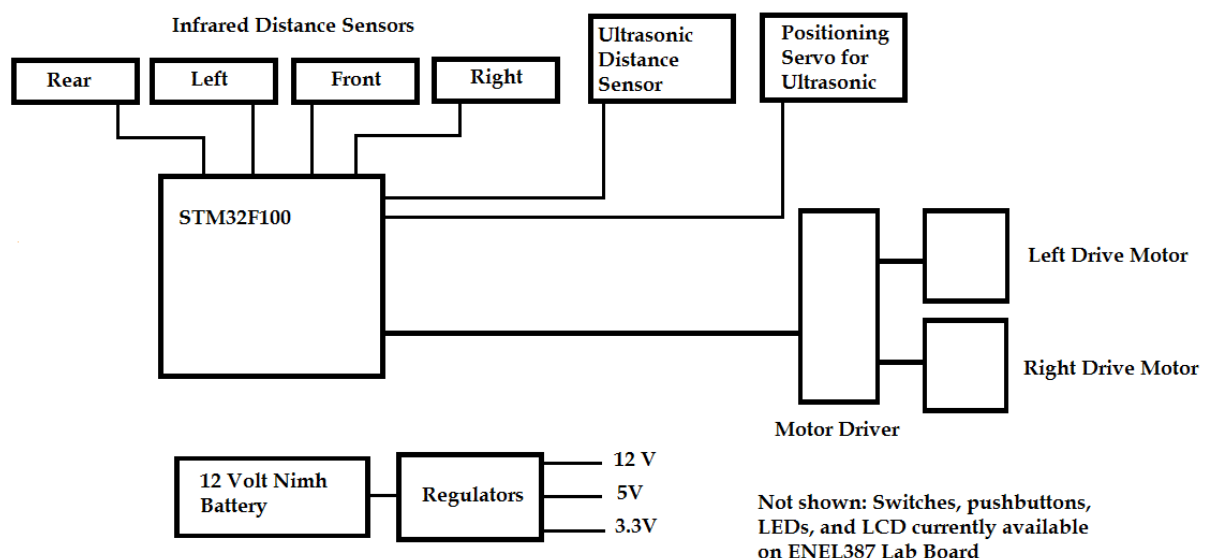

Figure 1: Simplified Block Diagram for Autonomous Robot System