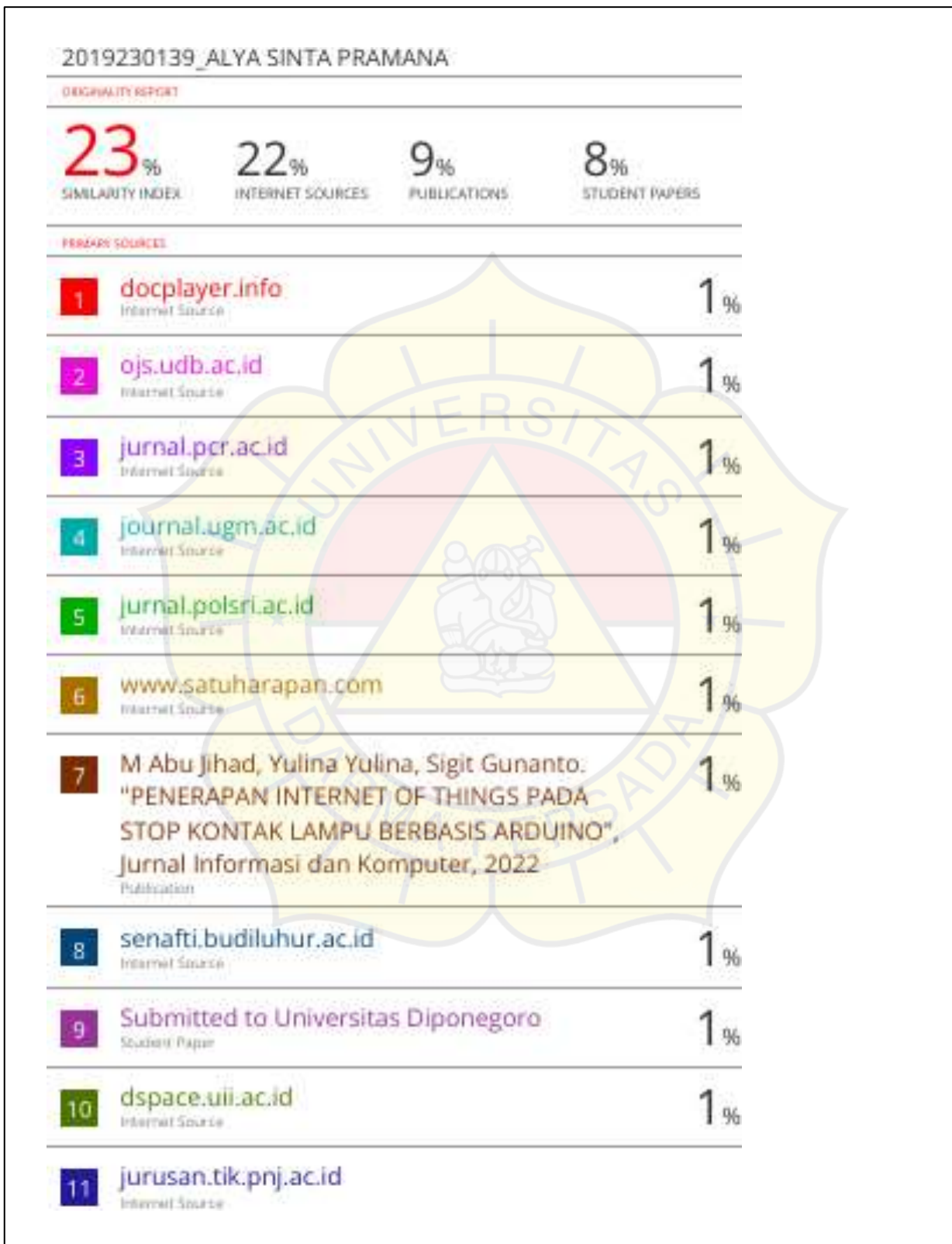


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Lampiran 3. Source Code (Arduino IDE Mikrokontroler)

```
#include <WiFi.h>

#include <HTTPClient.h>

#include <WiFiClientSecure.h>

#include <UniversalTelegramBot.h>

// --- KONFIGURASI JARINGAN, SERVER, TELEGRAM ---
const char* ssid = "iPhone";
const char* password = "alyalyalya";
const char* serverName =
"https://iotbanjir.biz.id/iot_banjir/kirimdata.php";
#define BOT_TOKEN "7715167405:AAE-
J09ErS5Gko2mFjjKladC2YQMnAkaZM0"
#define CHAT_ID "1431866197"

// --- KONFIGURASI PIN SENSOR & AKTUATOR ---
#define RAINDROP_PIN 34
#define FLOW_SENSOR_PIN 25
#define TRIG_PIN_1 12
#define ECHO_PIN_1 13
#define TRIG_PIN_2 32
#define ECHO_PIN_2 33
#define BUZZER_PIN 14

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```

```

WiFiClientSecure secured_client;

UniversalTelegramBot bot(BOT_TOKEN, secured_client);

HTTPClient http;

volatile int pulseCount = 0;
float flowRate = 0.0;
unsigned long flowPreviousMillis = 0;

int lastRainStatus = 0;
int previousRaindrop = 4095;
long duration1, distance1;
long duration2, distance2;

bool flowAlertSent = false;
bool ultrasonic1AlertSent = false;
bool ultrasonic2AlertSent = false;

// --- FUNGSI INTERRUPT & BACA SENSOR ---
void IRAM_ATTR pulseCounter() { pulseCount++; }

void bacaSemuaSensor() {
    // Hitung Flow Rate setiap detik
    if (millis() - flowPreviousMillis >= 1000) {
        noInterrupts();

```

```

int currentPulse = pulseCount;

pulseCount = 0;

interrupts();

