

LAMPIRAN

1. Kode program alat

```
#include <Fuzzy.h>
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <ArduinoJson.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
//DHT setup
#include "DHT.h"
#define DHTPIN D3
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);
#define led_hijau D6
#define led_kuning D7
#define led_merah D8
#define buzzer D5
const float xnm = 9.5703125;

Fuzzy *fuzzy = new Fuzzy();
//Fuzzy input sensor gas
FuzzySet *kecil = new FuzzySet(500, 500, 600, 750);
FuzzySet *sedang = new FuzzySet(600, 750, 750, 900);
FuzzySet *besar = new FuzzySet(750, 900, 900, 1000);
//Fuzzy input sensor suhu
FuzzySet *dingin = new FuzzySet(20, 20, 25, 32);
FuzzySet *hangat = new FuzzySet(25, 32, 32, 37);
FuzzySet *panas = new FuzzySet(32, 37, 40, 40);
//Fuzzy Output
FuzzySet *aman = new FuzzySet(0, 0, 30, 50);
FuzzySet *waspada = new FuzzySet(30, 50, 50, 70);
FuzzySet *bahaya = new FuzzySet(50, 70, 100, 100);
//Konfigurasi WiFi
const char *ssid = "Smart";
const char *password = "12345678";
String status;

void setup() {
  Serial.begin(9600);
  WiFi.mode(WIFI_STA);
  WiFi.begin(ssid, password);
```

```

int i=0;
while (WiFi.status() != WL_CONNECTED) {
    Serial.print(".");
    delay(1000);
}
//Jika koneksi berhasil, maka akan muncul address di serial
monitor
Serial.println("");
Serial.print("Connected to ");
Serial.println(ssid);
Serial.print("IP address: ");
Serial.println(WiFi.localIP());
pinMode(led_hijau, OUTPUT);
pinMode(led_kuning, OUTPUT);
pinMode(led_merah, OUTPUT);
pinMode(buzzer, OUTPUT);
dht.begin();
Wire.begin(D2, D1); //Use predefined PINS consts
lcd.begin(20, 4); // The begin call takes the width and height.
lcd.backlight(); // Turn on the backlight.
lcd.home();
//Fuzzy Input
FuzzyInput *gas = new FuzzyInput(1);
gas->addFuzzySet(kecil);
gas->addFuzzySet(sedang);
gas->addFuzzySet(besar);
fuzzy->addFuzzyInput(gas);
//Fuzzy Input 2
FuzzyInput *suhu = new FuzzyInput(2);
suhu->addFuzzySet(dingin);
suhu->addFuzzySet(hangat);
suhu->addFuzzySet(panas);
fuzzy->addFuzzyInput(suhu);
//Fuzzy output
FuzzyOutput *led = new FuzzyOutput(1);
led->addFuzzySet(aman);
led->addFuzzySet(waspada);
led->addFuzzySet(bahaya);
fuzzy->addFuzzyOutput(led);
//FuzzyRule//////////////////////////////////// 1
FuzzyRuleAntecedent *kecil_dingin = new FuzzyRuleAntecedent();
kecil_dingin->joinWithAND(kecil, dingin);
FuzzyRuleConsequent *led_aman1 = new FuzzyRuleConsequent();
led_aman1->addOutput(aman);
FuzzyRule *fuzzyRule1 = new FuzzyRule(1, kecil_dingin, led_aman1);
fuzzy->addFuzzyRule(fuzzyRule1);
//FuzzyRule//////////////////////////////////// 2

