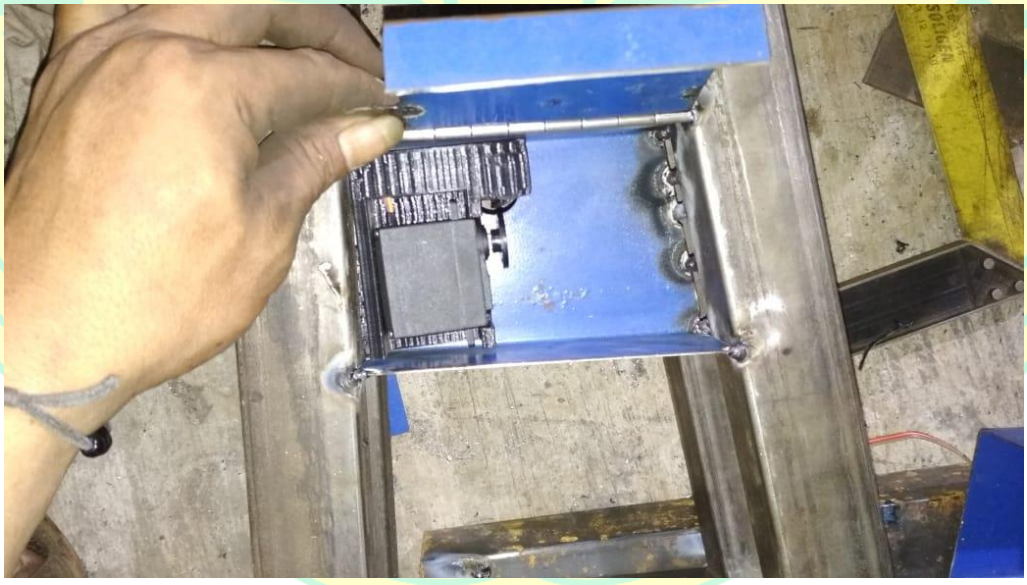
LAMPIRAN-LAMPIRAN

Lampiran 1. Percobaan Parkiran Dengan Sepeda

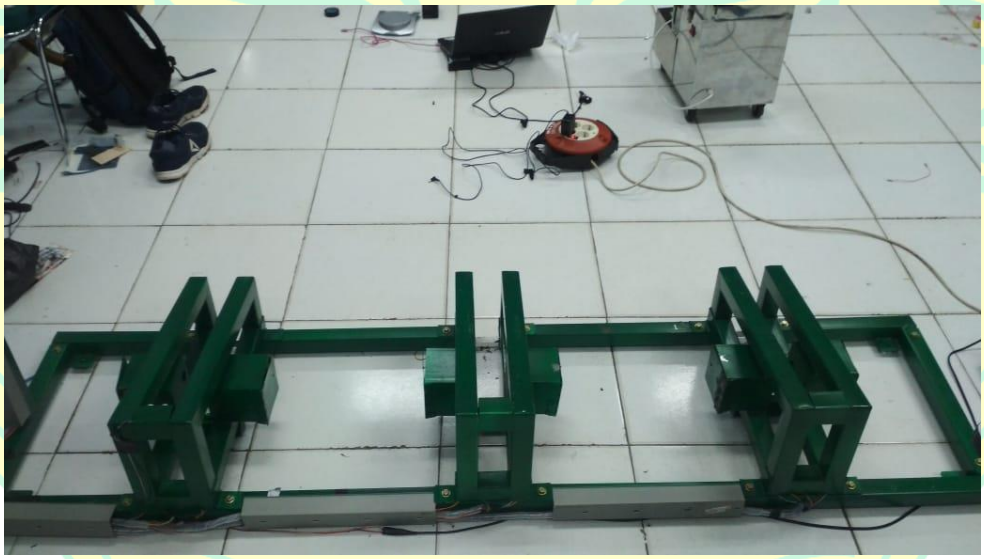
Gambar 1. Percobaan parkiran sepeda menggunakan sepeda