// Kalibrasi ulang: (frekuensi pulsa / k-faktor) * 60 detik =
L/min

// k-faktor umum sekitar 7.5

float kFactor = 7.5;

flowRate = ( (float)currentPulse / kFactor ) * 60.0;

flowPreviousMillis = millis();
}

// Baca sensor hujan
previousRaindrop = analogRead(RAINDROP_PIN); ★

// Baca sensor ultrasonik 1
digitalWrite(TRIG_PIN_1, LOW); delayMicroseconds(2);
digitalWrite(TRIG_PIN_1, HIGH); delayMicroseconds(10);
digitalWrite(TRIG_PIN_1, LOW);

duration1 = pulseIn(ECHO_PIN_1, HIGH, 25000);

distancel = duration1 > 0 ? duration1 * 0.032 / 2 : 999; // 999
jika error

```

```

// Baca sensor ultrasonik 2

digitalWrite(TRIG_PIN_2, LOW); delayMicroseconds(2);

digitalWrite(TRIG_PIN_2, HIGH); delayMicroseconds(10);

digitalWrite(TRIG_PIN_2, LOW);

duration2 = pulseIn(ECHO_PIN_2, HIGH, 25000);

distance2 = duration2 > 0 ? duration2 * 0.032 / 2 : 999; // 999

jika error
}

// --- FUNGSI MENGIRIM DATA ---
void kirimDataKeWebServer(String kejadian) {
    if (WiFi.status() == WL_CONNECTED) {
        http.begin(serverName);
        http.addHeader("Content-Type", "application/x-www-form-
urlencoded");

        String postData = "ketinggian_air=" + String(distancel) +
            "&aliran_air=" + String(flowRate) +
            "&curah_hujan=" + String(previousRaindrop)
+
            "&kejadian=" + kejadian;

        int httpResponseCode = http.POST(postData);

```

```

if (httpResponseCode > 0) {
    Serial.println("-> Data '" + kejadian + "' dikirim ke
server. Kode: " + String(httpResponseCode));
} else {
    // INI PERBAIKANNYA: Pesan error lebih jelas dan tidak
menghentikan program
    Serial.println("-> Gagal kirim data ke server. Error: " +
http.errorToString(httpResponseCode));
}
http.end();
} else {
    Serial.println("-> WiFi terputus. Data tidak dikirim.");
}
}

// --- FUNGSI CEK KONDISI & KIRIM LAPORAN ---
void cekKondisiDanLapor() {
    // Cek Aliran Air Tinggi
    if (flowRate > 30.0 && !flowAlertSent) {
        String msg = "🚨 Aliran air tinggi: " + String(flowRate, 2) +
" L/min";
        bot.sendMessage(CHAT_ID, msg, "");
        kirimDataKeWebServer("Aliran Air Tinggi");
    }
}

```

```

    flowAlertSent = true;
} else if (flowRate <= 30.0) {
    flowAlertSent = false;
}

// Cek Hujan
if (previousRaindrop < 2000 && lastRainStatus == 0) {
    bot.sendMessage(CHAT_ID, "☁️☐ Hujan terdeteksi!", "");
    kirimDataKeWebServer("Hujan Terdeteksi");
    lastRainStatus = 1;
} else if (previousRaindrop >= 2000) {
    lastRainStatus = 0;
}

// Cek Penampungan 1
if (distance1 < 3 && !ultrasonic1AlertSent) {
    bot.sendMessage(CHAT_ID, "SIAGA!! SELOKAN 1 FULL ", "");
    kirimDataKeWebServer("selokan 1 Penuh");
    ultrasonic1AlertSent = true;
} else if (distance1 >= 3) {
    ultrasonic1AlertSent = false;
}

```

```

// Cek Penampungan 2 (BANJIR)

if (distance2 < 3 && !ultrasonic2AlertSent) {

    bot.sendMessage(CHAT_ID, "🚨 BANJIR!!! KETINGGIAN AIR
KRITIS", "");

    kirimDataKeWebServer("BANJIR TERDETEKSI");

    digitalWrite(BUZZER_PIN, HIGH);

    ultrasonic2AlertSent = true;
} else if (distance2 >= 3) {
    digitalWrite(BUZZER_PIN, LOW);
    ultrasonic2AlertSent = false;
}
}

// ===== FUNGSI SETUP =====

void setup() {
    Serial.begin(115200);
    WiFi.begin(ssid, password);

    Serial.print("Menghubungkan ke WiFi...");
    while (WiFi.status() != WL_CONNECTED) { delay(500);
Serial.print("."); }

    Serial.println("\nTerhubung ke WiFi");

    Serial.println(WiFi.localIP());
}

```

```

secured_client.setInsecure();

pinMode(FLOW_SENSOR_PIN, INPUT_PULLUP);

attachInterrupt(digitalPinToInterrupt(FLOW_SENSOR_PIN),
pulseCounter, RISING);

pinMode(TRIG_PIN_1, OUTPUT); pinMode(ECHO_PIN_1, INPUT);
pinMode(TRIG_PIN_2, OUTPUT); pinMode(ECHO_PIN_2, INPUT);
pinMode(RAINDROP_PIN, INPUT);
pinMode(BUZZER_PIN, OUTPUT);
digitalWrite(BUZZER_PIN, LOW);

Serial.println("Monitoring Dimulai (Mode Event-Based)...");
}

// ===== FUNGSI LOOP UTAMA
=====

void loop() {
    bacaSemuaSensor(); // Baca semua nilai sensor

    cekKondisiDanLapor(); // Cek kondisi dan kirim laporan jika
perlu

    delay(1000); // Beri jeda 1 detik setiap siklus
}

```