



Tick Waste Application in Houses With Warning of Microcontroller Assistant Social Media.

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ABSTRACT

Throwing garbage in its place might be something that is easy for everyone but in fact there are still lots of garbage scattered in any place. This is due to a lack of awareness of the community about the importance of maintaining cleanliness and health of the surrounding environment. Waste is a serious threat to the community, because littering can cause environmental pollution. Sometimes when garbage is dumped at home, sometimes there is no knowledge of the capacity of the garbage can. The impact of the ignorance of the capacity of the garbage can, there will be a buildup of garbage for days that have not been able to be disposed of in the trash. Trash can is a place to temporarily collect garbage, which is usually made of metal or plastic. The objectives of this study are to obtain the physical form of smart dry trash cans to be applied at home and to obtain information on the existence of garbage can capacities with WhatsApp social media and to provide information on the weight of garbage. the research methods used are hardware and software. Assembly for the acquisition of a Smart Trash Assisted by a Microcontroller, namely. Hardware Design through Functional Block Diagram of System Series, Microcontroller Circuit and Network Design, Programming of Microcontrollers with Arduino IDE. Warning on Social Media by WhatsApp. Sensor Testing and Delivery of the Social Media alert system by WhatsApp in 2 ways, namely: Sensor and Loadcell Testing, Testing Delivery of social media editing systems by WhatsApp.

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1. Introduction

Throwing garbage in its place might be something that is easy for everyone but in fact there are still lots of garbage scattered in any place. This is due to a lack of awareness of the community about the importance of maintaining cleanliness and health of the surrounding environment. Waste is a serious threat to the community, because littering can cause environmental pollution. This is evidenced by the existence of Law Number 18 of 2008 concerning Waste Management in Waste Management which is unlawful and deliberately conducts waste management activities by not paying attention to norms, standards, procedures, or criteria that can cause public health problems, security disturbances, environmental pollution, and / or environmental damage is threatened with imprisonment for a minimum of 4 (four) years and a maximum of 10 (ten) years and a fine of at least Rp100,000,000.00 (serratus million rupiah) and a maximum of Rp.5,000,000,000.00 (five billion rupiah) [1]. Sometimes garbage disposal at home, sometimes the ignorance of the capacity of the garbage can is unknown. The impact of the ignorance of the capacity of the garbage can, there will be a buildup of garbage for days that have not been able to be disposed of in the trash. Trash can is a place to temporarily collect garbage, which is





usually made of metal or plastic. In the room trash cans are generally stored in the kitchen to dispose of the rest of the kitchen needs such as fruit skin or bottles. There are also special paper bins used in the office. Some bins have a lid on the top to avoid the smell that is released by garbage [2].

Mobile computing is also a technology that can carry out data distribution systems while moving freely and can connect again to different network locations [3]. One element of mobile computing is social media, social media or social media providing facilities and space in using Mobile Computing to share data, information and digital content quickly and easily, based on computer networks for computer users around the world. At present, more and more Social Media services and social networks provide mobile platforms for the convenience of computer users in accessing them from mobile devices.

The link between garbage cans and social media is how to provide information on the capacity of the contents of trash cans with social media. Information sent via this social media uses the WhatsApp application. Whatsapp is a messaging application for smartphones with basic BlackBerry Messenger. Whatsapp messenger is a cross platform messaging application that is very possible we exchange messages without sms fees, because whatsapp messenger uses the same internet data package for e-mail, searching sites and so on whatsapp messenger application uses GPRS / EDGE / 3G / 4G or wifi connection for Data communication uses WhatsApp, we can have online conversations, file sharing, exchange photos directly from the camera, file manager and gallery media), video (directly from video cameras, file managers and gallery media), audio (directly recording sound from the file manager and music gallery). The objectives of this study are (1) to obtain the physical form of smart dry trash cans to be applied at home and (2) to obtain information on the existence of garbage can capacities with WhatsApp social media and to provide information on the weight of garbage. From the problems and objectives of the study, the authors want to try applying Smart Trash to the House with a Microcontroller Assisted Social Media Warning System.

