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LAMPIRAN-LAMPIRAN

Lampiran A. Data Pengujian

A. 1 Data karakterisasi sensor ultrasonik

Jarak pada Alat Ukur (cm)	Tegangan Keluaran (mV)					Rata-rata (mV)
	Percobaan 1	Percobaan 2	Percobaan 3	Percobaan 4	Percobaan 5	
10	54,5	54,4	53,6	53,6	54,1	54,04
20	96,4	95,5	93,8	95,7	96	95,48
30	136,5	136,8	137,9	138,1	140,3	137,92
40	182,3	185,2	183,1	182,5	180,8	182,78
50	221,5	218,7	219,4	220,6	219,2	219,88
60	268,8	267,8	271,7	269,7	270,5	269,7
70	326,3	325,8	325,7	327	326,6	326,28
80	393,7	396,8	389,6	392,1	393	393,04
90	433,8	436,3	431,5	438,4	434,5	434,9
100	488,9	491,5	488,3	489,4	487,2	489,06
110	518,7	520,6	521,5	523	519,6	520,68
120	576,8	577,4	581,4	583,7	582,7	580,4
130	619,4	620,2	623,4	622,6	618,3	620,78
140	668,6	671,2	670,4	672	671,1	670,66
150	719,8	722,5	720,9	723,6	717,4	720,84
160	787,9	786,8	792,3	793,5	790,8	790,26
170	824,1	819,6	816,7	821,2	822,5	820,82
180	887,7	892,4	891,7	888,4	890,6	890,16
190	927,3	931,6	930	929,5	932,1	930,1
200	1001,9	999,7	998,6	1002,2	998,9	1000,26
210	1050,2	1051,5	1052,4	1048,6	1049,7	1050,48
220	1103,6	1108,5	1105,6	1107,4	1102,5	1105,52
230	1157,8	1162,6	1161,8	1160,7	1159,9	1160,56
240	1197,6	1199,2	1201,6	1203,5	1200,8	1200,54
250	1251,1	1249,7	1248,6	1250,7	1252,5	1250,52
260	1289,3	1290,3	1288,7	1293,2	1291,5	1290,6
270	1340,9	1341,6	1340	1339,7	1338,5	1340,14
280	1389,6	1390,4	1394,4	1387,8	1392,2	1390,88
290	1454,2	1455,3	1456,7	1453,9	1456,8	1455,38
300	1501,6	1499,5	1498,6	1502,9	1500,7	1500,66
310	1559,7	1560,4	1558,6	1561,6	1562,5	1560,56

Jarak pada Alat Ukur (cm)	Tegangan Keluaran (mV)					Rata-rata (mV)
	Percobaan 1	Percobaan 2	Percobaan 3	Percobaan 4	Percobaan 5	
320	1601,1	1603,2	1599,4	1598,6	1600,7	1600,6
330	1651,7	1653,7	1652,6	1649,5	1647,4	1650,98
340	1711,4	1709,7	1708,5	1710,3	1713,2	1710,62
350	1761,6	1764,6	1767,8	1765,9	1766,5	1765,28
360	1809,8	1811,6	1810,3	1808,7	1812,4	1810,56
370	1890	1893	1889,5	1887,4	1891,7	1890,32
380	1927,5	1925,7	1924,8	1926,4	1923,8	1925,64
390	1978,1	1981,3	1982,4	1980,6	1979,8	1980,44
400	2036,7	2034,6	2035,1	2037,9	2033,8	2035,62
410	2098,5	2097,1	2093,5	2095,7	2091,4	2095,24
420	2138,9	2134,5	2135	2133,6	2136,2	2135,64
430	2185,6	2187,5	2182,1	2183,7	2187,6	2185,3
440	2240,7	2237,6	2238,5	2241,3	2242,4	2240,1
450	2289,7	2286,8	2291,4	2290,6	2292,2	2290,14
460	2364,5	2365	2366,8	2367,4	2363,3	2365,4
470	2511,4	2504,7	2503,3	2510,5	2502,6	2506,5
480	2625,2	2627,4	2624,8	2626,1	2628,5	2626,4
490	2696,1	2697,8	2698,2	2701,3	2699,7	2698,62
500	2737,5	2733,5	2738,8	2735	2736,9	2736,34
510	2788,4	2782,4	2783,7	2786,8	2785,6	2785,38
520	2807,9	2808,8	2803,4	2805,6	2809,6	2807,06
530	2874,2	2872,4	2873,9	2875,7	2871,6	2873,56
540	2939	2938,4	2935,3	2936,6	2940,4	2937,94
550	2962,5	2964,3	2966,7	2965,4	2963,8	2964,54
560	3093,2	3096,3	3095,4	3094,3	3097,5	3095,34
570	3138,6	3137,4	3139,1	3141,5	3133,1	3137,94
580	3235,8	3236,4	3232,5	3233,7	3234,9	3234,66
590	3346,8	3344	3348,3	3345,7	3347,5	3346,46
600	3533,2	3536,2	3538,2	3538,2	3537,2	3536,6

