

## LAMPIRAN

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <Servo.h>
#include <Ultrasonic.h>
#include <Adafruit_MLX90614.h>

#define SERVO_PIN 9
#define LED_GREEN 7
#define LED_RED 6
#define PUSH_BUTTON_PIN 8
#define USTRIG_PIN 12
#define USECHO_PIN 13

#define START_RUN 'a'
#define RESTART_ESP32 'r'
#define RESTART_SCAN 'n'

#define CLOSE_DOOR 180
#define OPEN_DOOR 90
#define DOOR_LOCK 0
#define OPEN_DOOR_TIME 4000
#define CLOSE_DOOR_TIME 1000
#define DELAY_TEMP_SUCCESS 2000
#define RESTART_TIME 5000

#define ON 0
#define OFF 1

#define MASK_DETECT_TH 80 //in percent %
#define START_SCAN_COUNT 15
#define DISTANCE_ERROR_COUNT 10
#define ERROR_COUNT 3
#define TEMP_MAX_ALLOWABLE 39
```

```

#define TEMP_THRESHOLD                35

#define MINIMUM_DISTANCE              35
#define MAXIMUM_DISTANCE              60

#define NO_OBJECT                     -1
#define TEMP_LOW                      0
#define TEMP_HIGH                     1
#define TEMP_ALLOWED                  2

#define SCAN_NO_OBJECT                0
#define SCAN_PASS                     1
#define SCAN_ERROR                    2

#define DISP_IP_INDEX                 0
#define DISP_DISTANCE_ERROR_INDEX     1

LiquidCrystal_I2C lcd(0x27,16,2); // set the LCD address to 0x27
for a 16 chars and 2 line display

Servo myServo;

Ultrasonic ultrasonic(USTRIG_PIN, USECHO_PIN);
Adafruit_MLX90614 mlx = Adafruit_MLX90614();

char gszIP_Add[20];
unsigned short gusMask_Detect = 0;
unsigned short gusLCD_Index = 0;
unsigned short gusDisp_Index = 0;
unsigned short gusIsNeedDisp = 1;
unsigned short gusIsNeed_Restart = 0;
unsigned short gusIsSend_Request = 0;

unsigned long gulStart_Timer_LCD = 0;
unsigned long gulRestart_Timer = 0;
unsigned long gulDistance_Timer = 0;

```

```

void setup()
{
    char szData[30];
    unsigned short usExit = 0;
    unsigned short usData_Len = 0;
    short a = 0;

    Serial.begin(9600);
    mlx.begin();

    lcd.init(); // initialize the lcd
    lcd.backlight();

    pinMode(PUSH_BUTTON_PIN, INPUT_PULLUP);
    pinMode(LED_GREEN, OUTPUT);
    pinMode(LED_RED, OUTPUT);

    vLED_Control(SCAN_NO_OBJECT);
    vServo_Control(DOOR_LOCK);

    lcd.clear();
    lcd.print("Wifi");
    lcd.setCursor(0,1);
    lcd.print("connecting...");

    memset(szData, '\0', sizeof(szData));
    memset(gszIP_Add, '\0', sizeof(gszIP_Add));

    do
    {
        usData_Len = usRead_Serial_Data(szData, sizeof(szData));

        if(usData_Len > 0)
        {
            for(short i=0; i<usData_Len; i++)

```

```

    {
        if(szData[i] == '#')
        {
            i++;
            while(szData[i] != ',')
            {
                gszIP_Add[a] = szData[i++];
                a++;
            }
            usExit = 1;
            break;
        }
    }
}
else
{
    if((millis() - gulRestart_Timer) > RESTART_TIME)
    {
        Serial.println(RESTART_SCAN);
        gulRestart_Timer = millis();
    }
}
}while(usExit == 0);

vLCD_Disp_Ip(gszIP_Add);
gusDisp_Index = DISP_IP_INDEX;
gulStart_Timer_LCD = millis();
}

void loop()
{
    char szData[30];
    unsigned short usExit = 0;
    unsigned short usTempExit = 0;
    unsigned short usData_Len = 0;

```