Gambar 2. Box pengunci ban sepeda

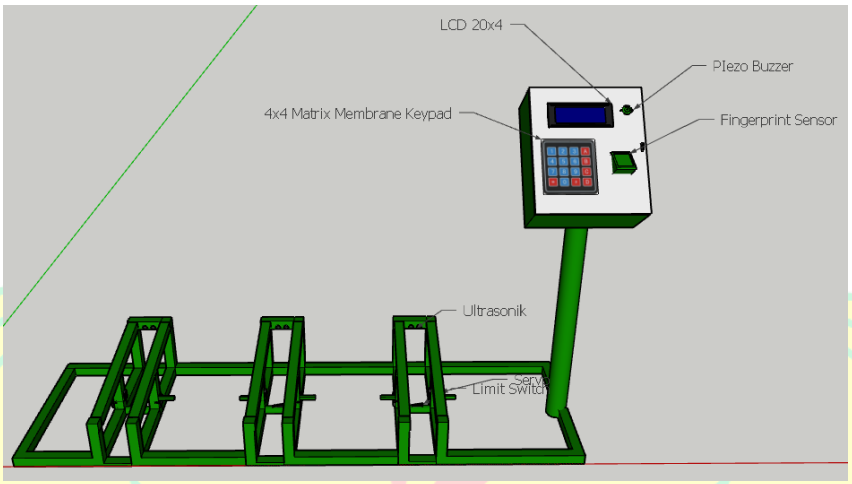
Lampiran 2. Dokumentasi Produk Yang Dihasilkan

