Microprocessor and Computer Architechture (UE20CS252)

Topic:- Smart garbage monitoring system.

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SMART GARBAGE MONITORING SYSTEM

Description:

This project Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via LCD display. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. IR sensor is used to detect whether any particle is present in the depth. Another sensor called load sensor used to analyze the weight of the bin. Metal sensor(Reed switch sensor) is used to detect any metal particle is there in the bin.The system makes use of AVR family microcontroller, LCD screen.The system is powered by a 1 Ampere transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. The system puts on the buzzer when the level of garbage collected crosses the set limit. Thus this system helps to keep the city clean by informing about the garbage levels of the bins .when it reaches certain level it will glow up.

Why?

This is a detection system to automate the cleanliness drive for the city , because this helps in automatic garbage reporting and cleaning.

also saves fuel of the garbage collecting vehicle because they don't have to go and see each and every dustbin to see whether it is filled or not.

So with the help of these circuit we could build a system.

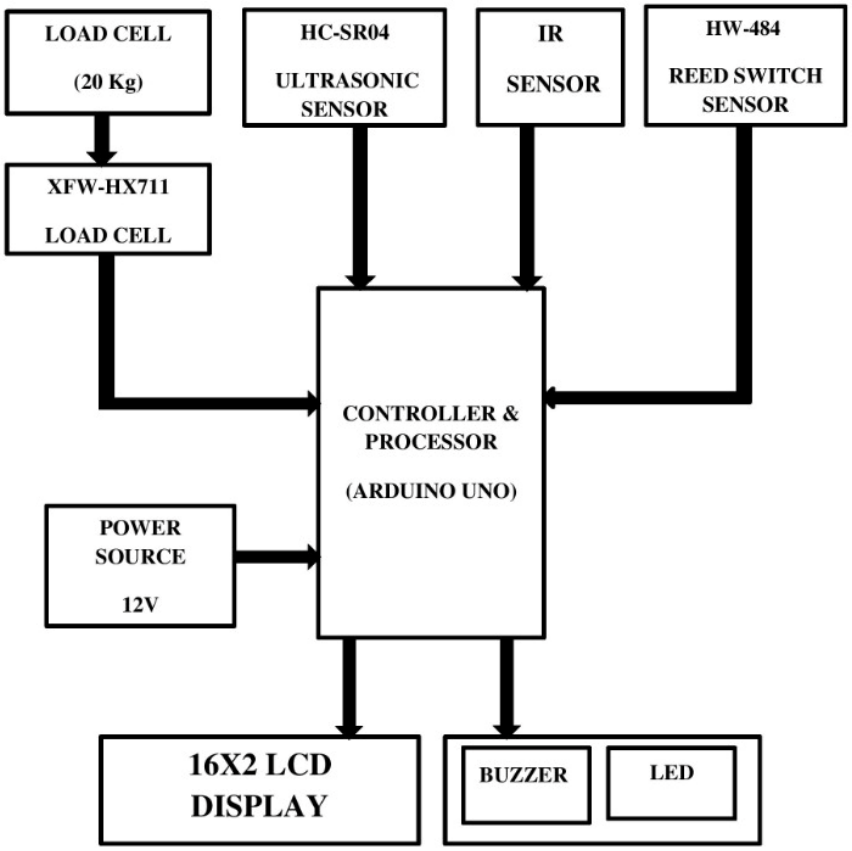
Actual process:

initialize and check total depth of bin and based on reference value it will monitor the garbage filled value and calculates the total depth then start filling garbage to the bin .Initial depth of the bin is 0.00

we pour some garbage in dustbin then it is reflected in LCD display, then add some more garbage to the bin and see the level reflected in the display.

when after particular limit it produces buzzer sound and reflects in LCD display. and this is how easily alert the authorities and this is how when necessary.

Block Diagram



- **Hardware Specifications**
- Arduino uno Microcontroller
- HC-SR04 Ultrasonic
- IR Sensor
- HW-484 Reed switch sensor
- XWF-HX711 Load cell
- 16*2 LCD Display
- Buzzer
- Resistors
- Cables and Connectors
- PCB and Breadboards
- LED
- Adapter
- Switch

- **Software Specifications**
- Arduino Compiler
- Programming Language: C

Source code:

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(8, 9, 10, 11, 12, 13);

#define echoPin 2

#define trigPin 3

long duration;

int distance;

#include <HX711_ADC.h>

#include <Wire.h>
```

```
HX711_ADC LoadCell(6, 7); // dt pin, sck pin
int a = 0;
float b = 0;
int IRSensor = 4;
int ReedSwich = 5;
int val;
int BUZZER = 1;
int LEDoutput = 0;


void setup()
{
lcd.begin(16, 2);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
LoadCell.begin();
LoadCell.start(1000); // 1000ms of time to stabilize
LoadCell.setCalFactor(375);
pinMode (IRSensor, INPUT);
pinMode (ReedSwich, INPUT);
pinMode (BUZZER, OUTPUT);
pinMode (LEDoutput, OUTPUT);
lcd.setCursor(0,0);
lcd.print("SMART GARBAGE");
lcd.setCursor(0,1);
lcd.print("MONITORING S/M");
```

```
delay(5000);
lcd.clear();
}

void loop()
{
digitalWrite (BUZZER, LOW);// LOW
digitalWrite (LEDoutput, LOW);// LOW
LoadCell.update(); // Fetches data from the load cell
float i = LoadCell.getData(); // output
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = duration * 0.034 / 2;
if(distance>=10.1 && distance<=12)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=00%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
```

```
}
if(distance>=8.1 && distance<=10)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=05%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
}
if(distance>=6.1 && distance<=8)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=20%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
}
if(distance>=5.1 && distance<=6)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=40%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
```

```
lcd.print("g ");
delay(100);
}
if(distance>=4.1 && distance<=5)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=60%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
}
if(distance>=3.1 && distance<=4)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=80%");
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
}
if(distance>=2.1 && distance<=3)
{
lcd.setCursor(0, 0);
lcd.print("STORAGE=90%");
```

```
lcd.setCursor(1, 1);
lcd.print(i, 1);
lcd.print("g ");
delay(100);
}
if (i>=100)
{
i=0;
lcd.setCursor(7, 1);
lcd.print(" OVER L/D");
delay(1000);
lcd.clear();
}
int statusSensor = digitalRead (IRSensor);
if (statusSensor == LOW)
{
digitalWrite(BUZZER, HIGH); // HIGH
digitalWrite(LEDoutput, HIGH); // HIGH
delay(400);
}
else
{
digitalWrite(BUZZER, LOW); // LOW
digitalWrite(LEDoutput, LOW); // LOW
}
```

```
val = digitalRead (ReedSwich);
if (val == HIGH)
{
digitalWrite (BUZZER, HIGH);// HIGH
delay(150);
digitalWrite (BUZZER, LOW);// LOW
delay(100);
digitalWrite (BUZZER, HIGH);// HIGH
delay(150);
}
else
{
digitalWrite (BUZZER, LOW);// LOW
}
}
```