2. Research Method

For the continuity of the research method, a number of research materials are needed in the form of hardware and software. Hardware, includes: (i) 42 Liter Trash Can, (ii) Arduino Mega 2560, (iii) Ultrasonic (HCSR-04), (iv) Load 3 kg Cell, (v) number of pin cables, (vi) HX711 Module, (vii) Servo Motor, (viii) Buzzer, (ix) LED, (x) Ethernet Shield, (xi) Project Board, (xii) Module i2c, (xiii) LAN Cable and (xiv) Adapter 5v 2a. The software in the form of Arduino Integrated Development Environment (Arduino IDE) version 1.8.1 is available free of charge and can be obtained directly on the Arduino official page at <https://www.arduino.cc/en/main/software>, C programming language, and online application based inventor app at <http://ai2.appinventor.mit.edu>. In addition to research materials, research tools are needed in the form of: (a) Google Chrome web browser, (b) Android-based smartphones with Samsung Note 3 SM-N900 brands, and (c) Core2Duo P7370 2.00 GHz laptops. The steps in the research method are based on the research objectives. Flow chart of research methods, as shown in Figure 1.



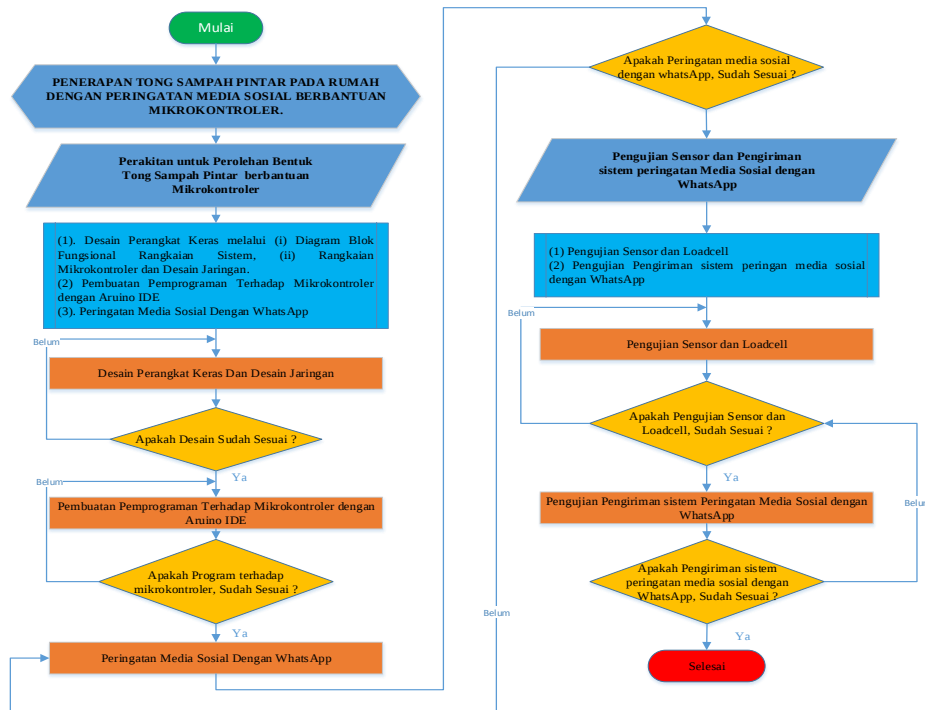


Figure 1. Flow Chart of Research Methods

3. Results and Discussion

This chapter will be discussed in accordance with the steps in the research method flow chart, where the discussion consists of hardware design, programming, warning of social media and testing. The following are the results and results of this study:

3.1. Hardware Design

3.1.1. Functional Block Diagram.

Based on the block diagram found in Figure 2, the whole system is divided into three parts. Sensors as inputs, controllers as recipients and senders of instructions and aquatic as output. The following are details of the types of each relation. In figure 2 the block diagram describes the input sensor device from the system that will send data. The device used is a proximity sensor. The sensor to be used is Ultrasonic. Following is the design of sensor relations and controllers. Arduino receives input data from an Ultrasonic sensor. After receiving Arduino the data will be sent instructions to the actuator.