Gambar 1. Tampak Depan

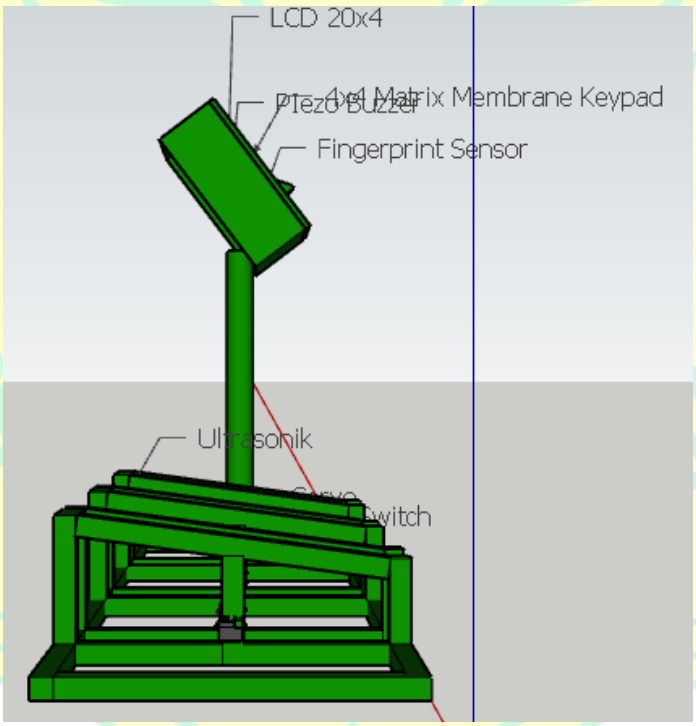


Gambar 2. Tampak Belakang

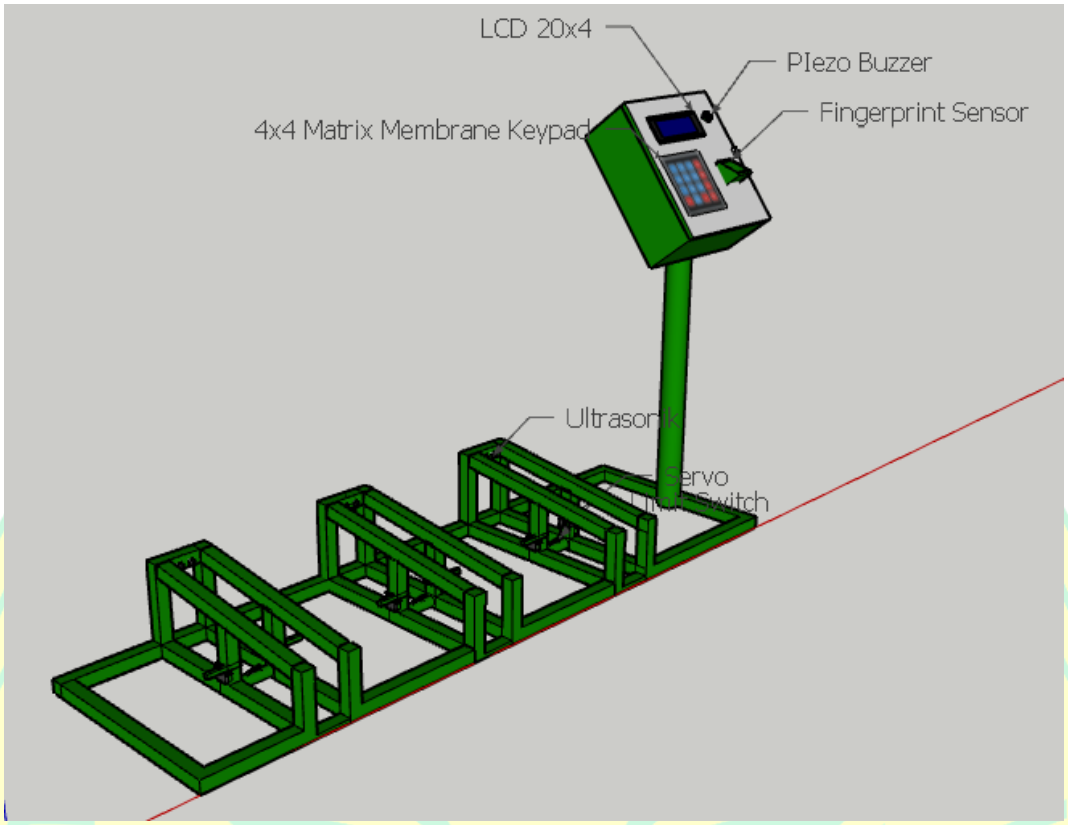
Lampiran 3. Gambar Teknik



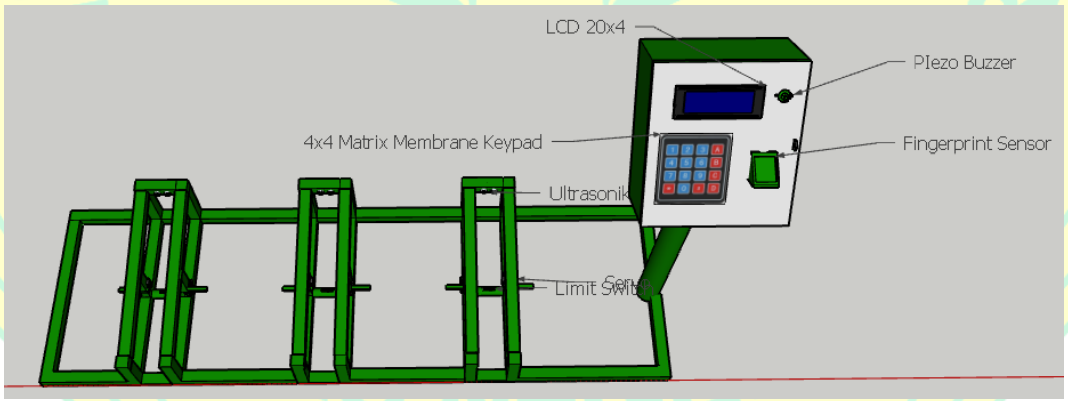
Gambar 1. Tampak depan



Gambar 2. Tampak Samping



Gambar 3. Tampak Isometric



Gambar 4. Tampak atas

Lampiran 4. Pengujian Tingkat Keberhasilan Kerja Rancang Bangun Alat Pengaman Pada Parkiran Sepeda

Parkiran	1	2	3	Total
1	√	√	√	9
	√	√	√	
	√	√	√	
2	√	√	√	9
	√	√	√	
	√	√	√	
3	√	√	√	9
	√	X	√	
	√	√	√	
Total				27

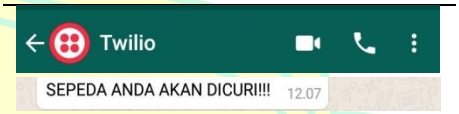
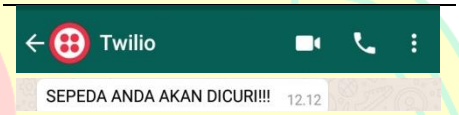
Kegagalan yang terjadi disebabkan oleh pengunci ban sepeda yang tersangkut pada box motor pengunci sehingga pengunci ban sepeda tidak dapat mengunci ban sepeda.

Lampiran 5. Pengujian Identifikasi Sidik Jari

No	Jari	Kriteria Pengujian	Tampilan	Hasil Pengujian
1	Ibu jari	Mengidentifikasi sidik jari yang telah didaftarkan	 COM3 Adafruit finger detect test Found fingerprint sensor! Sensor contains 5 templates Waiting for valid finger... Found ID #1 with confidence of 108	BAIK
2	Jari telunjuk		 COM3 Adafruit finger detect test Found fingerprint sensor! Sensor contains 5 templates Waiting for valid finger... Found ID #2 with confidence of 100	BAIK
3	Jari tengah		 COM3 Adafruit finger detect test Found fingerprint sensor! Sensor contains 5 templates Waiting for valid finger... Found ID #3 with confidence of 79	BAIK