Lampiran B. *List Program*

B. 1 Program karakterisaasi sensor ultrasonik JSN-SR04T

```
int trigPin = 22;    // Trigger
int echoPin = 24;    // Echo
long duration, cm;

void setup() {
    //Serial Port begin
    Serial.begin (9600);
    //Define inputs and outputs
    pinMode(trigPin, OUTPUT);
    pinMode(echoPin, INPUT);
}

void loop() {
    // The sensor is triggered by a HIGH pulse of 10 or
    // more microseconds.
    // Give a short LOW pulse beforehand to ensure a clean
    // HIGH pulse:
    digitalWrite(trigPin, LOW);
    delayMicroseconds(5);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);

    // Read the signal from the sensor: a HIGH pulse whose
    // duration is the time (in microseconds) from the
    // sending
    // of the ping to the reception of its echo off of an
    // object.
    pinMode(echoPin, INPUT);
    duration = pulseIn(echoPin, HIGH);

    // Convert the time into a distance
    cm = (duration/2) / 29.1;    // Divide by 29.1 or
    // multiply by 0.0343

    Serial.print(cm);
    Serial.print("cm");
    Serial.println();
    delay(250);
}
```

B. 2 Program pengujian motor servo

```
#include <Servo.h> //library servo
Servo myservo; // membuat variabel servo untuk
dikendalikan
int pos = 0; // deklarasi variabel untuk posisi sudut

void setup() {
myservo.attach(6); //deklarasi servo pada pin 3
}

void loop() {
for(pos = 0; pos < 90; pos+= 1) // perulangan untuk
posisi 0 sampai 180 derajat

{ // step setiap 1 derajat
myservo.write(pos); // memerintahkan servo ke posisi
derajat sesuai nilai variabel pos
delay(50); // menunggu 15 milidetik
}
}
```

B. 3 Program ESP32-CAM

Tab 1- Telegram Bot and Wi-Fi

```
#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 = "****"; // wifi name
const char* password = "*****"; // wifi password
String BOTtoken = "5508343588:****"; // token bot telegram
String CHAT_ID = "13978340**";

WiFiClientSecure clientTCP;
UniversalTelegramBot bot(BOTtoken, clientTCP);

#define FLASH_LED_PIN 4
bool flashState = LOW;
```



```

bool sendPhoto1 = false;

int botRequestDelay = 1000; //Cek pesanan telegram
setiap 1 detik.
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

void setup() {
  WRITE_PERI_REG(RTC_CNTL_BROWN_OUT_REG, 0);
  Serial.begin(115200);
  pinMode(FLASH_LED_PIN, OUTPUT); // Set lampu flash
  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());
    pinMode(2, OUTPUT);
    pinMode(14, OUTPUT);
    pinMode(15, OUTPUT);
}

void loop() {
    if (millis() > lastTimeBotRan + botRequestDelay) {
        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();
    }
}

```

Tab 2- Camera

```

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
    }

```

Tab 3- Telegram Menu

```

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 = "Hi , " + from_name + "\n" ;
            welcome += "Selamat datang di SLOT PARKIR";
        }
    }
}

```

```

        welcome += ", gunakan perintah berikut untuk info
lebih lanjut \n";
        welcome += "/kondisi : toggles flash LED \n";
        bot.sendMessage(CHAT_ID, welcome, "");
    }

    if (text == "/kondisi") {
        String kon = "kondisi slot parkir saat ini \n";
        int tom1 = digitalRead(2);
        int tom2 = digitalRead(14);
        int tom3 = digitalRead(15);
        if (tom1 == HIGH) {
            kon += "kon 1= terisi\n";
        }
        else {
            kon += "kon 1= tersedia\n";
        }
        if (tom2 == HIGH) {
            kon += "kon 2= terisi\n";
        }
        else {
            kon += "kon 2= tersedia\n";
        }
        if (tom3 == HIGH) {
            kon += "kon 3= terisi\n";
        }
        else {
            kon += "kon 3= tersedia\n";
        }

        bot.sendMessage(CHAT_ID, kon, "");
        Serial.println("New photo request");
    }
}

```



Tab 4- Connection

```

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 = "--kotakpaket\r\nContent-Disposition:
form-data; name=\"chat_id\"; \r\n\r\n" + CHAT_ID +
"\r\n--kotakpaket\r\nContent-Disposition: form-data;
name=\"photo\"; filename=\"esp32-cam.jpg\"\r\nContent-
Type: image/jpeg\r\n\r\n";
    String tail = "\r\n--kotakpaket--\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=kotakpaket");
    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;
}

```

B.4 Program keseluruhan

```

#include <Servo.h>
#include <SoftwareSerial.h>
SoftwareSerial ESP(42, 44);
Servo Myservo1;
Servo Myservo2;
int data = 0;

```

```
String response = "";
```

```

//G1 (Gate1)
const int triggerPin_1 = 22;
const int echoPin_1 = 24;

```