```

```

FuzzyRuleAntecedent *kecil_hangat = new FuzzyRuleAntecedent();
kecil_hangat->joinWithAND(kecil, hangat);
FuzzyRuleConsequent *led_aman2 = new FuzzyRuleConsequent();
led_aman2->addOutput(aman);
FuzzyRule *fuzzyRule2 = new FuzzyRule(2, kecil_hangat, led_aman2);
fuzzy->addFuzzyRule(fuzzyRule2);
//FuzzyRule//////////////////////////////////// 3
FuzzyRuleAntecedent *sedang_dingin = new FuzzyRuleAntecedent();
sedang_dingin->joinWithAND(sedang, dingin);
FuzzyRuleConsequent *led_aman3 = new FuzzyRuleConsequent();
led_aman3->addOutput(aman);
FuzzyRule *fuzzyRule3 = new FuzzyRule(3, sedang_dingin,
led_aman3);
fuzzy->addFuzzyRule(fuzzyRule3);
//FuzzyRule//////////////////////////////////// 4
FuzzyRuleAntecedent *kecil_panas = new FuzzyRuleAntecedent();
kecil_panas->joinWithAND(kecil, panas);
FuzzyRuleConsequent *led_waspada4 = new FuzzyRuleConsequent();
led_waspada4->addOutput(waspada);
FuzzyRule *fuzzyRule4 = new FuzzyRule(4, kecil_panas,
led_waspada4);
fuzzy->addFuzzyRule(fuzzyRule4);
//FuzzyRule//////////////////////////////////// 5
FuzzyRuleAntecedent *besar_dingin = new FuzzyRuleAntecedent();
besar_dingin->joinWithAND(besar, dingin);
FuzzyRuleConsequent *led_waspada5 = new FuzzyRuleConsequent();
led_waspada5->addOutput(waspada);
FuzzyRule *fuzzyRule5 = new FuzzyRule(5, besar_dingin,
led_waspada5);
fuzzy->addFuzzyRule(fuzzyRule5);
//FuzzyRule//////////////////////////////////// 6
FuzzyRuleAntecedent *sedang_hangat = new FuzzyRuleAntecedent();
sedang_hangat->joinWithAND(sedang, hangat);
FuzzyRuleConsequent *led_waspada6 = new FuzzyRuleConsequent();
led_waspada6->addOutput(waspada);
FuzzyRule *fuzzyRule6 = new FuzzyRule(6, sedang_hangat,
led_waspada6);
fuzzy->addFuzzyRule(fuzzyRule6);
//FuzzyRule//////////////////////////////////// 7
FuzzyRuleAntecedent *sedang_panas = new FuzzyRuleAntecedent();
sedang_panas->joinWithAND(sedang, panas);
FuzzyRuleConsequent *led_bahaya7 = new FuzzyRuleConsequent();
led_bahaya7->addOutput(bahaya);
FuzzyRule *fuzzyRule7 = new FuzzyRule(7, sedang_panas,
led_bahaya7);
fuzzy->addFuzzyRule(fuzzyRule7);
//FuzzyRule//////////////////////////////////// 8

```

```

FuzzyRuleAntecedent *besar_hangat = new FuzzyRuleAntecedent();
besar_hangat->joinWithAND(besar, hangat);
FuzzyRuleConsequent *led_bahaya8 = new FuzzyRuleConsequent();
led_bahaya8->addOutput(bahaya);
FuzzyRule *fuzzyRule8 = new FuzzyRule(8, besar_hangat,
led_bahaya8);
fuzzy->addFuzzyRule(fuzzyRule8);
//FuzzyRule//////////////////////////////////// 9
FuzzyRuleAntecedent *besar_panas = new FuzzyRuleAntecedent();
besar_panas->joinWithAND(besar, panas);
FuzzyRuleConsequent *led_bahaya9 = new FuzzyRuleConsequent();
led_bahaya9->addOutput(bahaya);
FuzzyRule *fuzzyRule9 = new FuzzyRule(9, besar_panas,
led_bahaya9);
fuzzy->addFuzzyRule(fuzzyRule9);
}

