SRM Institute of Science and Technology
College of Engineering and Technology
Department of Electronics and Communication Engineering
18ECO109J-Embedded System Design Using Raspberry Pi **2022-23 (Odd Semester)**

Mini Project Report

Name   :

Register No.   :

Day / Session   :

Venue   :

Project Title   :

Lab Supervisor   :

Team Members   :

Particulars	Max. Marks	Marks Obtained
Objective & Description	05	
Algorithm,Flowchart, Program	10	
Presentation	10	
Results	10	
Viva	10	
Report	05	
Total	**50**	

REPORT VERIFICATION

Date   :

Staff Name   :

GARBAGE MONITORING SYSTEM

Objectives:

With the phenomenal increase in the world population and rapid growth of urban centers, many environmental, ecological, and social problems are on the rise. Garbage disposal is one of the major problems that are being faced regularly in homes, offices, industries, hospitals, and schools. Improper management of garbage disposal can result in hygiene and health-related issues. Garbage monitoring and disposal in large offices, institutions, and industries are particularly a problem. Forgetting to dispose off a bin full of garbage can cause many problems. In first-world societies, negligence in timely garbage disposal can result in hefty fines and penalties. We have come up with IOT Garbage Monitoring Using Raspberry Pi project to solve these issues.

Abstract:

The IOT garbage monitoring using Raspberry Pi project uses two ultrasonic sensors to monitor the garbage level of two bins. The ultrasonic sensors consist of a transmitter and a receiver. They work on the principle of Doppler's effect. The sensor generates an ultrasonic wave that reflects back after colliding with an obstacle or an object. The time-lapse between the transmission and reception of the ultrasonic wave is measured by the ultrasonic sensor and the distance calculation is made based on this time-lapse value. The distance measured by the sensor in our case is the distance between the sensor and the surface level of the garbage.

The garbage fill level of the bins as measured by the ultrasonic sensors is continuously fed to the Raspberry Pi single-board computer. The Raspberry Pi controller processes this data and transmits it to the output devices as well as the remote servers.

Hardware/Software Requirements:

- Power supply unit which is responsible for converting the AC voltage to low-level DC voltage.
- Ultrasonic sensors.
- Raspberry Pi controller.
- LCD screen
- Buzzer
- IOT platform

Block Diagram/Connection Diagram:

Raspberry Pi
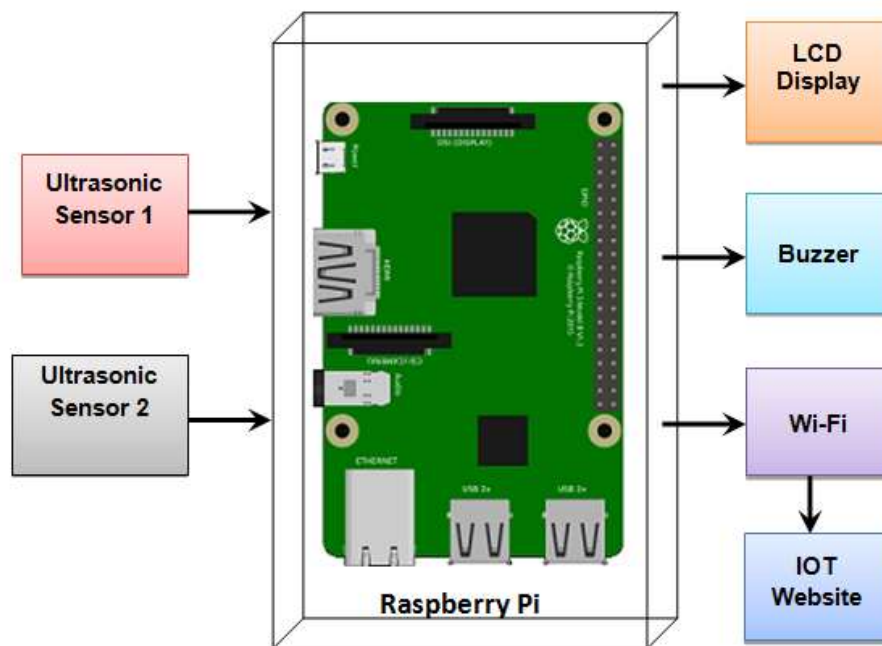
Algorithm:

1) Setup the Gpio using GPIO.BCM

2) SET pin 18 and 24 for TRIGGER and ECHO, where TRIGGER is set as GPIO.OUT and ECHO is set as GPIO.IN

3) Trigger the ultrasonic wave and cut it in 0.01 milliseconds.