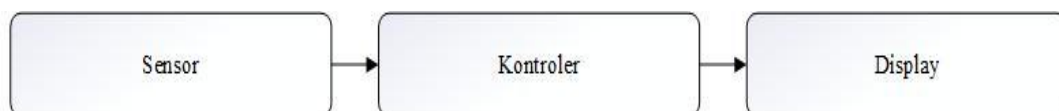


Figure 2. Functional Block Diagram.

Figure 3 shows Arduino receiving input data from an Ultrasonic sensor. After receiving Arduino the data will be sent instructions to the actuator. Figure 3 shows Arduino Mega 2560 that receives data from ultrasonic. And sending instructions to the web receives garbage bin data and the LCD is the output that the trash can is full and sends short messages to WhatsApp.



Figure 3. Block Sensor Sensor Ultrasonic Diagram with Arduino.

In Figure 4, it is explained that ultrasonic sensors, load cell sensors are inputs, Arduino microcontrollers are processes, LCDs, servo motors, LEDs, buzzers and Ethernet shields are outputs.

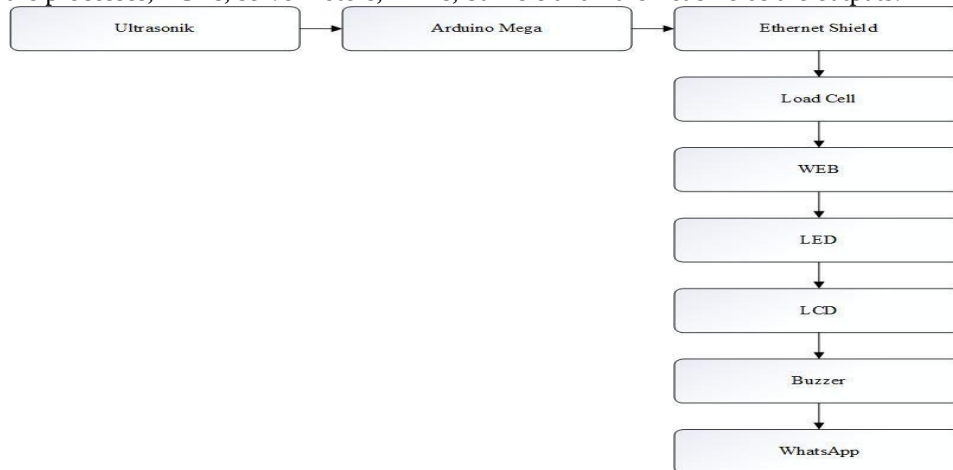
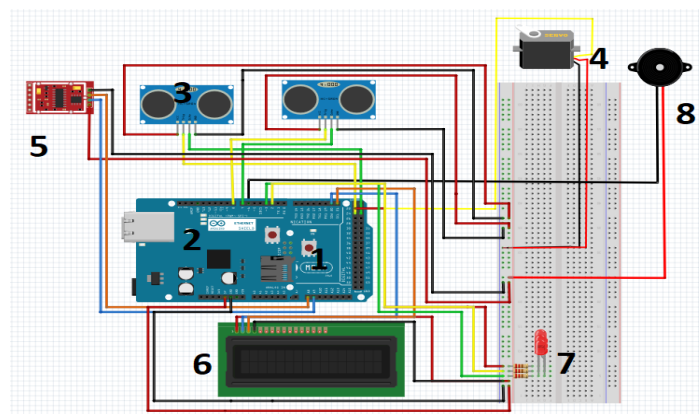


Figure 4. Overall Block Diagram.

3.1.2. Microcontroller Circuit and Network Design

The microcontroller circuit can be done with several mathematical diagrams related to research, starting from the system diagram of the overall system of ultrasonic diagrams with Arduino Mega 2560, loadcell diagrams with Arduino Mega 2560, servo motors with Arduino Mega 2560, LED diagrams with Arduino Mega2560, buzzer diagrams with Arduino mega 2560, diagram of the LCD with Arduino Mega 2560, diagram of the Ethernet Shield. The following are some of the stages of mathematics in this study.



In figure 5 the circuit is divided into 9 stages, namely, the first stage of schematic diagram series Ultrasonic sensor with Arduino Mega, second Arduino Mega with LoadCell, third Arduino with Servo, fourth Arduino with LCD, fifth Arduino with LED, six Arduino with buzzer, go to Arduino with ethernet shield. The constraints of the schematic diagram can be seen in table 1.