4	Jari kelingking	 COM3 Adafruit finger detect test Found fingerprint sensor! Sensor contains 5 templates Waiting for valid finger... Found ID #4 with confidence of 108	BAIK
5	Jari manis	 COM3 Adafruit finger detect test Found fingerprint sensor! Sensor contains 5 templates Waiting for valid finger... Found ID #5 with confidence of 108	BAIK

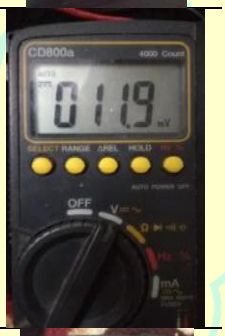
Lampiran 6. Pengujian pemberitahuan Melalui Whatsapp

Slot Parkiran	Kondisi	Kriteria Pengujian	Tampilan
1	Terjadi pencurian	*Push button* tidak aktif *Limit switch* aktif Sensor Ultrasonik mendeteksi ban	
2			
3			

Lampiran 7. Pengukuran Limit Switch dan Push Button

No	Limit Switch	Kriteria Pengujian	Vout	Hasil Pengujian	Tampilan hasil pengukuran
1	*Push button* 1 ditekan	Ketika limit switch dan push button ditekan maka akan mengeluarkan logika HIGH dengan range tegangan 3,5V-5V. Jika limit switch dan push button tidak ditekan maka mengeluarkan logika LOW dengan range tegangan 0-0,7V	4,95V	Baik	
	Push button 1 tidak ditekan		23mV	Baik	
2	*Push button* 2 ditekan		4,95V	Baik	
	Push button 2 tidak ditekan		22,2mV	Baik	
3	*Push button* 3 ditekan		4,95V	Baik	
	Push button 3 tidak ditekan		22,3mV	Baik	

4	*Limit switch* 1 ditekan	4,95V	Baik	
	Limit switch 1 tidak ditekan	22,5mV	Baik	
5	*Limit switch* 2 ditekan	4,94V	Baik	
	Limit switch 2 tidak ditekan	22,3mV	Baik	
6	*Limit switch* 3 ditekan	4,95V	Baik	
	Limit switch 3 tidak ditekan	22,8mV	Baik	

7	*Limit switch* 4 ditekan		4,93V	Baik	
	Limit switch 4 tidak ditekan		21,2mV	Baik	
8	*Limit switch* 5 ditekan		4,94V	Baik	
	Limit switch 5 tidak ditekan		11,9mV	Baik	
9	*Limit switch* 6 ditekan		4,95V	Baik	
	Limit switch 6 tidak ditekan		22,2mV	Baik	