```

```

void loop() {
int in_gas = analogRead(A0);
int in_suhu = dht.readTemperature();

float ppm = xnm * in_gas;
Serial.print("Sensor Value: ");
Serial.println(in_gas);
Serial.print("PPM: ");
Serial.println(ppm);

fuzzy->setInput(1, in_gas);
fuzzy->setInput(2, in_suhu);
fuzzy->fuzzify();

int out_fuzzy = fuzzy->defuzzify(1);
if (out_fuzzy < 30) {
lcd.setCursor(0, 0);
lcd.print("Gas:");
lcd.setCursor(7, 0);
lcd.print(in_gas);
lcd.print("ADC / ");

lcd.setCursor(7, 1);
lcd.print(String(ppm));
lcd.print("PPM");

lcd.setCursor(0, 2);
lcd.print("Suhu:");
lcd.setCursor(8, 2);

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```

lcd.print(in_suhu);
lcd.print("'C");

lcd.setCursor(0, 3);
lcd.print("Kondisi:");
lcd.setCursor(8, 3);
lcd.print(out_fuzzy);

lcd.setCursor(13, 3);
lcd.print("Aman  ");

digitalWrite(led_hijau, HIGH);
digitalWrite(led_kuning, LOW);
digitalWrite(led_merah, LOW);
status="AMAN";
Serial.print("gas :");
Serial.print(in_gas);
Serial.print("suhu :");
Serial.print(in_suhu);
Serial.print("Kondisi :");
Serial.println(out_fuzzy);
Serial.println("aman");
} else if (out_fuzzy < 60) {
lcd.setCursor(0, 0);
lcd.print("Gas:");
lcd.setCursor(7, 0);
lcd.print(in_gas);
lcd.print("ADC /  ");

lcd.setCursor(7, 1);
lcd.print(String(ppm));
lcd.print("PPM");

lcd.setCursor(0, 2);
lcd.print("Suhu:");
lcd.setCursor(8, 2);
lcd.print(in_suhu);
lcd.print("'C");

lcd.setCursor(0, 3);
lcd.print("Kondisi:");
lcd.setCursor(8, 3);
lcd.print(out_fuzzy);

lcd.setCursor(13, 3);
lcd.print("Waspada");

```

```

digitalWrite(led_kuning, HIGH);
digitalWrite(led_hijau, LOW);
digitalWrite(led_merah, LOW);
digitalWrite(buzzer, LOW);
statuss="WASPADA";
Serial.print("gas :");
Serial.print(in_gas);
Serial.print("suhu :");
Serial.print(in_suhu);
Serial.println("derajat");
Serial.print("Kondisi:");
Serial.println(out_fuzzy);
Serial.println("Waspada");
} else {
  lcd.setCursor(0, 0);
  lcd.print("Gas:");
  lcd.setCursor(7, 0);
  lcd.print(in_gas);
  lcd.print("ADC / ");

  lcd.setCursor(7, 1);
  lcd.print(String(ppm));
  lcd.print("PPM");

  lcd.setCursor(0, 2);
  lcd.print("Suhu:");
  lcd.setCursor(8, 2);
  lcd.print(in_suhu);
  lcd.print("'C");

  lcd.setCursor(0, 3);
  lcd.print("Kondisi:");
  lcd.setCursor(8, 3);
  lcd.print(out_fuzzy);

  lcd.setCursor(13, 3);
  lcd.print("Bahaya");
  digitalWrite(led_merah, HIGH);
  digitalWrite(led_hijau, LOW);
  digitalWrite(led_kuning, LOW);
  statuss="BAHAYA";
  digitalWrite(buzzer, HIGH);
  Serial.print("gas :");
  Serial.print(in_gas);
  Serial.print("suhu :");
  Serial.print(in_suhu);
  Serial.print("Kondisi :");

```

```

        Serial.println(out_fuzzy);
        Serial.print("bahaya");
    }
    if ((WiFi.status() == WL_CONNECTED)) {
        WiFiClient client;
        HTTPClient http;
        String address;
        // address
        ="http://192.168.204.99/webgas/webapi/api/create.php?suhu=";
        address
        ="http://webpangkalangas.projectk.my.id/webapi/api/create.php?suhu="
        ;
        address += String(in_suhu);
        address += "&gas=";
        address += String(in_gas);
        address += "&status=";
        address += String(status) ;
        address += "&ppm=";
        address += String(ppm) ;
        http.begin(client,address); //Specify request destination
        int httpCode = http.GET();//Send the request
        String payload;
        if (httpCode > 0) { //Check the returning code
            payload = http.getString(); //Get the request response
payload
            payload.trim();
            if( payload.length() > 0 ){
                Serial.println(payload + "\n");
            }
        }
        http.end(); //Close connection
    }else{
        Serial.print("Not connected to wifi ");Serial.println(ssid);
    }

    delay(2000);
}

