

**Project Title: Final Project (Backup Beeper)**

**Lab Course: CpE 185 Section 2**

**Lab Instructor Name: Sean Kennedy**

**Lab Day: Tuesday 6:30 pm**

**Team Members:**

**Ryan Aboueljoud,**

**David Quintanilla,**

**Xavier Howell**

Name	Bitbucket Username	Bitbucket Email
David Quintanilla	dquint54	dquint54@gmail.com
Ryan Aboueljoud	raboueljoud_csus	raboueljoud@csus.edu
Xavier Howell	xhowell	xavierhowell@csus.edu

**Project Description:**

We will be using a raspberry pi to control an ultrasonic sensor that will detect the distance between the sensor and a nearby object in front of it. When the distance between the sensor and object is relatively far a green light will be lit, as the object moves closer to the sensor a yellow light will then turn on and a slow rhythmic beep will start. When the object is very close to the sensor a red light will be displayed and a faster beep will occur to indicate dangerously close proximity.

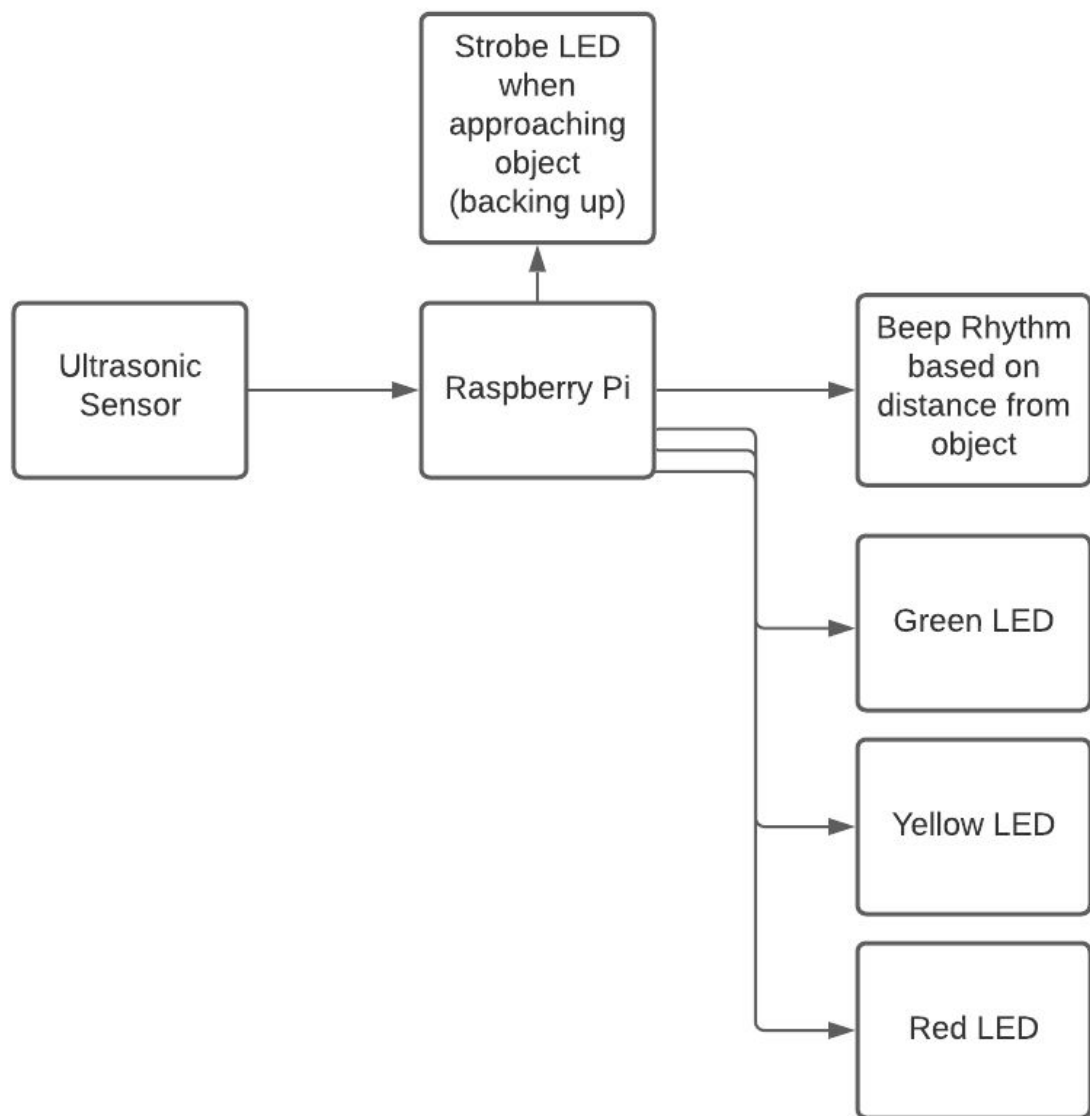