Lampiran 8. Koding Arduino

```
#include <LiquidCrystal_I2C.h>
#include <Keypad.h>
#include <Adafruit_Fingerprint.h>
#include <Servo.h>

Servo motorServo1, motorServo2, motorServo3, motorServo4, motorServo5,
motorServo6;
LiquidCrystal_I2C lcd(0x27, 20, 4);

SoftwareSerial mySerial(11, 10);
Adafruit_Fingerprint finger = Adafruit_Fingerprint(&mySerial);
uint8_t id;
uint8_t p;

int kondisi1 = 0;
int kondisi2 = 0;
int kondisi3 = 0;
int kondisi4 = 0;
int kondisi5 = 0;
int kondisi6 = 0;
int kondisi7 = 0;
int kondisi8 = 0;
int kondisi9 = 0;

int Switch1 = 39;
int Switch2 = 35;
int Switch3 = 31;
int Switch4 = 27;
int Switch5 = 23;
int Switch6 = 22;
int Switch7 = 26;
int Switch8 = 30;
int Switch9 = 34;


int pinBuzzer = A8;
int x = 0;
int y = 0;
int z = 0;
String xx = "whatsapp:+62";
char g[50];
String xx1 = """;
char g1[50];
char newNum1[16] = "";
char newNum2[16] = "";
char newNum3[16] = "";
```

```
char keypressed;

#define trigPin1 15
#define echoPin1 14
#define trigPin2 17
#define echoPin2 16
#define trigPin3 19
#define echoPin3 18

const byte ROWS = 4; //four rows
const byte COLS = 4; //three columns
char keys[ROWS][COLS] = {
  {'1', '2', '3', 'A'},
  {'4', '5', '6', 'B'},
  {'7', '8', '9', 'C'},
  {'*', '0', '#', 'D'}
};
byte rowPins[ROWS] = {44, 45, 46, 47};
byte colPins[COLS] = {40, 41, 42, 43};

Keypad Mykeypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS,
COLS );

void setup()
{
  Serial.begin(9600);
  finger.begin(57600);
  if (finger.verifyPassword()) {
  } else {
    while (1) {
      delay(1);
    }
  }
  finger.getTemplateCount();

  //---------------- PIN ULTRASONIK
  pinMode(trigPin1, OUTPUT);
  pinMode(echoPin1, INPUT);
  pinMode(trigPin2, OUTPUT);
  pinMode(echoPin2, INPUT);
  pinMode(trigPin3, OUTPUT);
  pinMode(echoPin3, INPUT);

  //---------------- PIN SWITCH
  pinMode(Switch1, INPUT);
  pinMode(Switch2, INPUT);
  pinMode(Switch3, INPUT);
```

```
  pinMode(Switch4, INPUT);
  pinMode(Switch5, INPUT);
  pinMode(Switch6, INPUT);
  pinMode(Switch7, INPUT);
  pinMode(Switch8, INPUT);
  pinMode(Switch9, INPUT);
  pinMode(pinBuzzer, OUTPUT);

  //--------------- PIN MOTOR SERVO
  motorServo1.attach(9);
  motorServo2.attach(8);
  motorServo3.attach(7);
  motorServo4.attach(6);
  motorServo5.attach(5);
  motorServo6.attach(4);

  motorServo1.write(150);
  motorServo2.write(0);
  motorServo3.write(150);
  motorServo4.write(0);
  motorServo5.write(150);
  motorServo6.write(0);
  delay(100);
  lcd.begin();
  z = 0;
  y = 0;
  menuutama();
}

uint8_t readnumber(void) {
  uint8_t num = 0;

  while (num == 0) {
    while (! Serial.available());
    num = Serial.parseInt();
  }
  return num;
}

void loop () {
  z = 0;
  y = 0;
  // Ultrasonik 1
  long duration1, distance1;
  digitalWrite(trigPin1, LOW); // Added this line
  delayMicroseconds(2); // Added this line
  digitalWrite(trigPin1, HIGH);
  delayMicroseconds(10); // Added this line
```

```
digitalWrite(trigPin1, LOW);
duration1 = pulseIn(echoPin1, HIGH);
distance1 = (duration1 / 2) / 29.1;

// Ultrasonik 2
long duration2, distance2;
digitalWrite(trigPin2, LOW); // Added this line
delayMicroseconds(2); // Added this line
digitalWrite(trigPin2, HIGH);
delayMicroseconds(10); // Added this line
digitalWrite(trigPin2, LOW);
duration2 = pulseIn(echoPin2, HIGH);
distance2 = (duration2 / 2) / 29.1;

// Ultrasonik 3
long duration3, distance3;
digitalWrite(trigPin3, LOW); // Added this line
delayMicroseconds(2); // Added this line
digitalWrite(trigPin3, HIGH);
delayMicroseconds(10); // Added this line
digitalWrite(trigPin3, LOW);
duration3 = pulseIn(echoPin3, HIGH);
distance3 = (duration3 / 2) / 29.1;

keypressed = Mykeypad.getKey();
if (keypressed) {
  switch (keypressed)
  {
    case 'A':
      parkir();
      break;
    case 'B':
      pilihkeluar();
      break;
    case 'C':
      menuutama();
      break;
  }
}
kondisi1 = digitalRead(Switch1);
kondisi2 = digitalRead(Switch2);
kondisi3 = digitalRead(Switch3);
kondisi4 = digitalRead(Switch4);
kondisi5 = digitalRead(Switch5);
kondisi6 = digitalRead(Switch6);
kondisi7 = digitalRead(Switch7);
kondisi8 = digitalRead(Switch8);
kondisi9 = digitalRead(Switch9);
```

```
  //alarm 1
  if (kondisi1 == LOW && distance1 <= 15 && (kondisi2 == HIGH || kondisi3
== HIGH)) {
    buzz();
    Serial.println(newNum1);
    delay(5000);
  }

  // alarm 2
  if (kondisi4 == LOW && distance2 <= 15 && (kondisi5 == HIGH || kondisi6
== HIGH)) {
    buzz();
    Serial.println(newNum2);
    delay(5000);
  }

  //alarm 3
  if (kondisi7 == LOW && distance3 <= 15 && (kondisi8 == HIGH || kondisi9
== HIGH)) {
    buzz();
    Serial.println(newNum3);
    delay(5000);
  }
}

void menuutama () {
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("A= PARKIR");
