Parking Assist System: Phase 2
Version 1

Jeffin Jacob

1 Hardware Components

The Parking Assist System Prototype consists of:

1. Arduino Nano

2. HC-SR04 Ultrasonic Sonar Distance Sensor

3. 5V Buzzer

These 3 components are connected by a half-size breadboard and 8 male to male jumper wires. Power is provided to the Arduino Nano by an M1 MacBook Air via a USB-C to Micro-B cable.

2 Software Components

The codebase consists of:

- `sensor_task()`

- `setup()`

Sensor Task is a FreeRTOS task that pulses the ultrasonic sensor to determine the relative distance of nearby obstacles. It then updates a state variable accordingly. *Setup* initializes all tasks and semaphores.

3 Test Scripts and Patterns

3.1 Sensor-Task Test

Sensor-Task Test is responsible for verifying the functionality of Sensor Task. Sensor-Task Test runs concurrently, alongside Sensor Task, prompting the tester, via serial output, to place an obstacle at various distances from the sensor, and checking whether the state variable has been correctly updated, conveying the result to serial output.

4   Images
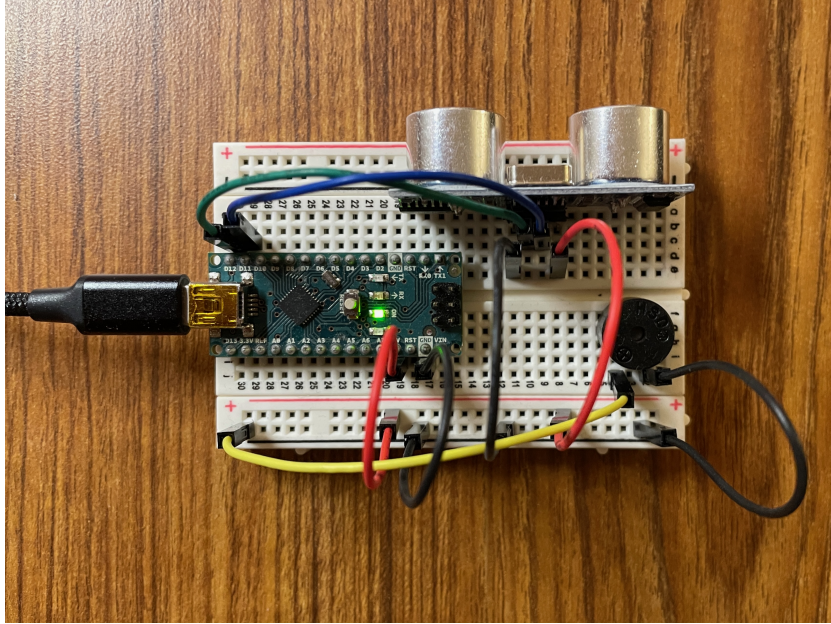

Figure 1: Parking Assist System Prototype

5   Observations and Notes

5.1   Progress

The project is 50% complete. I have a working Sensor Task, which writes the system's state; now, I need to implement a *Buzzer Task*, which will read the system's state and sound the buzzer at the appropriate frequency.

5.2   Setbacks

A minor setback has been the conversion of the duration of ultrasonic pulses to distance. Further testing must be done to determine the accuracy of the current implementation.