

SMART RAIL TRACK SENTINAL

(SAFETY)

DESCRIPTION:

- Our product is smart rail track sentinel which senses the distance of the train from the installed place and gives signals using LED lights.
- After the train leave another ultrasonic sensor senses the distance of the obstacle by sending ultrasonic sound pulses.
- When the train is 500 meters away from the check post opens.
- The main objective of our project is to avoid accidents while crossing the checkpoint which has been happening in recent years. The person appointed to close the check post may not be always vigilant.
- It detects with respect to distance and alerts the passers-by early. It also gives some time for crossing and to clear the related traffic.
- It needs no human interference and can function accurately.

INTERFACES:

The interfaces we will be using are,

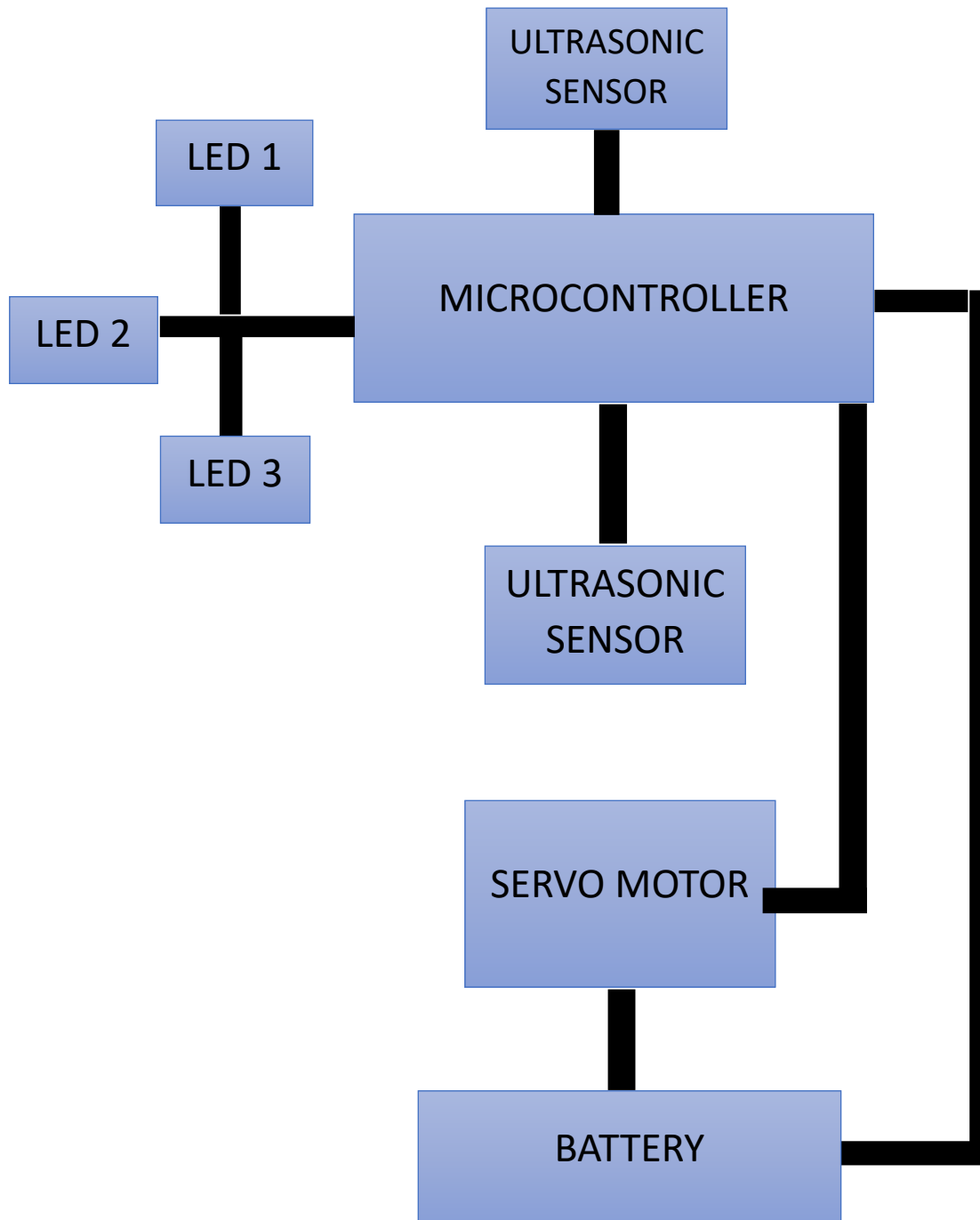
- 5V pin, PWM pin, GPIO pin for motor
- 5V pin, GPIO pin for sensor