  lcd.setCursor(0, 1);
  lcd.print("B= KELUAR PARKIR");
}


void parkir () {
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Pilih Parkir");
  lcd.setCursor(0, 1);
  lcd.print("1 2 3");

  while (z < 1) {
    keypressed = Mykeypad.getKey();
    if (keypressed == '1') {
      kondisi1 = digitalRead(Switch1);
      kondisi2 = digitalRead(Switch2);
      kondisi3 = digitalRead(Switch3);
```

```
    if (kondisi1 == HIGH && distance1 <= 15 && (kondisi2 == LOW &&
kondisi3 == LOW)) {
      numwa1();
    }
    if (kondisi1 == LOW) {
      sensoroff();
    }
    if (kondisi1 == HIGH && distance1 <= 15 && (kondisi2 == HIGH || kondisi3
== HIGH)) {
      parkiransudahada();
    }
  }
  if (keypressed == '2') {
    kondisi4 = digitalRead(Switch4);
    kondisi5 = digitalRead(Switch5);
    kondisi6 = digitalRead(Switch6);
    if (kondisi4 == HIGH && distance2 <= 15 && (kondisi5 == HIGH || kondisi6
== HIGH)) {
    parkiransudahada();
    }
    if (kondisi4 == HIGH && distance2 <= 15 && (kondisi5 == LOW &&
kondisi6 == LOW)) {
      numwa2();
    }
    if (kondisi4 == LOW) {
      sensoroff();
    }
  }
  if (keypressed == '3') {
    kondisi7 = digitalRead(Switch7);
    kondisi8 = digitalRead(Switch8);
    kondisi9 = digitalRead(Switch9);
    if (kondisi7 == HIGH && distance3 <= 15 && (kondisi8 == LOW &&
kondisi9 == LOW)) {
      numwa3();
    }
    if (kondisi7 == LOW) {
      sensoroff();
    }
    if (kondisi7 == HIGH && distance3 <= 15 && (kondisi8 == HIGH || kondisi9
== HIGH)) {
      parkiransudahada();
    }
  }
  if (keypressed == 'C') {
    menuutama();
  }
 }
```

```
}

void parkiransudahada() {
  while (y < 1) {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Parkiran Sudah");
    lcd.setCursor(0, 1);
    lcd.print("Terisi");
    delay(1000);
    menuutama();
  }
}

void sensoroff() {
  while (z < 1) {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("BAN SEPEDA ANDA");
    lcd.setCursor(0, 1);
    lcd.print("BELUM MENYENTUH");
    delay(1000);
    menuutama();
  }
}

void numwa1() {
  lcd.clear();
  lcd.setCursor(2, 0);
  lcd.print("Masukkan Nmr WA1 :");
  lcd.setCursor(0, 3);
  lcd.print("D=hapus");
  lcd.setCursor(10, 3);
  lcd.print("#=Enter");
  lcd.setCursor(0, 1);
  lcd.print("+62");
  while (y < 1) {
    keypressed = Mykeypad.getKey();
    if (keypressed != NO_KEY && keypressed != '#' && keypressed != 'D') {
      newNum1[x] = keypressed;
      newNum1[x + 1] = '\0';
      x++;
      lcd.setCursor(3, 1);
      lcd.print(newNum1);
    }
    if (keypressed == '#') {
      id = 5;
      while (!  getFingerprintEnroll() );
```

```
      lcd.clear();
      lcd.setCursor(2, 0);
      lcd.print("Terima Kasih");
      delay(1000);
      motorServo1.write(0);
      motorServo2.write(150);
      delay(3000);
      menuutama();
    }
    if (keypressed == 'D') {
      lcd.rightToLeft();
      lcd.print(" ");
      lcd.leftToRight();
      lcd.print(" ");
      lcd.rightToLeft();
      lcd.print(" ");
      lcd.leftToRight();
      x--;
      newNum1[x] = 0;
    }
    if (keypressed == 'C') {
      menuutama();
    }

    if (x > 16) {
      lcd.clear();
      lcd.setCursor(0, 0);
      lcd.print("invalid number");
      lcd.setCursor(0, 1);
      lcd.print("12 digits only");
      delay(1000);
      x = 0;
      numwa1();
    }
  }
}

void numwa2() {
  lcd.clear();
  lcd.setCursor(2, 0);
  lcd.print("Masukkan Nmr WA2 :");
  lcd.setCursor(0, 3);
  lcd.print("D=hapus");
  lcd.setCursor(10, 3);
  lcd.print("#=Enter");
  lcd.setCursor(0, 1);
  lcd.print("+62");
  while (z < 1) {
```

```
    keypressed = Mykeypad.getKey();
    if (keypressed != NO_KEY && keypressed != '#' && keypressed != 'D') {
      newNum2[x] = keypressed;
      newNum2[x + 1] = '\0';
      x++;
      lcd.setCursor(3, 1);
      lcd.print(newNum2);
    }
    if (keypressed == '#') {
      id = 7;
      while (!  getFingerprintEnroll() );
      lcd.clear();
      lcd.setCursor(2, 0);
      lcd.print("Terima Kasih");
      delay(1000);
      motorServo3.write(0);
      motorServo4.write(150);
      delay(3000);
      menuutama();
    }
    if (keypressed == 'D') {
      lcd.rightToLeft();
      lcd.print(" ");
      lcd.leftToRight();
      lcd.print(" ");
      lcd.rightToLeft();
      lcd.print(" ");
      lcd.leftToRight();
      x--;
      newNum2[x] = 0;
    }
    if (keypressed == 'C') {
      menuutama();
    }
    if (x > 16) {
      lcd.clear();
      lcd.setCursor(0, 0);
      lcd.print("invalid number");
      lcd.setCursor(0, 1);
      lcd.print("12 digits only");
      delay(1000);
      numwa2();
    }
  }
}

void numwa3() {
  lcd.clear();
```

```
lcd.setCursor(2, 0);
lcd.print("Masukkan Nmr WA3 :");
lcd.setCursor(0, 3);
lcd.print("D=hapus");
lcd.setCursor(10, 3);
