DAFTAR PUSTAKA

Alexander Maier, Andrew Sharp, & Y. V. (2017). *Comparative analysis and practical implementation of the ESP32 microcontroller module for the Internet of Things.*

Bipasha Biswas, S., & Tariq Iqbal, M. (2018). Solar Water Pumping System Control Using a Low Cost ESP32 Microcontroller. *Canadian Conference on Electrical and Computer Engineering*, *2018-May*(October). https://doi.org/10.1109/CCECE.2018.8447749

Donald M. Cunningham, P., & Pa. (1976). ELECTRIC HEATING ELEMENTS. *United States Patent*, *75*.

Hadinata, S. (2016). *UJI KARAKTERISTIK SENSOR SUHU LM35 PADA BAHAN KOMPOSIT SEBAGAI DESAIN AWAL PEMBUATAN ALAT PENGUKUR KONDUKTIVITAS PANAS*. *August*.

Khaenury, V. F., Darlis, D., & Mulyana, A. (2020). Rancang Bangun Alat Medical Check Up Berbasis Internet Of Things. *E-Proceeding of Engineering*, *6*(2), 2468–2475.

Maier, A., Sharp, A., & Vagapov, Y. (2017). Comparative analysis and practical implementation of the ESP32 microcontroller module for the internet of things. *2017 Internet Technologies and Applications, ITA 2017 - Proceedings of the 7th International Conference*, *September*, 143–148. https://doi.org/10.1109/ITECHA.2017.8101926

Mediaperawat. (2022). *Konsep Dasar Ventilasi Mekanik*. 23 Januari 2022. https://mediaperawat.id/konsep-dasar-ventilasi-mekanik/

Nasrullah, E., Trisanto, A., & Utami, L. (2011). Rancang Bangun Sistem Penyiraman Tanaman Secara Otomatis Menggunakan Sensor Suhu LM35 Berbasis Mikrokontroler ATMega8535. *Bina Sarana Informatika Teknologi Elektro*, *5*(3), 182–192.

Pasaribu, M. I., Putra, G., & Junaidi, F. A. A. (2019). Mengukur Tekanan Udara Pada Ban Secara Otomatis dengan Kecepatan Anemometer. *Jurnal Teknologi*, *December*.

ROBODUKKAN. (2007). *2 CHANNEL 5V 10A RELAY MODULE*.

https://www.robodukkan.com/class/INNOVAEditor/assets/2_CHANNEL_5

V_10A_RELAY_MODULE.pdf

Rozi, F. (2020). Systematic Literature Review pada Analisis Prediktif dengan IoT:

Tren Riset, Metode, dan Arsitektur. *Jurnal Sistem Cerdas*, *3*(1), 43–53.

https://doi.org/10.37396/jsc.v3i1.53

Sardadi, A. B. (2018). RANCANG BANGUN ALAT DISPLAY HARGA

SECARA OTOMATIS MENGGUNAKAN LCD GRAFIS Sardadi, Adi

Baroto. *STIKOM SURABAYA*, *2*, 227–249.

Seminar, P., Penelitian, N., Nas, M., Armila, N., Jurusan, D., Elektro, T., Negeri,

P., Pandang, U., Jurusan, M., Elektro, T., Negeri, P., Pandang, U., Jurusan,

M., Elektro, T., Negeri, P., & Pandang, U. (2019). *Sistem pengontrolan pintu

gerbang berbasis iot*. *2019*, 42–46.

Shah, R. H. (2001). *METHOD AND APPARATUS OF CONTROLLING

OPERATION OF RANGE TOP HEATING ELEMENTS FOR COOKING*.

1(12).

Sinauarduino. (2016). *Arduino IDE*.

https://www.sinauarduino.com/artikel/mengenal-arduino-software-ide/

Suharmanto, A., & Musafa, A. (2013). Perancangan Sistem Pengisian Udara Ban

Kendaraan Secara Otomatis Berbasis Mikrokontroler. *Fakultas Teknik

Universitas Budi Luhur*, *4*(021).

Sumartiningtyas, H. K. N. (2021). *Perjalanan Ventilator dari Wabah Polio

hingga Pandemi Covid-19*. 02 Juli 2021.

file:///C:/Users/lenovo/Videos/PROPOSAL WOIIIII !!!!!!/Hasil/Perjalanan

Ventilator dari Wabah Polio hingga Pandemi Covid-19 Halaman all -

Kompas.com.html

Widi Wahyuning Tyas. (2020). *Sejarah Penemuan Ventilator, Awalnya untuk Alat

Bantu Pernapasan Pasien Polio Artikel ini telah tayang di TribunBatam.id

dengan judul Sejarah Penemuan Ventilator, Awalnya untuk Alat Bantu

Pernapasan Pasien Polio, https://batam.tribunnews.com/2020/*. 06 Juni

2020. https://batam.tribunnews.com/2020/06/06/sejarah-penemuan-

ventilator-awalnya-untuk-alat-bantu-pernapasan-pasien-polio?page=all

Yalandra, H., & Jaya, P. (2019). *RANCANG BANGUN PENGAMAN PINTU PERSONAL ROOM MENGGUNAKAN SENSOR SIDIK JARI BERBASIS ARDUINO. 7*(2).