```

2. Kode Program Web

a. Index

```

<?php session_start();
//Aktifkan session
require 'config/koneksi.php';
?>
<!DOCTYPE html>

```

```

<html>
  <head>
    <meta charset="UTF-8">
    <title>PANGKALAN LILI HAMBALI</title>
    <link href="Assets/css/bootstrap.min.css"
rel="stylesheet" type="text/css"/>
    <link href="Assets/css/dataTables.bootstrap.min.css"
rel="stylesheet" type="text/css"/>
    <link href="Assets/font-awesome-4.5.0/css/font-
awesome.min.css" rel="stylesheet" type="text/css"/>

    <style type="text/css">
      body {
        margin-top:70px;
      }
      .modalDialog {
        position: fixed;
        font-family: Arial, Helvetica, sans-serif;
        top: 0;
        right: 0;
        bottom: 0;
        left: 0;
        background: rgba(0,0,0,0.8);
        z-index: 99999;
        opacity:0;
        transition: opacity 200ms ease-in;
        pointer-events: none;
      }
      .modalDialog:target {opacity:1; pointer-events:
auto;}

      .modalDialog > div {
        width: 400px;
        position: relative;
        margin: 10% auto;
        padding: 5px 20px 13px 20px;
        border-radius: 10px;
        background: #fff;
        background: linear-gradient(#fff, #aaa);
      }
      .close:hover { background:#00d9ff; }
      .close {
        background: #606061;
        color: #FFFFFF;
        line-height: 25px;
        position: absolute;
        text-align: center;
        top: -10px;

```



```

        right: -12px;
        width: 24px;
        text-decoration: none;
        font-weight: bold;
        border-radius: 12px;
        box-shadow: 1px 1px 3px #000;
    }

    button {
        background-color: #00d9ff;
        color: white;
        padding: 14px 20px;
        margin: 8px 0;
        border: none;
        cursor: pointer;
        width: 100%;
    }

</style>
</head>
<script>
    setInterval(function() { $(".main-
content").load("index.php"); }, 500);
</script>
<body>

    <?php //mengambil file menu.php
    require 'akun.php';
    ?>

    <?php //mengambil file menu.php
    require 'menu.php';
    ?>

    <?php //mengambil file menu.php
    require 'content.php';
    ?>

    <?php //mengambil file menu.php
    require 'footer.php';
    ?>

    <script src="Assets/js/jquery.js"
type="text/javascript"></script>
    <script src="Assets/js/bootstrap.min.js"
type="text/javascript"></script>

```

```

        <script src="Assets/js/jquery.dataTables.min.js"
type="text/javascript"></script>
        <script src="Assets/js/dataTables.bootstrap.min.js"
type="text/javascript"></script>

        <script type="text/javascript" >
            $(function () {
                $('#dtskripsi').dataTable();
            });
        </script>

    </body>

</html>

```

b. Beranda

```

<?php

require 'config/koneksi.php';

?>

<div class="container">
<div class="row">
    <div class="col-xs-12">

        <div class="alert alert-info">
            <strong>MONITORING PANGKALAN GAS LPG LILI
HAMBALI</strong>
        </div>
    </div>
</div>
<div class="row">
<div class="col-sm-9 col-xs-12 text-center">
    <div class="panel panel-default">

        <div class="panel-body">
            <!-- <?php
                //buat sql untuk tampilan data,
gunakan kata kunci select
                $sql = "SELECT * FROM data_alat";
                $query = mysqli_query($koneksi, $sql)
or die("SQL Anda Salah");
                // Baca hasil query dan isi variabel-
variabel yang diperlukan
                while ($row =
mysqli_fetch_array($query)) {