4) Record the start time when the wave sent and stop time when the wave is

received.

5) Stop time is subtracted from the start
   time to find the time difference.

6) Now distance can be found using the
   time difference using the formula:

   Distance = (Time difference * 34300)/2
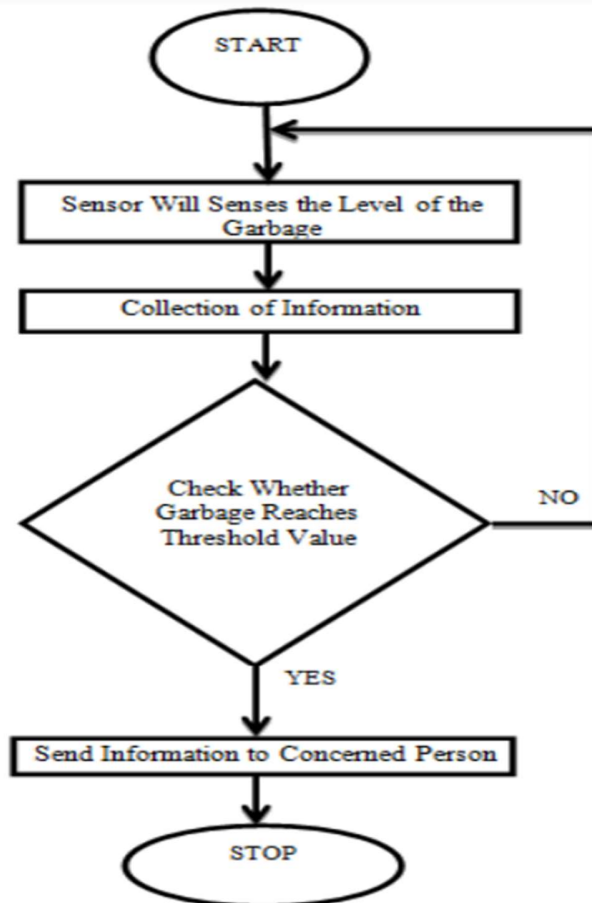   (in centimeters)

7) If the distance is less than 10 cm the
   garbage is 75% or Above

8) If the distance is less than 20 cm the
   garbage is 50% or Above

9) Otherwise , the dustbin is not full.

Flow Chart:

START

Sensor Will Senses the Level of the Garbage

Collection of Information

Check Whether Garbage Reaches Threshold Value

NO

YES

Send Information to Concerned Person

STOP

Program:

```python
import RPi.GPIO as GPIO
import time,signal,sys

GPIO.setmode(GPIO.BCM)


TRIG = 18
ECHO = 24

GPIO.setup(2,GPIO.OUT)


def close(signal,frame):
    print("\n Turning Of Ultra-Sonic")
    GPIO.cleanup()
    sys.exit(0)W

signal.signal(signal.SIGINT,close)
GPIO.setup(TRIG,GPIO.OUT)
GPIO.setup(ECHO,GPIO.IN)

while True :
    GPIO.output(TRIG,True)
    time.sleep(0.00001)
    GPIO.output(TRIG,False)
    startTime = time.time()
    stopTime = time.time()

    while 0 == GPIO.input(ECHO):

        startTime = time.time()
    while 1 == GPIO.input(ECHO):

        stopTime = time.time()
    TimeElapsed = stopTime - startTime
    distance = (TimeElapsed * 34300)/2

  print("Distance :%.1f cm"%distance)
  time.sleep(1)



  if distance < 10:
      GPIO.output(2,GPIO.HIGH)
        print("Garbage  is 75% or Above .")

   elif distance < 20:
        GPIO.output(2,GPIO.HIGH)
        print("Garbage  is 50% or Above .")
```

```
else:
    GPIO.output(2,GPIO.LOW)+
    print(" Dust- Bin is Empty or Not Much More Garbage.")
```

Output:

Dust- Bin is Empty or Not Much More Garbage

Real Time Constraints:

If any tall objects less occupying trash is in the bin then the sensor detects this and
this may cause wrong output predictions.

Conclusion:

The IOT garbage monitoring using Raspberry Pi project can be used for the
monitoring and management of garbage in big organizations and industries where
dozens of bins are present.