

## LAMPIRAN

### A. Kode Program Arduino

#### - Mikrokontroler

```
const int relay = 2;
const int pinAout = A1;
const int com = 5;
const int buzz = 6;
LiquidCrystal_I2C lcd(0x27, 16, 2);

void setup() {
    //Init the serial port communication - to debug the library
    Serial.begin(9600); //Init serial port
    lcd.init();
    lcd.backlight();
    pinMode(relay, OUTPUT);
    pinMode(com, OUTPUT);
    pinMode(buzz, OUTPUT);
    digitalWrite(relay , HIGH);
    digitalWrite(com, HIGH);
    digitalWrite(buzz, LOW);
    lcd.setCursor(0, 0); lcd.print("Standby...");

    //Set math model to calculate the PPM concentration and the value of constants
    MQ2.setRegressionMethod(1); //_PPM = a*ratio^b
    MQ2.setA(574.25); MQ2.setB(-2.222); // Configure the equation to calculate
    LPG concentration
    MQ2.init();
    Serial.print("Calibrating please wait.");
    float calcR0 = 0;
    for (int i = 1; i <= 10; i++)
    {
```

```

MQ2.update(); // Update data, the arduino will read the voltage from the analog
pin
calcR0 += MQ2.calibrate(RatioMQ2CleanAir);
Serial.print(".");
}

MQ2.setR0(calcR0 / 10);
Serial.println(" done!.!");

if (isinf(calcR0)) {
    Serial.println("Warning: Connection issue, R0 is infinite (Open circuit detected)
please check your wiring and supply");
    while (1);
}
if (calcR0 == 0) {
    Serial.println("Warning: Connection issue found, R0 is zero (Analog pin shorts to
ground) please check your wiring and supply");
    while (1);
}
*****
/*MQ CAlibration *****/
}

MQ2.serialDebug(true);
}

void loop() {
    MQ2.update(); // Update data, the arduino will read the voltage from the analog
pin
    MQ2.readSensor(); // Sensor will read PPM concentration using the model, a and
b values set previously or from the setup
    MQ2.serialDebug(); // Will print the table on the serial port
    delay(500); //Sampling frequency
}

```

```

lcd.setCursor(0, 0); lcd.print("Smoke:"); lcd.print(MQ2._PPM); lcd.print(" PPM
");
if (MQ2._PPM >= 20) {
    digitalWrite(relay, LOW);
    digitalWrite(com, LOW);
    digitalWrite(buzz, HIGH);
    delay(10000);
    digitalWrite(relay, HIGH);
    Serial.println("bahaya");
}
else {
    //digitalWrite(relay, HIGH);
    digitalWrite(com, HIGH);
    digitalWrite(buzz, LOW);
}
}

```

## B. Kode Program ESP32 Cam

```

// AI Thinker ESP32-CAM

#include <Arduino.h>
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include "soc/soc.h"
#include "soc/rtc_cntl_reg.h"
#include "esp_camera.h"
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>

const char* ssid = "Semesta";
const char* password = "12345678";

```

```

// Initialize Telegram BOT

String BOTtoken = "6015153939:AAFgmoFwbqDAn-
zqtrJddQATycDkHaeCaFk"; // your Bot Token (Get from Botfather)

// Use @myidbot to find out the chat ID of an individual or a group
// Also note that you need to click "start" on a bot before it can
// message you

String CHAT_ID = "1109492936";

bool sendPhoto = false;

WiFiClientSecure clientTCP;
UniversalTelegramBot bot(BOTtoken, clientTCP);

#define FLASH_LED_PIN 4
bool flashState = LOW;

//Checks for new messages every 1 second.
int botRequestDelay = 1000;
unsigned long lastTimeBotRan;

//CAMERA_MODEL_AI_THINKER
#define PWDN_GPIO_NUM 32
#define RESET_GPIO_NUM -1
#define XCLK_GPIO_NUM 0
#define SIOD_GPIO_NUM 26
#define SIOC_GPIO_NUM 27

#define Y9_GPIO_NUM 35
#define Y8_GPIO_NUM 34