```

```

        $status = $row['status'];
        $created_at = $row['created_at'];
        $suhu = $row['suhu'];
        $gas = $row['gas'];
    ?> -->

    <div class="alert alert-danger" role="alert">
        <span class="h1 font-weight-bold mb-0" style="font-size: 2em;">TERDETEKSI <?php echo $status;?></span>
        <audio autoplay class="hidden" loop="true">
            <source src="alert2.mp3" type="audio/mpeg">
        </audio>
    </div>
    <p class="mt-3 mb-0 text-muted text-sm">
        <span class="text-success mr-2"> Tanggal </span>
        <span class="text-nowrap"><?php echo $created_at;?></span>
    </p>
    <div class="row pt-4">
        <div class="panel panel-default">
            <div class="panel-body">
                <h5 class="h1 font-weight-bold mb-0" style="font-size: 2em;">Suhu</h5>
                <span class="h2 font-weight-bold mb-0" style="font-size: 2em;"><?php echo $suhu;?></span>
            </div>
        </div>

        <div class="panel panel-default">
            <div class="panel-body">
                <h5 class="h1 font-weight-bold mb-0" style="font-size: 2em;">Gas</h5>
                <span class="h2 font-weight-bold mb-0" style="font-size: 2em;"><?php echo $gas;?></span>
            </div>
        </div>
    </div>
</div>

```

```
</div>
</div>
</div>
```

```
<!--akhir colomn kedua-->
<div class="col-sm-3 col-xs-12">
  <!--Jika terjadi login error tampilkan pesan ini-->
  <?php if(isset($_GET['error'])) {?>
  <div class="alert alert-danger">Maaf! Login Gagal,
Coba Lagi..</div>
  <?php }?>

  <?php if (isset($_SESSION['username'])) { ?>
  <div class="alert alert-info">
    <strong>Welcome <?=$_SESSION['nama']?></strong>
  </div>
  <?php
  } else { ?>

  <div class="panel panel-success">
    <div class="panel-heading">
      <h3 class="panel-title">Masuk Ke Sistem</h3>
    </div>
    <div class="panel-body">
      <form class="form-horizontal"
action="proses_login.php" method="post">
        <div class="form-group">
          <div class="col-sm-12">
            <input type="text" name="user"
class="form-control input-sm"
placeholder="Username"
required="" autocomplete="off"/>
          </div>

          </div>
          <div class="form-group">
            <div class="col-sm-12">
              <input type="password" name="pwd"
class="form-control input-sm"
placeholder="Password"
required="" autocomplete="off"/>
            </div>
          </div>
          <div class="form-group">
            <div class="col-sm-12">
```

```

        <button type="submit"
name="login" value="login"
        class="btn btn-success
btn-block"><span class="fa fa-unlock-alt"></span>
        Login Sistem
        </button>
    </div>
</form>
</div>
</div>
</div>
<?php } ?>
</div>
<script type="text/javascript">
    window.setTimeout( function() {
        window.location.reload();
    }, 900000);
</script>

```

c. API

```

<?php
    header("Access-Control-Allow-Origin: *");
    header("Content-Type: application/json; charset=UTF-8");

    include_once '../config/database.php';
    include_once '../class/nodemcu_log.php';

    $database = new Database();
    $db = $database->getConnection();

    $item = new Nodemcu_log($db);

    if ($_SERVER['REQUEST_METHOD'] === 'POST') {
        // The request is using the POST method
        $data = json_decode(file_get_contents("php://input"));
        $item->suhu = $data->suhu;
        $item->gas = $data->gas;
        $item->statuss = $data->statuss;
    }
    elseif ($_SERVER['REQUEST_METHOD'] === 'GET'){
        // The request is using the GET method
        $item->suhu = isset($_GET['suhu']) ? $_GET['suhu'] :
die('wrong structure!');
        $item->gas = isset($_GET['gas']) ? $_GET['gas'] :
die('wrong structure!');

```

```

        $item->status = isset($_GET['status']) ?
$_GET['status'] : die('wrong structure!');
    }else {
        die('wrong request method');
    }

    if($item->createLogData()){
        echo 'Data created successfully.';
    } else{
        echo 'Data could not be created.';
    }
}
?>
<?php
class Database {
    private $host = "localhost";
    private $database_name = "gas";
    private $username = "root";
    private $password = "";

    public $conn;

    public function getConnection(){
        $this->conn = null;
        try{
            $this->conn = new PDO("mysql:host=" . $this->host
. ";dbname=" . $this->database_name, $this->username, $this-
>password);
            $this->conn->exec("set names utf8");
        }catch(PDOException $exception){
            echo "Database could not be connected: " .
$exception->getMessage();
        }
        return $this->conn;
    }
}
?>
<?php
class Nodemcu_log{

    // Connection
    private $conn;

    // Table
    private $db_table = "data_alat";

    // Columns
    public $id;

