**APPENDIX**

#include <LiquidCrystal.h>

LiquidCrystal lcd(11, 12, 13, 14, 15, 18);

int monitoring = 0;

int metalDetection = P1\_4;

int sensor\_pin = P1\_3;

int output\_value ;

const int trigPin = P1\_0;

const int echoPin = P1\_1;

long duration;

int motorPin1 = 9;

int motorPin2 = 10;

int nodemcu = P1\_5;

void setup()

{

lcd.begin(16, 2);

lcd.clear();

lcd.print(" WELCOME TO");

lcd.setCursor(0, 1);

lcd.print(" HYBRID BIN");

delay(5000);

lcd.clear();

lcd.print("BIN SENSORS ARE");

lcd.setCursor(0, 1);

lcd.print("ACTIVATING...");

delay(5000);

pinMode(nodemcu, OUTPUT);

digitalWrite(nodemcu, LOW);

pinMode(trigPin, OUTPUT);

pinMode(echoPin, INPUT);

Serial.begin(9600);

pinMode(motorPin1, OUTPUT);

pinMode(motorPin2, OUTPUT);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

lcd.clear();

lcd.print(" THE BIN IS");

lcd.setCursor(0, 1);

lcd.print(" CONFIGURED");

delay(5000);

}

void loop()

{

lcd.clear();

lcd.print("WAITING TO ACCEPT");

lcd.setCursor(0, 1);

lcd.print("THE WASTE");

digitalWrite(trigPin, LOW);

delayMicroseconds(2);

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);

Serial.println(duration);

delay(20);

digitalWrite(nodemcu, LOW);

if (duration < 5000)

{

output\_value = analogRead(sensor\_pin);

delay(3000);

monitoring = analogRead(metalDetection);

delay(3000);

if (monitoring < 1000)//metal item

{

lcd.clear();

lcd.print("YOU THROWN NON-");

lcd.setCursor(0, 1);

lcd.print("DEGRADDABLE WASTE");

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

if (output\_value < 100)//metal item

{

lcd.clear();

lcd.print("YOU THROWN NON-");

lcd.setCursor(0, 1);

lcd.print("DEGRADABLE WASTE");

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

if (output\_value < 1000 && output\_value > 300) // food item

{

lcd.clear();

lcd.clear();

lcd.print("YOU THROWN");

lcd.setCursor(0, 1);

lcd.print("DEGRADABLE WASTE");

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

if (output\_value < 199 && monitoring < 1000) // metal with water

{

lcd.clear();

lcd.print("YOU THROWN NON-");

lcd.setCursor(0, 1);

lcd.print("DEGRADABLE WASTE");

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

if (output\_value == 0) // metal

{

lcd.clear();

lcd.print("YOU THROWN NON-");

lcd.setCursor(0, 1);

lcd.print("DEGRADABLE WASTE");

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

if (output\_value == 1023 && monitoring == 1023) // plastic

{

lcd.clear();

lcd.print("YOU THROWN NON-");

lcd.setCursor(0, 1);

lcd.print("DEGRADABLE WASTE");

digitalWrite(motorPin1, HIGH);

digitalWrite(motorPin2, LOW);

delay(640);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, HIGH);

delay(580);

digitalWrite(motorPin1, LOW);

digitalWrite(motorPin2, LOW);

delay(3000);

delay(2000);

digitalWrite(nodemcu, HIGH);

lcd.clear();

}

}

}