```

unsigned short usTemp_Allowed = NO_OBJECT;
unsigned short usIsNeed_Rescan = 0;
unsigned short usFace_Distance = 0;
unsigned short usStart_Scanning_Count = 0;
unsigned short usDistance_Error = 0;
unsigned short usError_Count = 0;
short sMask_Percent = 0;
float fTemperature_Object = 0;

while(usTempExit == 0)
{
    fTemperature_Object = mlx.readObjectTempC();

    if(fTemperature_Object > TEMP_MAX_ALLOWABLE)
    {
        // temp high
        vLED_Control(SCAN_ERROR);
        usTemp_Allowed = TEMP_HIGH;
        gusIsNeedDisp = 1;
    }
    else if(fTemperature_Object > TEMP_THRESHOLD)
    {
        vLED_Control(SCAN_PASS);
        usTemp_Allowed = TEMP_ALLOWED;

        gusIsNeedDisp = 1;
        usTempExit = 1;
    }
    else
    {
        vLED_Control(SCAN_NO_OBJECT);
        usTemp_Allowed = NO_OBJECT;
    }

    if(gusIsNeedDisp == 1)

```

```

{
    if(usTemp_Allowed != NO_OBJECT)
    {
        vDisp_Temp_Sensor(usTemp_Allowed, fTemperature_Object);
    }
    else if(usTemp_Allowed == NO_OBJECT)
    {
        vLCD_Disp_Ip(gszIP_Add);
        gusDisp_Index = DISP_IP_INDEX;
    }
    gusIsNeedDisp = 0;
}
vLCD_Disp_Timer_Index();
sRead_But();
}

delay(DELAY_TEMP_SUCCESS);
vLED_Control(SCAN_NO_OBJECT);

while(usTempExit == 1)
{
    usExit = 0;

    usFace_Distance = usRead_Distance();

    if((usFace_Distance > MINIMUM_DISTANCE) && (usFace_Distance <
MAXIMUM_DISTANCE))
    {
        usStart_Scanning_Count++;

        vDisp_Scanning();
    }
    else
    {
        usStart_Scanning_Count = 0;
    }
}

```

```

}

if(usStart_Scanning_Count > START_SCAN_COUNT)
{
    //optimal distance to scan face
    memset(szData, '\\0', sizeof(szData));

    do
    {
        usFace_Distance = usRead_Distance();

        if((usFace_Distance > MINIMUM_DISTANCE) &&
(usFace_Distance < MAXIMUM_DISTANCE))
        {
            if(gusIsSend_Request == 0)
            {
                Serial.println(START_RUN);
                gusIsSend_Request = 1;
            }

            usData_Len = usRead_Serial_Data(szData, sizeof(szData));
            //Read data from ESP32-CAM
            if(usData_Len > 0)
            {
                if(szData[0] == '*')
                {
                    sscanf(szData, "%d", &sMask_Percent); // ESP32-CAM
will return mask percent to Arduino

                    usIsNeed_Rescan = 0;
                    gusIsSend_Request = 0;
                    usExit = 1;
                }
            }
        }
    }
else

```

```

    {
        usDistance_Error++;
    }

    if(usDistance_Error > DISTANCE_ERROR_COUNT)
    {
        usDistance_Error = 0;

        usIsNeed_Rescan = 1;
        usExit = 1;
    }
}while(usExit == 0);

if(usIsNeed_Rescan == 0)
{
    vLCD_Disp_Status(sMask_Percent);

    if(sMask_Percent >= MASK_DETECT_TH) //if the percentage is
higher than MASK_DETECT_TH (80%), door will open
    {
        usTempExit = 0;
        vDoor_Control(ON);
    }
else
{
    vDoor_Control(OFF);
    usError_Count++;

    if(usError_Count >= ERROR_COUNT)
    {
        usTempExit = 0;
    }
}
}
}

```



```

else if(usIsNeed_Rescan == 1)
{
    usError_Count++;

    if(usError_Count >= ERROR_COUNT)
    {
        usTempExit = 0;
    }
    else
    {
        short a = 0;
        vLCD_Disp_Error_Scan();
        vLED_Control(SCAN_ERROR);
        memset(szData, '\0', sizeof(szData));
        Serial.println(RESTART_ESP32);
        gulRestart_Timer = millis();

        do
        {
            usData_Len = usRead_Serial_Data(szData,
sizeof(szData)); //Read data from ESP32-CAM, and dump previous
data.

            if(usData_Len > 0)
            {
                gusIsSend_Request = 0;
                for(short i=0; i<usData_Len; i++)
                {
                    if(szData[i] == '#')
                    {
                        i++;
                        while(szData[i] != ',')
                        {
                            gszIP_Add[a] = szData[i++];
                            a++;
                        }
                    }
                }
            }
        }
    }
}

```

```

        usExit = 0;
        break;
    }
}
else
{
    if((millis() - gulRestart_Timer) > RESTART_TIME)
    {
        Serial.println(RESTART_SCAN);
        gulRestart_Timer = millis();
    }
}
}while(usExit == 1);
}
}
else
{
    vLED_Control(SCAN_NO_OBJECT);

    if(gusIsNeedDisp == 1)
    {
        vLCD_Disp_Scan_Face(usFace_Distance);
        gusDisp_Index = DISP_DISTANCE_ERROR_INDEX;
        gusIsNeedDisp = 0;
    }
}
vLCD_Disp_Timer_Index();
sRead_But();
}
}
void vDisp_Scanning()
{
    lcd.clear();

```