```

```

public $suhu;
public $gas;
public $status;
public $created_at;

// Db connection
public function __construct($db){
    $this->conn = $db;
}

// GET ALL DATA
public function getLogData(){
    $sqlQuery = "SELECT id, suhu, gas, status,
created_at FROM " . $this->db_table . ";";
    $stmt = $this->conn->prepare($sqlQuery);
    $stmt->execute();
    return $stmt;
}

// CREATE
public function createLogData(){
    $sqlQuery = "INSERT INTO
        ". $this->db_table ."
        SET
            suhu = :suhu,
            gas = :gas,
            status=:status";

    $stmt = $this->conn->prepare($sqlQuery);

    // sanitize
    $this->suhu=htmlspecialchars(strip_tags($this-
>suhu));
    $this->gas=htmlspecialchars(strip_tags($this->gas));
    $this->status=htmlspecialchars(strip_tags($this-
>status));
    // bind data
    $stmt->bindParam(":suhu", $this->suhu);
    $stmt->bindParam(":gas", $this->gas);
    $stmt->bindParam(":status", $this->status);

    if($stmt->execute()){
        return true;
    }
    return false;
}

```

```

// fetch single
public function getSingleLogData(){
    $sqlQuery = "SELECT
                id,
                suhu,
                gas,
                status,
                created_at
            FROM
                ". $this->db_table ."
            WHERE
                id = ?
            LIMIT 0,1";

    $stmt = $this->conn->prepare($sqlQuery);
    $stmt->bindParam(1, $this->id);
    $stmt->execute();

    //error handling
    if($stmt->errorCode() == 0) {
        while(($dataRow = $stmt->fetch(PDO::FETCH_ASSOC)) !=
false) {
            $this->suhu = $dataRow['suhu'];
            $this->gas = $dataRow['gas'];
            $this->status = $dataRow['status'];
            $this->created_at = $dataRow['created_at'];
        }
    } else {
        $errors = $stmt->errorInfo();
        echo($errors[2]);
    }

    // $dataRow = $stmt->fetch(PDO::FETCH_ASSOC);
    // $this->suhu = $dataRow['suhu'];
    // $this->kelembaban = $dataRow['kelembaban'];
    // $this->created_at = $dataRow['created_at'];
}

// Edit Data
public function updateDataLog(){
    $sqlQuery = "UPDATE
                ". $this->db_table ."
            SET
                suhu = :suhu,
                gas = :gas,
                status = :status,
                created_at = :created_at
            WHERE

```



```

        id = :id";

$stmt = $this->conn->prepare($sqlQuery);

$this->suhu=htmlspecialchars(strip_tags($this-
>suhu));
$this->gas=htmlspecialchars(strip_tags($this->gas));
$this->status=htmlspecialchars(strip_tags($this-
>status));
$this->created_at=htmlspecialchars(strip_tags($this-
>created_at));
$this->id=htmlspecialchars(strip_tags($this->id));

// bind data
$stmt->bindParam(":suhu", $this->suhu);
$stmt->bindParam(":gas", $this->gas);
$stmt->bindParam(":status", $this->status);
$stmt->bindParam(":created_at", $this->created_at);
$stmt->bindParam(":id", $this->id);

if($stmt->execute()){
    $itemCount = $stmt->rowCount();
    if($itemCount > 0){
        return true;
    }else{
        return false;
    }
}

return false;
}

// DELETE
function deleteLogData(){
    $sqlQuery = "DELETE FROM " . $this->db_table . "
WHERE id = ?";
    $stmt = $this->conn->prepare($sqlQuery);

    $this->id=htmlspecialchars(strip_tags($this->id));

    $stmt->bindParam(1, $this->id);

    if($stmt->execute()){
        return true;
    }
    return false;
}

```

? }