TABLE 1
CONSTRAINTS OF A SCHEMATIC DIAGRAM

No	Device	Function
1	Arduino Mega 2560	Untuk mengelola data
2	Sensor Ultrasonik	Untuk membuka tutup tempat sampah secara otomatis





No	Device	Function
3	HX711 Loadcell	Untuk mendeteksi berat sampah
4	Motor Servo	Untuk mengerjakan buka tutup tempat sampah
5	LED	Untuk mengetahui jika Led kuning sebagai tanda kosong, Led hijau sebagai tanda bahwa tempat terbuka, Led merah sebagai tanda bahwa tempat sampah telah penuh
6	Buzzer	Notifikasi Suara
7	Lcd	Output dari Arduino Mega 2560 dan Tempat Sampah terdeteksi
8	Ethernet Shield	Untuk menghubungkan Arduino ke sebuah web server atau jaringan menggunakan kabel RJ-45

Network Design

The network design in figure 6 shows that Arduino mega 2560 receives data connected with ultrasonic, ultrasonic gives instructions to the ethernet shield

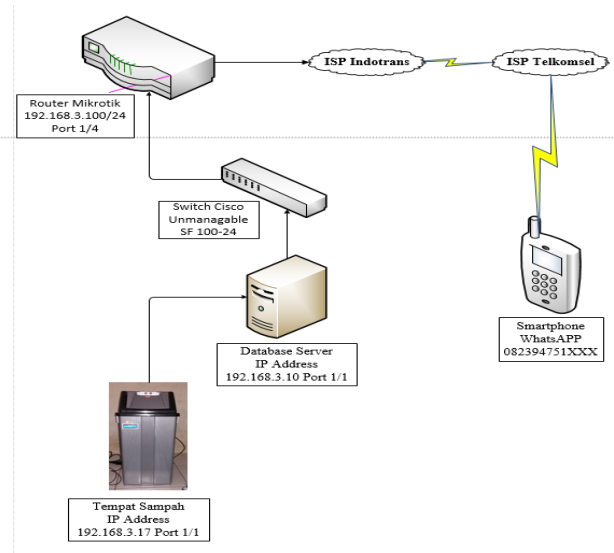


Figure 6. Network Design.

3.2. Program Making

At the stage of making the program, the assembly or installation of all components carried out previously was implemented in the real system. Figure 7 is a functional flowchart that will be applied. Flowchart consists of several parts, each part is divided based on work processes. Here are the stages of implementation to be carried out.

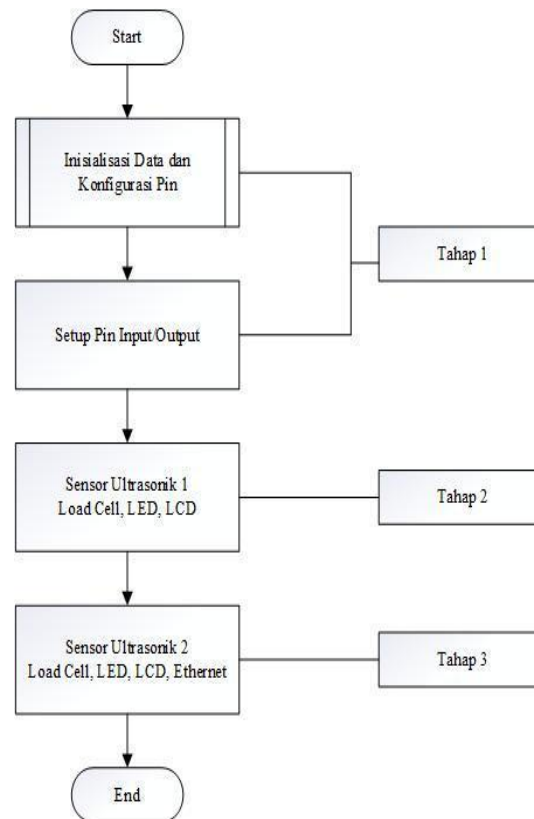


Figure 7. Flowchart functional.