SENSOR USED:

Yes, we use sensors. The type of sensor that our product will be utilising is Proximity Sensor which is Ultrasonic sensor. It is an instrument that measures the distance of an object by using ultrasonic sound waves. It uses transducers to send and receive ultrasonic sound pulses. Using the velocity of sound and time taken between transmission and reception it will calculate distance of the object from the place it is installed.

$$\text{Distance} = (\text{speed} \times \text{time})/2$$

BLOCK DIAGRAM:



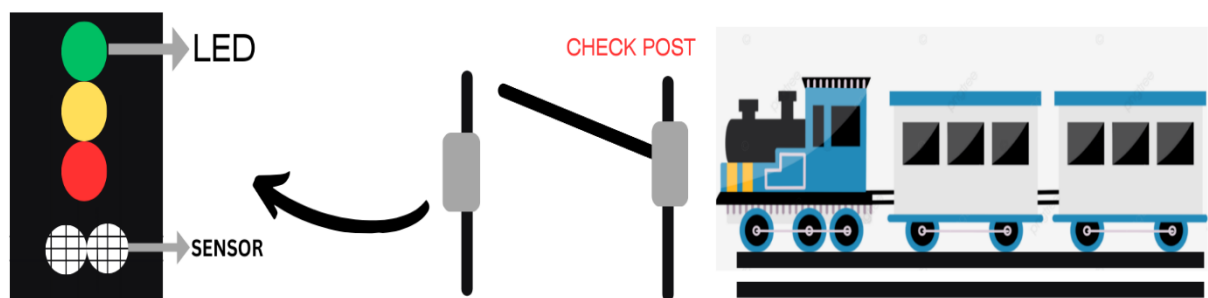
ALGORITHM:

1. Start.
2. Transmit sound waves.
3. Hitting and reflection from obstacle of sound waves.
4. Detection of reflected sound waves by sensor.
5. Calculate the distance of the obstacle.
6. For distance above or equal to 2km the green LED glows.
7. For the distance above or equal to 1km and less than 2km the orange LED glows.
8. When the obstacle is near, which is less than 1km, the red LED glows.
9. Simultaneously, when the obstacle is at 1km the servo motor rotates 90 degrees making the check post to close.
10. After the obstacle passes by and is about 500 meters away the check post closes again.
11. Stop

EXPLANATION:

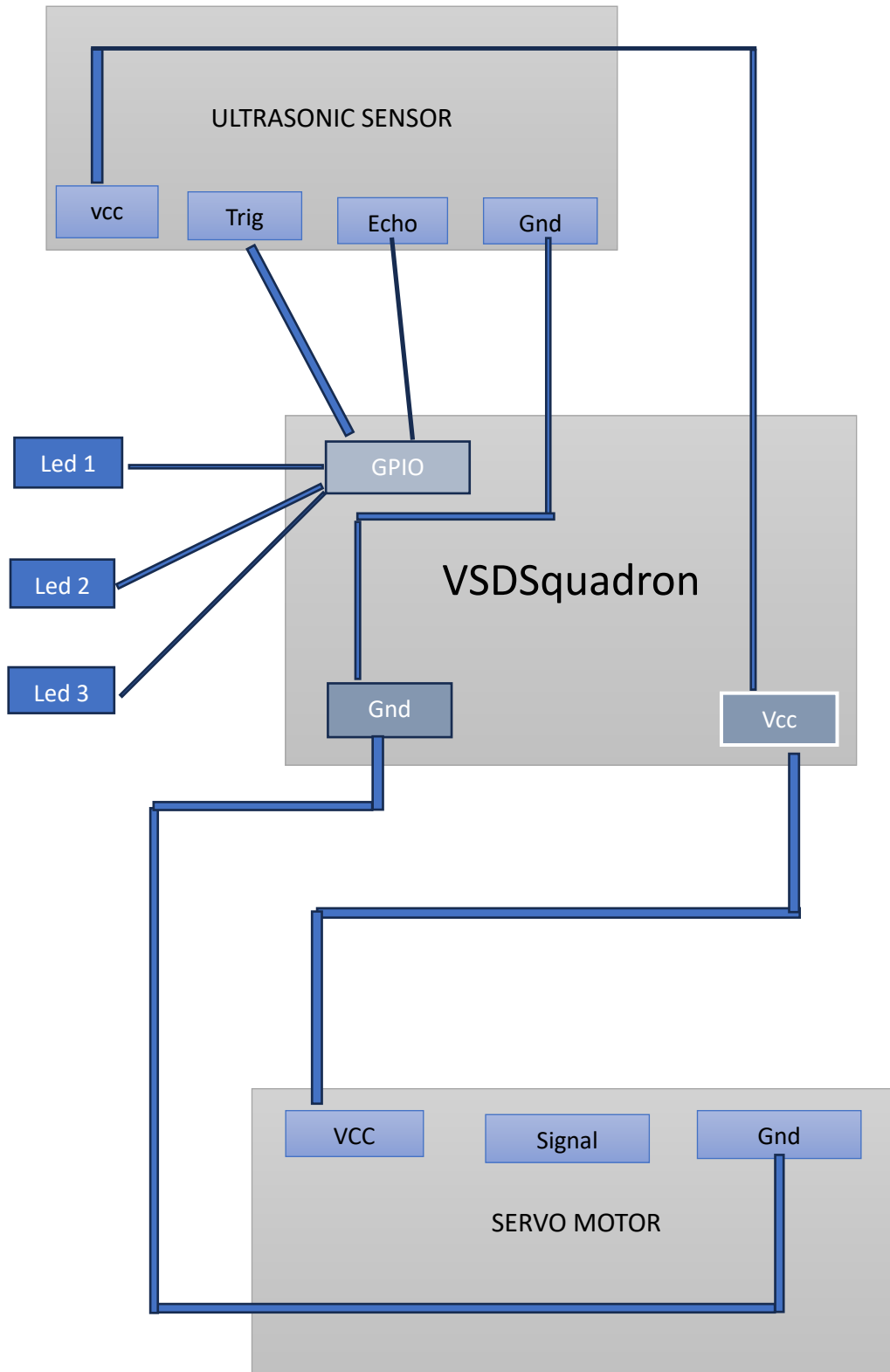
- When the train is approaching the check post and is at 2km away, the sensor transmits ultrasonic sound pulses
- The sound waves hit the train and reflects back
- The sensor senses the reflected sound pulse and sends a signal to the LED lights
- At first the green LED glows denoting that the train is 2km away.
- When the train is at a distance less than 2km and more than (or equal to) 1km, the orange LED glows
- When the train is at a distance less than 1km, the red LED glows making the check post to close.
- After the train passes and is at a distance of 500 meters away, the sound pulse from another sensor hits the train and reflects back.
- This then make the check post to open thereby clearing the traffic.

ROUGH SKETCH OF FINAL PRODUCT:



ROUGH SKETCH OF INTERNAL PRODUCT:

(Two sensors with similar connections are used here)



BoM:

COMPONENT NAME	QUANTITY REQUIRED	UNIT PRICE (Rs.)	TOTAL PRICE
BREAD BOARD	1	65	65
JUMPER WIRES	20	2	40
ULTRASONIC SENSOR	2	135	270
BATTERY	2	35	70
LED	10	5	50
SERVO MOTOR	1	135	135

TOTAL PRICE: Rs.630

TEAM DETAILS:

NAM E	UNIVE RSITY	A G E	GEN DER	CUR REN T SEM STER	ADDRESS	ACCOMM ODATION	ROLE
Karthi gaa.S	MIT-ANNA UNIVE RSITY	19	FEM ALE	3	167,A.P.Pudhur,Ve llakoil,Tiruppur	NEEDED	Gave conne ctions
M.Par kavi	MIT-ANNA UNIVE REITY	18	FEM ALE	3	NO.5/517, Agathiyar salai, mogappair east, Chennai	NEEDED	Codde d the progra m