```

```
#define Y7_GPIO_NUM    39
#define Y6_GPIO_NUM    36
#define Y5_GPIO_NUM    21
#define Y4_GPIO_NUM    19
#define Y3_GPIO_NUM    18
#define Y2_GPIO_NUM     5
#define VSYNC_GPIO_NUM  25
#define HREF_GPIO_NUM   23
#define PCLK_GPIO_NUM   22
#define Foto 13
int foto = 0;
```

```
void configInitCamera() {
    camera_config_t config;
    config.ledc_channel = LEDC_CHANNEL_0;
    config.ledc_timer = LEDC_TIMER_0;
    config.pin_d0 = Y2_GPIO_NUM;
    config.pin_d1 = Y3_GPIO_NUM;
    config.pin_d2 = Y4_GPIO_NUM;
    config.pin_d3 = Y5_GPIO_NUM;
    config.pin_d4 = Y6_GPIO_NUM;
    config.pin_d5 = Y7_GPIO_NUM;
    config.pin_d6 = Y8_GPIO_NUM;
    config.pin_d7 = Y9_GPIO_NUM;
    config.pin_xclk = XCLK_GPIO_NUM;
    config.pin_pclk = PCLK_GPIO_NUM;
    config.pin_vsync = VSYNC_GPIO_NUM;
    config.pin_href = HREF_GPIO_NUM;
    config.pin_sscb_sda = SIOD_GPIO_NUM;
```

```

config.pin_sscb_scl = SIOC_GPIO_NUM;
config.pin_pwdn = PWDN_GPIO_NUM;
config.pin_reset = RESET_GPIO_NUM;
config.xclk_freq_hz = 20000000;
config.pixel_format = PIXFORMAT_JPEG;

//init with high specs to pre-allocate larger buffers
if(psramFound()) {
    config.frame_size = FRAMESIZE_UXGA;
    config.jpeg_quality = 10; //0-63 lower number means higher quality
    config.fb_count = 2;
} else {
    config.frame_size = FRAMESIZE_SVGA;
    config.jpeg_quality = 12; //0-63 lower number means higher quality
    config.fb_count = 1;
}
// camera init
esp_err_t err = esp_camera_init(&config);
if (err != ESP_OK) {
    Serial.printf("Camera init failed with error 0x%x", err);
    delay(1000);
    ESP.restart();
}

// Drop down frame size for higher initial frame rate
sensor_t * s = esp_camera_sensor_get();
s->set_framesize(s, FRAMESIZE_CIF); // UXGA|SXGA|XGA|SVGA|VGA|CIF|QVGA|HQVGA|QQVGA
}

void handleNewMessages(int numNewMessages) {

```

```

Serial.print("Handle New Messages: ");
Serial.println(numNewMessages);

for (int i = 0; i < numNewMessages; i++) {
    String chat_id = String(bot.messages[i].chat_id);
    if (chat_id != CHAT_ID) {
        bot.sendMessage(chat_id, "Unauthorized user", "");
        continue;
    }
    // Print the received message
    String text = bot.messages[i].text;
    Serial.println(text);

    String from_name = bot.messages[i].from_name;
    if (text == "/start") {
        String welcome = "Welcome , " + from_name + "\n";
        welcome += "Use the following commands to interact with the ESP32-CAM
\n";
        welcome += "/photo : takes a new photo\n";
        welcome += "/flash : toggles flash LED \n";
        bot.sendMessage(CHAT_ID, welcome, "");
    }
    if (text == "/flash") {
        flashState = !flashState;
        digitalWrite(FLASH_LED_PIN, flashState);
        Serial.println("Change flash LED state");
    }
    if (text == "/photo") {
        sendPhoto = true;
        Serial.println("New photo request");
    }
}