The first stage in Figure 7 is initializing the data that has been determined and configuration on the ultrasonic, load cell, led and lcd sensors. Here's the program code that uses the C Language.

Listing Program Inisialisasi data

```
#include <Wire.h>
#include <NewPing.h> //Library untuk Sensor Ultrasonic
#include <Servo.h> //Library untuk Servo
#include <LiquidCrystal_I2C.h>
#include "HX711.h"
#include <SPI.h>
#include <Ethernet.h>
#define trigPin 24 //Set Trigger HCSR04 di Pin digital 24
#define echoPin 25 //Set Echo HCSR04 di Pin digital 25
#define trigPin2 8 //Set Trigger HCSR04 di Pin digital 8
#define echoPin2 7 //Set Echo HCSR04 di Pin digital 7
#define MAX_DISTANCE 500 //Set jarak maksimal
LiquidCrystal_I2C lcd(0x3f, 2, 1, 0, 4, 5);
NewPing
sonar(trigPin,
echoPin,
MAX_DISTANCE);
NewPing
sonar2(trigPin2,
```



```
echoPin2,
MAX_DISTANCE);

HX711 scale(A9, A8); // DT, SCK
int berat, a;
float calibration_factor = 708.892;
// mengisi calibration_factor
dengan nilai calibration_factor

// yang telah
dicari lewat
sketch kalibrasi otomatis
```

In the second stage, the input / output pin is determined.

Listing Program Sensor

```
void setup() {
    Serial.begin (9600); //Kecepatan komunikasi serial
    Ethernet.begin(mac,ip,gateway);
    pinMode(trigPin, OUTPUT); //Set pin Trigger sebagai output
    pinMode(echoPin, INPUT); //Set pin Echo sebagai input
    pinMode(trigPin2, OUTPUT); //Set pin Trigger sebagai output
    pinMode(echoPin2, INPUT); //Set pin Echo sebagai input
    if(jarak<=25) // jarak (cm) dapat anda sesuaikan
    {
        //if(jarak<=20)
        lcd.setCursor(0,1);
        lcd.print(" Terima kasih");
        digitalWrite(LEDhijau, HIGH); //LEDhijau mati
        digitalWrite(LEDkuning, LOW); //LEDkuning hidup
        myservo.attach(23);
        myservo.write(90); //Posisi servo pada 60 derajat
        delay(1000); //Delay
        pos = 90;
    }
    else{ //Jika jarak lebih dari yang ditentukan
        lcd.setCursor(0,1);
        lcd.print(berat);
        lcd.setCursor(6,1);
        lcd.print("gram");
        digitalWrite(LEDkuning, HIGH); //LEDkuning mati
```



```
digitalWrite(LEDhijau, LOW); //LEDhijau
hidup
myservo.write(0); //Posisi servo pada 0
derajat
delay(2000);
myservo.detach();
pos = 0;
}
delay(450); //Delay
}
}
```

In the third stage carried out on ultrasonic sensor 2 and ethernet shield where, ultrasonic sensor 2 is input and Loadcell, Led, Lcd and Ethernet shield are output.

Listing Program loadcell

```
if (jarak2<=10){
a=1;
con(); lcd.setCursor(0,0);
alarm();
lcd.print(" PENUH ");
if (jarak2 <=10 && pos == 80) myservo.write(0);
digitalWrite(LEDmerah, HIGH);
//LEDmerah hidup
digitalWrite(LEDkuning, LOW); //LEDkuning mati
}

void con(){
if (Client.connect(server, 80)){
Serial.println("Connected");
Client.print("GET
/monitoring_trash/add_log_trash_mon.php?berat=");
Client.print(berat);
Client.print("&kondisi=");
Client.print(a); Client.println("HTTP/1.1");
Client.println("Host: 192.168.3.10");
Client.println("Connection: close");
Client.println();
Client.println(); while(Client.connected()) {
if(Client.available()) {
Serial.write(Client.read());
}
}
}else {
Serial.println(" koneksi putus ");
}
Client.stop();
while(Client.status() !=0) {
Delay(10);
}
}
```

At this stage, Arduino Mega sends data to the server so data from Arduino will be sent via the WhatsApp API. Following is the Program Listing.