```

    lcd.print("SCANNING...");

    lcd.setCursor(0,1);

    lcd.print("Pls wait & hold.");

}

//PERCENTAGE OF FACE DETECTED, MORE FACE DETECTED, LOW PERCENTAGE,
NO MASK

void vLCD_Disp_Status(short sMask_Percent)
{
    lcd.clear();

    lcd.print("Mask: ");

    lcd.print(sMask_Percent);

    lcd.print("%");

    lcd.setCursor(0,1);

    if(sMask_Percent >= MASK_DETECT_TH)
    {
        lcd.print("Enter Allowed.");
    }
    else
    {
        lcd.print("PLEASE WEAR MASK");
    }
}

void          vDisp_Temp_Sensor(short          usTemp_Allowed,          float
fTemperature_Object)
{
    lcd.clear();

    lcd.setCursor(0,0);

    lcd.print("Body Temp: ");

    lcd.print(fTemperature_Object);

    lcd.print(char(223));

    lcd.print("C");

    lcd.setCursor(0,1);

    if(usTemp_Allowed == TEMP_ALLOWED)

```

```

    {
        lcd.print("Body Temp OK");
    }
    else if(usTemp_Allowed == TEMP_HIGH)
    {
        lcd.print("Body Temp HIGH");
    }
    else if(usTemp_Allowed == TEMP_LOW)
    {
        lcd.print("Body Temp LOW");
    }
}
void vLCD_Disp_Ip(char *szIp)
{
    lcd.clear();

    if(gusLCD_Index == 0)
    {
        lcd.setCursor(2,0);
        lcd.print("PLEASE SCAN");
        lcd.setCursor(2,1);
        lcd.print("TEMPERATURE");
    }
    else
    {
        lcd.setCursor(1,0);
        lcd.print("CONNECTED TO:");
        lcd.setCursor(1,1);
        lcd.print(szIp);
    }
}
void vLCD_Disp_Scan_Face(unsigned short usFace_Distance)
{
    lcd.clear();
    if(gusLCD_Index == 0)

```

```

{
    lcd.setCursor(0,0);
    lcd.print("Pls Scan ur face");
    lcd.setCursor(0,1);
    lcd.print(MINIMUM_DISTANCE);
    lcd.print("-");
    lcd.print(MAXIMUM_DISTANCE);
    lcd.print("cm from cam");
}
else if(gusLCD_Index == 1)
{
    lcd.setCursor(0,0);
    lcd.print("youre ");
    lcd.print(usFace_Distance);
    lcd.print("cm away");

    lcd.setCursor(0,1);
    if(usFace_Distance > MAXIMUM_DISTANCE)
    {
        lcd.print("Move Closer.. ");
    }
    else if(usFace_Distance < MINIMUM_DISTANCE)
    {
        lcd.print("Take a step back..");
    }
}
}

void vDisp_Face_Distance_Error(unsigned short usFace_Distance)
{
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("youre ");
    lcd.print(usFace_Distance);
    lcd.print("cm away");
}

```

```

lcd.setCursor(0,1);
if(usFace_Distance > MAXIMUM_DISTANCE)
{
    lcd.print("Move Closer.. ");
}
else if(usFace_Distance < MINIMUM_DISTANCE)
{
    lcd.print("Take a step back..");
}
}
void vLCD_Disp_Error_Scan()
{
    lcd.clear();
    lcd.print("Take a step back");
    lcd.setCursor(0,1);
    lcd.print("and rescan again");
}
void vLED_Control(short sScan_Status)
{
    if(sScan_Status == SCAN_PASS)
    {
        digitalWrite(LED_GREEN,HIGH);
        digitalWrite(LED_RED,LOW);
    }
    else if(sScan_Status == SCAN_ERROR)
    {
        digitalWrite(LED_GREEN,LOW);
        digitalWrite(LED_RED,HIGH);
    }
    else
    {
        digitalWrite(LED_GREEN,LOW);
        digitalWrite(LED_RED,LOW);
    }
}
}

```

