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ECE 153B

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Project Proposal

Wireless Item Dispenser

Project Website

- https://sites.google.com/view/ece153b-proj-alejandrod

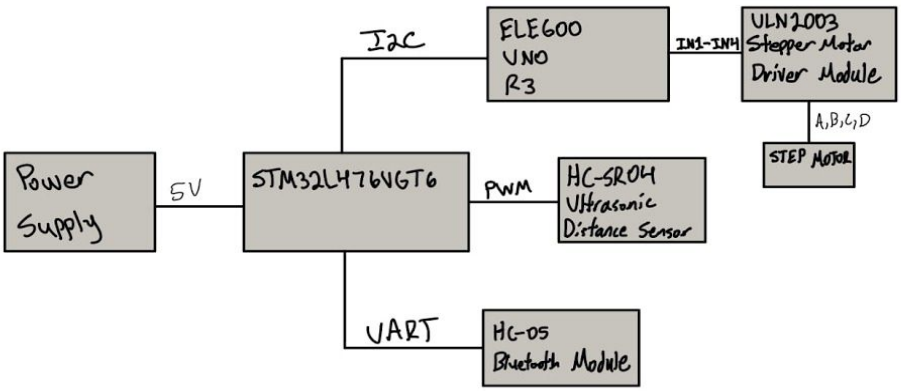
Objective

The Wireless Item Dispenser solves modern-day health precautions by minimizing the spread of germs. This dispenser has the functionality to be triggered via Bluetooth or detected within close proximity of an ultrasound sensor then will instantaneously set a stepper motor to open or close the dispenser. The dispenser shall remain open for a long enough time interval in order to dispense approximately 1-2 items.

Peripherals (external to STM32L476 board)

1. HC-05 Bluetooth Module
2. ULN2003 Stepper Motor & Driver Module
3. HC-SR04 Ultrasonic Distance Sensor
4. ELEGOO UNO R3 Controller Board

Block Diagram



Responsibility

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- Everything :,)

Software Structure

1. Initialize GPIO Pins for all devices (HC-05, Uno R3, HC-SR04)
2. Initialize I2C on both boards to set up communication (UNO R3 = Master, STM32L476VGT = Slave)
3. Initialize and configure UART to set up communication with HC-05 Bluetooth Module
4. Initialize an interrupt for when a valid input from HC-05 is received. This interrupt with trigger the dispense() function
5. Configure PWM signal that triggers the ultrasonic sensor (PE11) then set up input capture (PB6) to find time space in order to calculate distance.
6. Set up interrupt handler to computer pulse width.

7. If distance is close enough, enable interrupt that has STM32L476 send data to UNO R3 in order to dispense an item