lcd.print("#=Enter");
lcd.setCursor(0, 1);
lcd.print("+62");
while (z < 1) {
  keypressed = Mykeypad.getKey();
  if (keypressed != NO_KEY && keypressed != '#' && keypressed != 'D') {
    newNum3[x] = keypressed;
    newNum3[x + 1] = '\0';
    x++;
    lcd.setCursor(3, 1);
    lcd.print(newNum3);
  }
  if (keypressed == '#') {
    id = 9;
    while (!  getFingerprintEnroll() );
    lcd.clear();
    lcd.setCursor(2, 0);
    lcd.print("Terima Kasih");
    delay(1000);
    motorServo5.write(0);
    motorServo6.write(150);
    delay(3000);
    menuutama();
  }
  if (keypressed == 'D') {
    lcd.rightToLeft();
    lcd.print(" ");
    lcd.leftToRight();
    lcd.print(" ");
    lcd.rightToLeft();
    lcd.print(" ");
    lcd.leftToRight();
    x--;
    newNum3[x] = 0;
  }
  if (keypressed == 'C') {
    menuutama();
  }
  if (x > 16) {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("invalid number");
    lcd.setCursor(0, 1);
```

```
      lcd.print("12 digits only");
      delay(1000);
      numwa3();
    }
  }
}
//------------------------------- KELUAR -------------------------------
void pilihkeluar() {
  while (y < 1) {
    id = getFingerprintIDez();
    getFingerprintIDez();
    delay(50);
  }
}
//---------------------------------- ENROLL
uint8_t getFingerprintEnroll() {
  int p = -1;
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Tempel Jari Anda");

  while (p != FINGERPRINT_OK) {
    p = finger.getImage();

  }
  // OK success!
  p = finger.image2Tz(1);
  switch (p) {
    case FINGERPRINT_OK:
      break;
    case FINGERPRINT_IMAGEMESS:
      return p;
    case FINGERPRINT_PACKETRECIEVEERR:
      return p;
    case FINGERPRINT_FEATUREFAIL:
      return p;
    case FINGERPRINT_INVALIDIMAGE:
      return p;
    default:
      return p;
  }
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Lepas Jari");
  lcd.setCursor(6, 1);
  lcd.print("Anda");
  p = 0;
  while (p != FINGERPRINT_NOFINGER) {
```

```
  p = finger.getImage();
}
p = -1;

lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Tempelkan Kembali");
lcd.setCursor(0, 1);
lcd.print("Jari Anda");
//
while (p != FINGERPRINT_OK) {
  p = finger.getImage();
}
// OK success!
p = finger.image2Tz(2);
switch (p) {
  case FINGERPRINT_OK:
    break;
  case FINGERPRINT_IMAGEMESS:
    return p;
  case FINGERPRINT_PACKETRECIEVEERR:
    return p;
  case FINGERPRINT_FEATUREFAIL:
    return p;
  case FINGERPRINT_INVALIDIMAGE:
    return p;
  default:
    return p;
}
// OK converted!
p = finger.createModel();
if (p == FINGERPRINT_OK) {
} else if (p == FINGERPRINT_PACKETRECIEVEERR) {
  return p;
} else if (p == FINGERPRINT_ENROLLMISMATCH) {
  return p;
} else {
  return p;
}
p = finger.storeModel(id);
if (p == FINGERPRINT_OK) {
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Sidik Jari Tersimpan");
  delay(1000);
  menuutama();
} else if (p == FINGERPRINT_PACKETRECIEVEERR) {
  return p;
```

```
  } else if (p == FINGERPRINT_BADLOCATION) {
    return p;
  } else if (p == FINGERPRINT_FLASHERR) {
    return p;
  } else {
    return p;
  }
}

//---------------------- FINGERPRINT ---------------------------------
int getFingerprintIDez() {
  lcd.clear();
  lcd.print("Tempel Jari Anda");
  uint8_t p = finger.getImage();       //Image scanning
  if (p != FINGERPRINT_OK)  return -1;
  p = finger.image2Tz();              //Converting
  if (p != FINGERPRINT_OK)  return -1;
  p = finger.fingerFastSearch();     //Looking for matches in the internal memory
  if (p != FINGERPRINT_OK) {         //if the searching fails it means that the
template isn't registered
    lcd.clear();                  //And here we write a message or take an action for the
denied template
    lcd.print("Akses Ditolak");
    delay(2000);
    lcd.clear();
    lcd.print("Letakkan Jari Kembali");
    return -1;
  }
  if (finger.fingerID == 5) {
    lcd.clear();
    lcd.print("Selamat Datang");
    motorServo1.write(150);
    motorServo2.write(0);
    delay(2000);
    menuutama();
  }
  if (finger.fingerID == 7) {
    lcd.clear();
    lcd.print("Selamat Datang");
    motorServo3.write(150);
    motorServo4.write(0);
    delay(2000);
    menuutama();
  }
  if (finger.fingerID == 9) {
    lcd.clear();
    lcd.print("Selamat Datang");
    motorServo5.write(150);
```

```
    motorServo6.write(0);
    delay(2000);
    menuutama();
  }
}

void buzz() {
  digitalWrite(pinBuzzer, HIGH);
  delay(300);
  digitalWrite(pinBuzzer, LOW);
  delay(300);
  digitalWrite(pinBuzzer, HIGH);
  delay(300);
  digitalWrite(pinBuzzer, LOW);
  delay(300);
  digitalWrite(pinBuzzer, HIGH);
  delay(300);
  digitalWrite(pinBuzzer, LOW);
  delay(300);
  digitalWrite(pinBuzzer, HIGH);
  delay(300);
  digitalWrite(pinBuzzer, LOW);
  delay(300);
}
```

