CHAPTER 5

IMPLEMENTATION AND TESTING

5.1   Implementation

```
1. void loop() {
2. digitalWrite(trigPin, LOW);
3. delayMicroseconds(2);
4. digitalWrite(trigPin, HIGH);
5. delayMicroseconds(10);
6. digitalWrite(trigPin, LOW);
7. int hasil = digitalRead(2);
8. duration = pulseIn(echoPin, HIGH);
9. distance= duration*0.034/2;
10.       Serial.print("Distance: ");
11.       Serial.println(distance);
12.       delay(10);
13.       if(distance<30)
14.        {
15.         servo.write(180);
16.         delay(1000);
17.        }
18.       else
19.       {
20.          servo.write(0);
21.       }
22.       if (digitalRead(2) == HIGH)
23.       {
24.         if(delay>threshold){
25.       SIM800L.write("AT+CMGS=\"082322758702\"\r\n");
26.       SIM800L.write("SAMPAH PENUH GAES");
27.       Serial.println("SMS Selesai Dikirim!");
28.            }
29.         else
```

```
30.          {
31.          Serial.println("Sampah Belum Penuh!");
32.          }
```

This is the code for the ultrasonic sensors and the Obstacle IR sensor, where the distance functions as a determining distance parameter to open and close the trash when detected objects and ' int hasil (2) ' is OUT of the Obstacle IR sensor to detect if the garbage contents have been detected sensors and are declared full.

```
SIM800L.write("AT+CMGS=\"082322758702\"\r\n");
SIM800L.write("SAMPAH PENUH GAES");

Serial.println("SMS Selesai Dikirim!");
```

This code serves to send SMS in the form of text content with GSM SIM 800L module to the HP number that has been set as the destination number.

5.2   Testing

The overall system test was done when the Arduino UNO was active. All devices installed on the Arduino UNO are tested starting from the sensors used to some hardware that help to run this prototype. The proximity sensor and Obstacle IR sensors become the main sensors as the full or no-trash parameters. Then the GSM SIM module 800L sends an SMS as a notification of the condition of garbage contents when the trash is full.

Illustration 5.1: The Prototype

To conduct an experiment it takes interaction with an ultrasonic sensor in order to calculate the distance detected by the ultrasonic sensor.

- Tabel 5.1: Testing Sensor Ultrasonic

No	Manual (cm)	Sensor (cm)	Description
1	20 cm	21 cm	Inappropriate distance
2	15 cm	14 cm	Inappropriate distance
3	24 cm	24 cm	Appropriate
4	8 cm	8 cm	Appropriate
5	58 cm	57 cm	Inappropriate distance
6	72 cm	73 cm	Inappropriate distance
7	60 cm	62 cm	Inappropriate distance
8	40 cm	41 cm	Inappropriate distance
9	78 cm	78 cm	Appropriate
10	8 cm	8 cm	Appropriate
11	32 cm	32 cm	Appropriate
12	11 cm	11 cm	Appropriate
13	87 cm	86 cm	Inappropriate distance
14	95 cm	95 cm	Appropriate
15	Atap	299 cm	

So for accuracy results with multiple attempts between objects with ultrasonic sensors is 99.0476%

For module can send SMS data as notification need interaction between objects with IR sensor Obstacle.

Tabel 5.2: Testing Sensor IR Obstacle

No	Manual (cm)	Infra Red Data	Description
1	10 cm	0	Trash not yet full
2	7 cm	0	Trash not yet full
3	5 cm	0	Trash not yet full
4	2 cm	1	Full Trash
5	3 cm	1	Full Trash
6	9 cm	0	Trash not yet full
7	12 cm	0	Trash not yet full
8	15 cm	0	Trash not yet full
9	4 cm	0	Trash not yet full
10	3.5 cm	1	Full Trash

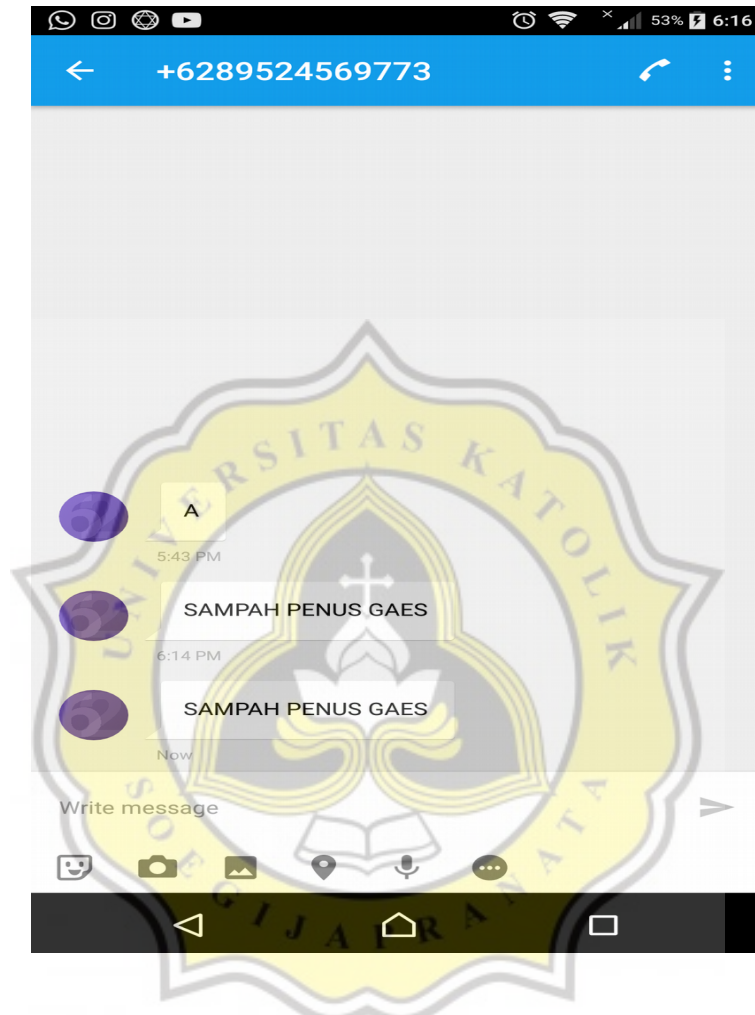llustration 5.2: Screenshots of interactions between object distances and ultrasonic sensors

llustration 5.3: Screenshot of SMS result sent to Handphone when trash object is full and detected by IR sensor Obstacle

So the result of the illustration above stated that the sensor works well and the module successfully sends the notification to the destination number of the phone SMS.