### **Team Members Responsibilities:**

**Functionality of appropriate lights changing as states change (Ryan Aboueljoud) :** Will work on determining which range of sensor values trigger a new state. Will also ensure that measured ranged trigger each state respectively.

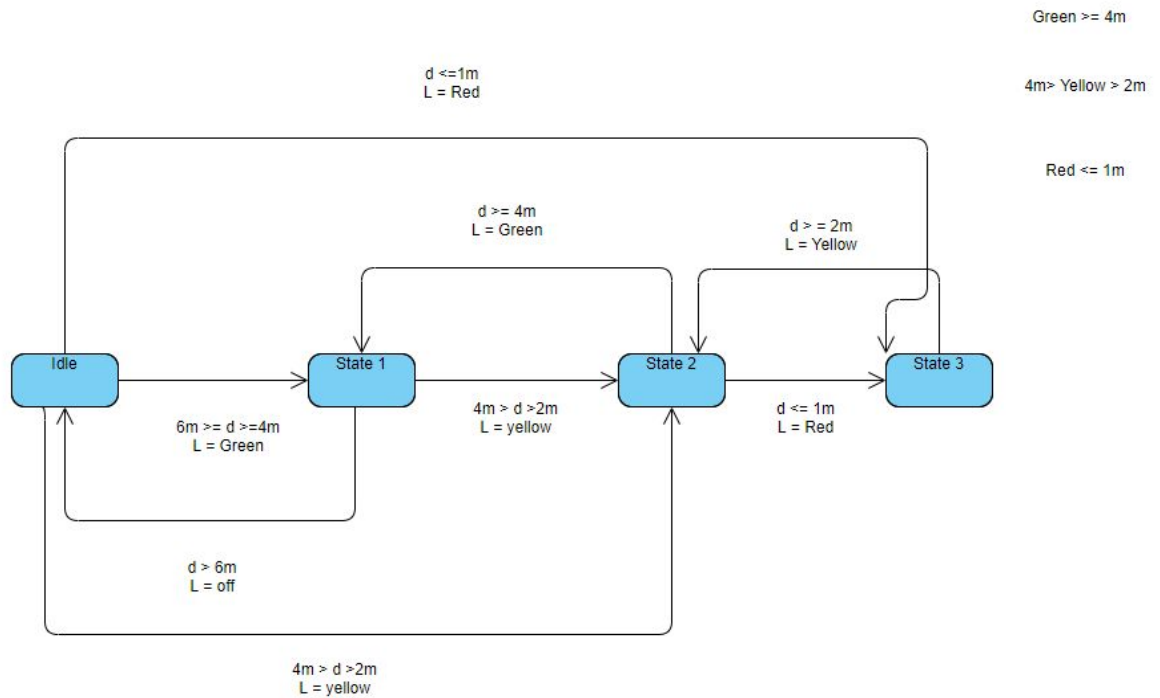
**Determining Direction of movement (David Quintanilla):** Will use feedback from ultrasonic sensors to determine direction of movement. The main directions of concern will be forward and backwards. Moving backwards from idle will trigger the state machine.

**Ensuring backup strobe works will only backward movement (Xavier Howell):** Will ensure that the backup strobe light only activates when the sensor is moving closer to an object or backing up. Strobe frequency will change based on distance.

### **Block Diagram:**



**FSM Diagram**



## Test Cases

**(Distance Test)** : Object is a far distance away

Object is a medium distance away

Object is dangerously close

**(Direction of movement)**: Is the object moving towards the object (backing up) or is it moving away (going forward)?

**(Backup light)**: Does white LED strobe when moving closer (backing up) to object