```

```

        }

    }

}

String sendPhotoTelegram() {
    const char* myDomain = "api.telegram.org";
    String getAll = "";
    String getBody = "";

    camera_fb_t * fb = NULL;
    fb = esp_camera_fb_get();
    if (!fb) {
        Serial.println("Camera capture failed");
        delay(1000);
        ESP.restart();
        return "Camera capture failed";
    }
    Serial.println("Connect to " + String(myDomain));

    if (clientTCP.connect(myDomain, 443)) {
        Serial.println("Connection successful");

        String head = "--RandomNerdTutorials\r\nContent-Disposition: form-data; name=\"chat_id\"; \r\n\r\n" + CHAT_ID + "\r\n--RandomNerdTutorials\r\nContent-Disposition: form-data; name=\"photo\"; filename=\"esp32-cam.jpg\"\r\nContent-Type: image/jpeg\r\n\r\n";
        String tail = "\r\n--RandomNerdTutorials--\r\n";
        uint16_t imageLen = fb->len;
        uint16_t extraLen = head.length() + tail.length();
        uint16_t totalLen = imageLen + extraLen;

        clientTCP.println("POST /bot" + BOTtoken + "/sendPhoto HTTP/1.1");

```

```

clientTCP.println("Host: " + String(myDomain));
clientTCP.println("Content-Length: " + String(totalLen));
clientTCP.println("Content-Type: multipart/form-data;
boundary=RandomNerdTutorials");
clientTCP.println();
clientTCP.print(head);

uint8_t *fbBuf = fb->buf;
size_t fbLen = fb->len;
for (size_t n = 0; n < fbLen; n = n + 1024) {
    if (n + 1024 < fbLen) {
        clientTCP.write(fbBuf, 1024);
        fbBuf += 1024;
    }
    else if (fbLen % 1024 > 0) {
        size_t remainder = fbLen % 1024;
        clientTCP.write(fbBuf, remainder);
    }
}

clientTCP.print(tail);
esp_camera_fb_return(fb);
int waitTime = 10000; // timeout 10 seconds
long startTimer = millis();
boolean state = false;

while ((startTimer + waitTime) > millis()) {
    Serial.print(".");
    delay(100);
    while (clientTCP.available()) {

```

```

char c = clientTCP.read();
if (state == true) getBody += String(c);
if (c == '\n') {
    if (getAll.length() == 0) state = true;
    getAll = "";
}
else if (c != '\r')
    getAll += String(c);
startTimer = millis();
}
if (getBody.length() > 0) break;
}
clientTCP.stop();
Serial.println(getBody);
}
else {
    getBody = "Connected to api.telegram.org failed.";
    Serial.println("Connected to api.telegram.org failed.");
}
return getBody;
}

void setup() {
    WRITE_PERI_REG(RTC_CNTL_BROWN_OUT_REG, 0);
    // Init Serial Monitor
    Serial.begin(115200);
    pinMode(Foto, INPUT_PULLUP);
    // Set LED Flash as output
    pinMode(FLASH_LED_PIN, OUTPUT);
    digitalWrite(FLASH_LED_PIN, flashState);
}

```

```

// Config and init the camera
configInitCamera();

// Connect to Wi-Fi
WiFi.mode(WIFI_STA);
Serial.println();
Serial.print("Connecting to ");
Serial.println(ssid);
WiFi.begin(ssid, password);
clientTCP.setCACert(TELEGRAM_CERTIFICATE_ROOT); // Add root
certificate for api.telegram.org
while (WiFi.status() != WL_CONNECTED) {
    Serial.print(".");
    delay(500);
}
Serial.println();
Serial.print("ESP32-CAM IP Address: ");
Serial.println(WiFi.localIP());
}

void loop() {
    foto = digitalRead(Foto);
    Serial.println(foto);
    if (sendPhoto) {
        Serial.println("Preparing photo");
        sendPhotoTelegram();
        sendPhoto = false;
    }
    if (millis() > lastTimeBotRan + botRequestDelay) {

```

```
if (foto == 0) {  
    sendPhoto = true;  
    Serial.println("New photo request");  
}  
  
int numNewMessages = bot.getUpdates(bot.last_message_received + 1);  
while (numNewMessages) {  
    Serial.println("got response");  
    handleNewMessages(numNewMessages);  
    numNewMessages = bot.getUpdates(bot.last_message_received + 1);  
}  
lastTimeBotRan = millis();  
}  
}
```

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Judul	:	Rancang Bangun Alat Pendekripsi Asap Rokok Berbasis <i>Internet Of Things</i> (IoT).