Listing Program Send WhatsApp

<?php

```
function kirim_whatsapp($message){
$my_apikey = "55CF305S1VHRPK76L14L";
$destination = "6289663143252";
```





```
$api_url =  
"http://panel.apiwha.com/send_message.p  
hp";  
$api_url .= "?apikey=". urlencode  
($my_apikey);  
$api_url .= "&number=". urlencode  
($destination);  
$api_url .= "&text=". urlencode  
($message);  
$my_result_object =  
json_decode(file_get_contents($api_ur  
l, false));  
echo "<br>Result: ". $my_result_object-  
>success;  
echo "<br>Description: ".  
$my_result_object->description;  
echo "<br>Code: ". $my_result_object-  
>result_code;  
}  
?>
```

3.4 Testing

After carrying out the design and installation of components, the next step is to conduct a series of trials on each of the circuit blocks which aim to obtain the suitability of specifications and desired results. In this testing phase 3 types of testing were carried out consisting of ultrasonic sensor testing, web monitoring results and social media monitoring results.

a. Ultrasonic Sensor Testing

Tests carried out on the automatic lid of the trash can are controlled through 2 Ultrasonic HC-SR04 sensors. Ultrasonic Sensor 1 serves to detect the presence of humans that block the sensor with a distance of less than 25 cm and ultrasonic sensor 2 detects the full or no condition of the trash can with a distance of garbage that blocks less than 10 cm.

TABLE 2
SENSOR DETECTION TEST RESULTS

| Number | Sensor Distance | Condition | Information |
|--------|-----------------|-----------|-------------|
| 1 | 20 cm | Open | OK |
| 2 | 19 cm | Open | OK |
| 3 | 15 cm | Open | OK |
| 4 | 10 cm | Open | OK |
| 5 | 5 cm | Open | OK |
| 6 | 3 cm | Open | OK |
| 7 | 30 cm | Close | No |
| 8 | 25 cm | Close | No |

b. Web monitoring results

The results of monitoring these two bins can be seen from the testing of monitoring two bins where the system is seen when the trash can is within 1 day. Data retrieval is done by monitoring the automatic trash can.

| Lokasi Sampah | Tanggal | Berat Sampah (kg) | Kondisi |
|---------------|---------------------|-------------------|---------------|
| Sampah 1 | 2019-04-15 15:03:45 | 3 | PERBAH |
| Sampah 2 | 2019-04-15 15:03:45 | 0.5 | KUCING |
| Sampah 1 | 2019-04-15 15:03:45 | 2.5 | HASRAT PERBAH |
| Sampah 2 | 2019-04-15 15:03:45 | 0 | PERBAH |
| Sampah 1 | 2019-04-15 15:03:50 | 0.5 | KUCING |
| Sampah 2 | 2019-04-15 15:03:50 | 1 | HASRAT PERBAH |

Figure 8. Results of monitoring the system via the web.





c. Social media monitoring results

In addition to monitoring using the web, monitoring can be done through social media in real time by sending information messages in the form of full or heavy trash cans. Social media used in this research is WhatsApp. Following are the results of monitoring using WhatsApp.



Figure 9. The results of monitoring using WhatsApp.

4. Conclusion

Based on the discussion, conclusions are drawn according to the research objectives.

- a. In obtaining the physical form of a garbage can to be applied at home, it is done through hardware and software handshaking. Assembly for the acquisition of a Smart Trash Assisted by a Microcontroller, namely. Hardware Design through, Functional Block Diagram of System Circuits, Microcontroller Circuit and Network Design, Programming of Microcontrollers with Aruino IDE. Warning on Social Media by WhatsApp. Sensor Testing and Delivery of the Social Media alert system by WhatsApp in 2 ways, namely: Sensor and Loadcell Testing, Testing Delivery of social media editing systems by WhatsApp.
- b. From the results of testing carried out, the ultrasonic sensor that is read is no more than 25 cm apart and the results of monitoring with social media use WhatsApp according to the information obtained. The appropriate information obtained through WhatsApp is the status of the full garbage bin and provides information on the weight of the trash.

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