Lampiran 9. Kodingan Raspberry

```
import time
import serial
from twilio.rest import Client
arduinoserial = serial.Serial('/dev/ttyACM0',9600)

account_sid = 'AC9afbcbc506ce5669b185439'

auth_token = 'b62781074a5565f81ee83e4dde'

client = Client(account_sid, auth_token)

while True:
    read_serial=arduinoserial.readline()
    print(read_serial)
    message = client.messages.create(
        body = "SEPEDA ANDA AKAN DICURI!!!",
        from_= 'whatsapp:+141552386',
        to = read_serial
        )
time.sleep(1)
print(message.sid)
arduinoserial.close()
```

RIWAYAT HIDUP

Fajri Maulana, lahir di Jakarta pada tanggal 26 juni 1997, dari pasangan Endang S Suryana dan Titin sebagai anak kedua dari tiga bersaudara. Bertempat tinggal di Jl. Radjiman Wedyodiningrat, Kp.Rawa Badung RT.07 RW.07 No.93 Kel. Jatinegara, Kec. Cakung, Jakarta Timur, DKI Jakarta. Peneliti menyelesaikan pendidikan formal dimulai dari pendidikan dasar yang ditempuh di SDN Jatinegara 15.agi selama 6 Tahun dan lulus pada tahun 2009. Selanjutnya peneliti melanjutkan pendidikan formalnya di sekolah menegah pertama selama 3 tahun di SMP Negeri 170 Jakarta dan lulus pada tahun 2012. Kemudian peneliti melanjutkan pendidikn formlnya ke sekolah menengah atas di SMA Negeri 83 Jakarta sejak tahun 2012 hingga lulus pada tahun 2015. Setelah tamat SMA peneliti melnjutkan pendidikan ke Universitas Negeri Jakarta dengan jalur ujian masuk SNMPTN pada tahun 2015 di Program Studi Pendidikan Vokasional Teknik Elektronika, Fakultas Teknik, Universitas Negeri Jakarta.