NO	TANGGAL	URAIAN	PARAF PEMBIMBING
1	02/24 /7	Revisi Bab I : perumusan masalah ditulis. Kelebihan dan kekurangan	+
2		Revisi Bab II ACC	+
3		Revisi Bab III tambahan layout Perbaikan pada tabel Pengujian	+
		Revisi Bab IV flowchart kejadian real	+
X.	11/24 /7	Revisi buku pengujian hasil	+
		ACC BAB III	+
		ACC BAB IV	+
		ACC BAB V	+
5	15/2024 /7		+

Palembang, 29 Juli 2024

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NO	TANGGAL	URAIAN	PARAF PEMBIMBING
1.	25/03/2024	Acc judul Laporan Akhir	✓
2.	27/05/2024	Pengajuan Bab I	✓
3.	29/05/2024	Revisi Bab I	✓
4.	30/05/2024	Acc Bab I dan Bab II	✓
5.	03/06/2024	Pengajuan Bab III	✓
6.	06/06/2024	Acc Bab III	✓
7.	10/06/2024	Pengajuan Bab IV	✓
8.	19/06/2024	Revisi Bab IV	✓
9.	02/07/2024	Revisi Bab IV	✓
10.	03/07/2024	Acc Bab IV	✓
11.	08/07/2024	Pengajuan Bab V	✓
12.	09/07/2024	Revisi Bab V	✓
13.	10/07/2024	Acc Bab V	✓
14.	11/07/2024	Acc Bab I, II, III, IV, V	✓

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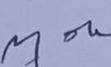
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Mahasiswa tersebut telah memenuhi persyaratan dan dapat mengikuti Ujian Laporan Tugas Akhir, pada Tahun Akademik 2024.

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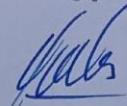
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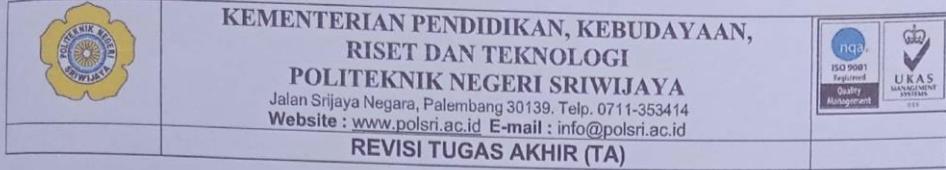
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*Internet Of Things (IOT)*

No	Uraian Revisi	Papaf
	<i>tata tulis</i> <i>Pembahasan datanya dengan</i> <i>cukup</i> <i>kesimpulan</i>	

Palembang, 2024  
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	<p>Menaruh nilai ppm          fungsi metode          program          kerupuk.</p> <p>Maks / Masa. !!!</p> <p>[data.a.kp@gmail.com.]</p>	<p>5/2024          17/7/2024</p>

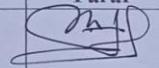
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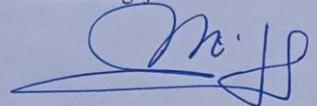
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No	Uraian Revisi	Paraf
	Perbaiki kesimpulan	

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1	Tingkat plagiasi tinggi 39 %. Turunkan hingga <15 %. Dan dari 1 sertifikat tidak boleh >1 %.	
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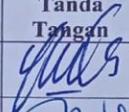
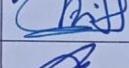
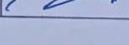
  
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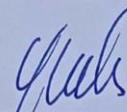
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Telah melaksanakan revisi terhadap Laporan Akhir (LA) yang diseminarkan pada hari **Selasa** tanggal **16** bulan **Juli** tahun **2024**. Pelaksanaan revisi terhadap Laporan Akhir tersebut telah disetujui oleh Dosen penilai yang memberikan revisi:

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