```

void vLCD_Disp_Timer_Index()
{
    if((millis() - gulStart_Timer_LCD) >= 1000)
    {
        gusLCD_Index++;

        if(gusDisp_Index == DISP_IP_INDEX)
        {
            if(gusLCD_Index > 1)
            {
                gusLCD_Index = 0;
            }
        }
        else if(gusDisp_Index == DISP_DISTANCE_ERROR_INDEX)
        {
            if(gusLCD_Index > 1)
            {
                gusLCD_Index = 0;
            }
        }

        gusIsNeedDisp = 1;
        gulStart_Timer_LCD = millis();
    }
}

short sRead_But()
{
    short sBut_Status = 0;

    sBut_Status = digitalRead(PUSH_BUTTON_PIN);

    if(sBut_Status == HIGH)
    {
        vDoor_Control(ON);
    }
}

```

```

    gusLCD_Index = 0;
    gulStart_Timer_LCD = millis();
    gusIsNeedDisp = 1;
}
}
void vDoor_Control(short sOnOff)
{
    if(sOnOff == ON)
    {
        vLED_Control(SCAN_PASS);
        vServo_Control(OPEN_DOOR);
        delay(OPEN_DOOR_TIME);

        vServo_Control(CLOSE_DOOR);
        delay(CLOSE_DOOR_TIME);
    }
    else
    {
        vServo_Control(DOOR_LOCK);
        vLED_Control(SCAN_ERROR);
        delay(OPEN_DOOR_TIME);
    }
}
unsigned short usRead_Distance()
{
    unsigned short usFace_Distance = 0;

    usFace_Distance = ultrasonic.read();
    delay(50);

    return usFace_Distance;
}
//CONTROL SERVO BASED ON RESULTS
void vServo_Control(int sDoor_Status)
{

```



```

myServo.attach(SERVO_PIN);

if(sDoor_Status == OPEN_DOOR) //open door
{
    for(int i = CLOSE_DOOR; i > OPEN_DOOR; i--)
    {
        myServo.write(i);
        delay(20);
    }
}
else if(sDoor_Status == CLOSE_DOOR)
{
    for(int i = OPEN_DOOR; i < CLOSE_DOOR; i++)
    {
        myServo.write(i);
        delay(20);
    }
}
else if(sDoor_Status == DOOR_LOCK)
{
    myServo.write(CLOSE_DOOR);
}

myServo.detach();
}

//READ SERIAL DATA FROM ESP32-CAM
unsigned short usRead_Serial_Data(char *szData, short sDataSize)
{
    short i=0;

    if(Serial.available())
    {
        *(szData+i) = Serial.read();
        i++;
        delay(2);
    }
}

```

```
while (Serial.available())
{
  *(szData+i) = Serial.read();
  i++;

  if(i >= sDataSize)
  {
    break;
  }
  delay(2);
}

Serial.flush();

return i;
}
```



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NO	TANGGAL	URAIAN	PARAF PEMBIMBING
	9/8-2023	- Perbaiki Alat - Tambahkan skema rangkai pd bab 3	
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No	Uraian	Paraf
	Total tulisan Laporan akhir direvisi, disesuaikan format lapa. akhir (6abp/1. 6al.5).	

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1.	Revisi. Lomba. LA.	

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No	Uraian	Paraf
1	Tata tulis harus di perbaiki dan harus konsisten (stilah asing di cetak miring)	
2	Abstrak di perbaiki	
3	Letter belakang di perbaiki -	
4	indeks di perbaiki	
5	Referensi, Bibliografi, Tugasan dan Montasok di perbaiki	
6	Sub FF tambahkan teori tentang api panas dan kebakaran	
7	Block Diagram di perbaiki	
8	Flow chart di perbaiki	
9	perbaikan di perbaiki	
10	komputer di perbaiki	

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No	Uraian	Paraf
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REVISI UJIAN TUGAS AKHIR



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Dilengkapi Pendeteksi Kebakaran Berbasis IOT

No	Uraian	Paraf
1	Revisi judul.	✓ Ef 25/9 2023
2	Tambahkan rancangan h/w (skematik), rancangan s/w, rancangan mende.	✓
3	Hal 8 → Hilangkan kata "saye" diganti penulis.	✓ Ef 3/9 2023
4	Judul tabel di atas, judul gambar di bawah.	✓ Ef 25/9 2023

Palembang, 16/8/2023  
Dosen Penguji,

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PELAKSANAAN REVISI UJIAN TUGAS AKHIR

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Telah melaksanakan revisi terhadap Laporan Tugas Akhir yang diujikan pada hari ..... tanggal ..... bulan ..... tahun .....  
Pelaksanaan revisi terhadap Laporan Tugas Akhir tersebut telah disetujui oleh Dosen Penguji yang memberikan revisi:

No	Komentar	Nama Dosen Penguji	Tanggal/ bulan	Tanda Tangan
1.	ACC	Ahyar Supani, S.T., M.T	18/9 2023	
2.	Acc	Herlambang Saputra, M.Kom., Ph.D.	21/10 -24	
3.	ok Acc	Mustaziri, ST., M.Kom.	3/10 21	
4.	Acc	M.Miftakhul Amin, S.Kom, M.Eng.	13/9 2023	
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