LAMPIRAN

Lampiran 1 Program ESP32 *prototype* Smart Ventilato

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <LiquidCrystal_I2C.h>

#define IN_SUHU     35
#define IN_TEKANAN  34
#define OUT_PEMANAS 33
#define OUT_KATUP   25
#define OUT_SPRAY   26
#define AVG         (250)
#define ON          (1)
#define OFF         (2)
#define INTERVAL    (1000)

WiFiClient wificlient;
PubSubClient mqtt(wificlient);
LiquidCrystal_I2C lcd(0x27, 16, 2);

unsigned long timer, last, mqtt_reconnect_attempt;

byte last_spray,
    last_katup,
    last_update;

const char* ssid = "Tepi Cerita";
const char* password = "kalausayangbilang";

byte set_interval_spray = 4,
```

```
    set_interval_katup = 16;


float c1 = 1.009249522e-03,
    c2 = 2.378405444e-04,
    c3 = 2.019202697e-07;
float R1 = 10000;
float kalibrasi = 1.80;


byte treshold_suhu = 30;
float treshold_tekanan = 0.00;


float get_suhu() {
  float val = 0;
  size_t i;


  for (i = 0; i < AVG; ++i) {
    int adc_val = analogRead(IN_SUHU);
    float R2 = R1 * (1023.0 / (float) adc_val - 1.0);
    float logR2 = log(R2);
    float celcius = (1.0 / (c1 + c2 * logR2 + c3 * logR2 * logR2 * logR2)) - 273.15
+ kalibrasi;
    val += celcius;
    delay(1);
  }


  val /= AVG;
  return val;
}


float get_tekanan() {
```

```
  float val = 0;
  size_t i;

  for (i = 0; i < AVG; ++i) {
   val += analogRead(IN_TEKANAN);
   delay(1);
  }
  val /= (AVG * 10.00);
  val -= treshold_tekanan;
  if (val < 0) val = 0.00;
  return val;
}

void set_output(byte pin, byte state) {
  if (state == ON) {
   pinMode(pin, OUTPUT);
   digitalWrite(pin, LOW);
  }
  else pinMode(pin, INPUT);
}

boolean reconnect() {
  if (mqtt.connect("andi-elektro-unhas-2022"))
   mqtt.subscribe("andi-elektro-unhas-2022/recv");
  return mqtt.connected();
}

void callback(char* unusedtopic, byte* payload, unsigned int length) {
  char cmd = payload[0];
```

```cpp
  String val = "";
  size_t i;
  for (i = 1; i < length; ++i)
    val += String((char) payload[i]);
  switch (cmd) {
    case 'K':
      set_interval_katup = val.toInt();
      break;
    case 'S':
      set_interval_spray = val.toInt();
      break;
    case 'T':
      treshold_suhu = val.toInt();
      break;
  }
}

void setup() {
  analogReadResolution(10);

  pinMode(IN_SUHU, INPUT);
  pinMode(IN_TEKANAN, INPUT);

  set_output(OUT_PEMANAS, OFF);
  set_output(OUT_KATUP, OFF);
  set_output(OUT_SPRAY, OFF);

  Serial.begin(115200);
  delay(1000);
```

```
  lcd.init();

  lcd.init();

  lcd.backlight();

  lcd.clear();


  treshold_tekanan = get_tekanan();

  mqtt_reconnect_attempt = 0;

  timer = 0;

  last = 0;

  last_spray = 0;

  last_katup = 0;

  last_update = 0;


  WiFi.mode(WIFI_STA);

  WiFi.begin(ssid, password);


  while (WiFi.status() != WL_CONNECTED) {

    delay(500);

    Serial.println("Connecting...");

  }

  Serial.printf("\nConnected : IP : %s\n", WiFi.localIP());


  mqtt.setServer("broker.hivemq.com", 1883);

  mqtt.setCallback(callback);

}


void loop() {

  if (!mqtt.connected()) {
```

```
    unsigned long now = millis();
    if (now - mqtt_reconnect_attempt > 5000) {
      mqtt_reconnect_attempt = now;
      if (reconnect()) mqtt_reconnect_attempt = 0;
    }
}
else mqtt.loop();


byte interval_spray = 60 / set_interval_spray;
byte interval_katup = 60 / set_interval_katup;


timer = millis();


if (timer - last >= INTERVAL) {
  ++last_spray;
  ++last_katup;
  ++last_update;
}


float cek_suhu = get_suhu();
if (cek_suhu >= treshold_suhu) set_output(OUT_PEMANAS, OFF);
else set_output(OUT_PEMANAS, ON);


if (last_spray >= interval_spray && last_spray <= interval_spray + 5)
  set_output(OUT_SPRAY, ON);
else if (last_spray >= interval_spray + 5) {
  set_output(OUT_SPRAY, OFF);
  last_spray = 0;
}
```

```
  if (last_katup >= interval_katup && last_katup <= interval_katup + 2)
    set_output(OUT_KATUP, ON);
  else if (last_katup >= interval_katup + 2) {
    set_output(OUT_KATUP, OFF);
    last_katup = 0;
  }
  if (last_update >= 2) {
    last_update = 0;
    float suhu = get_suhu();
    float tekanan = get_tekanan();
    lcd.setCursor(0, 0);
    lcd.print("Suhu    : ");
    lcd.print(suhu);
    lcd.print(" ");
    lcd.setCursor(0, 1);
    lcd.print("Tekanan : ");
    lcd.print(tekanan);
    lcd.print(" ");
    char msg[60];
    snprintf(msg,                                             60,
"{\"suhu\":%.2f,\"tekanan\":%.2f,\"is\":%d,\"ik\":%d,\"ts\":%d}",  suhu,  tekanan,
set_interval_spray, set_interval_katup, treshold_suhu);
    mqtt.publish("andi-elektro-unhas-2022/send", msg);
    Serial.printf("Suhu: %.2f degC, Tekanan: %.2f cmH2O\n", suhu, tekanan);
  }


}
```