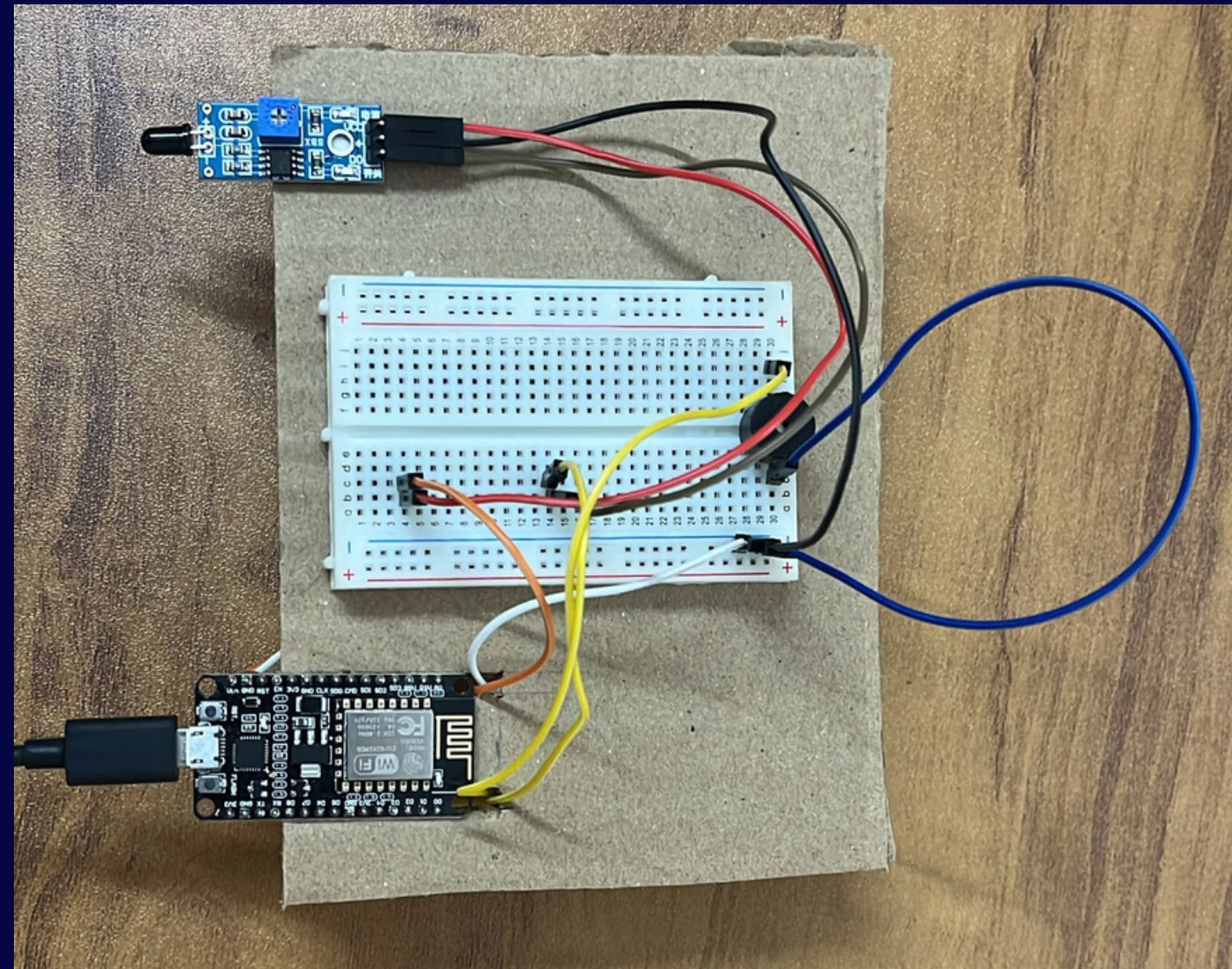# GROUP PROJECT

ELECTRONICS SYSTEM DESIGN LABORATORY (ECS752)

Fire Detection & Notification System

Enhancing fire safety with advanced detection and swift notification systems
for accurate alerts and rapid emergency responses.

Project Overview

The increasing emphasis on fire safety in contemporary settings has prompted a need for innovative solutions to address the limitations of traditional fire detection systems. This report presents a detailed account of the development and testing of a prototype for an advanced fire detection and notification system. The primary components utilized in this prototype include the NodeMCU ESP-12E, a fire sensor, a buzzer, and a breadboard interconnected using male-to-female jumpers.

Meet The Group

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Background

General Overview

Current fire detection methods encounter challenges, leading to potential delays, and there is a crucial need for technological advancements to enhance fire safety measures. The existing notification systems often lack the desired swiftness in response, necessitating improvements for more efficient alerts.

History

Despite progress in fire detection, challenges like false alarms persist, urging technological advances. Current systems lag in swiftly identifying specific fires and efficient notification. The call for innovation focuses on real-time data processing, AI, and IoT integration to revolutionize fire safety, ensuring accurate detection and quicker emergency responses.

Objective

The objectives of this project are twofold: to develop a reliable fire detector and to implement a swift notification system. This involves integrating a dependable fire sensor for accurate detection and utilizing NodeMCU ESP-12E for efficient data processing. Additionally, the creation of a smartphone app for real-time notifications and the incorporation of a buzzer for immediate local alerts are integral to achieving the project goals.

Integral Components

1 — Node MCU ESP-12E

NodeMCU ESP-12, an IoT powerhouse, efficiently integrates with fire sensors, enabling rapid fire detection and real-time alerts for enhanced safety measures.

2 — Flame Sensor

The flame sensor, crucial in fire safety setups, seamlessly interfaces with devices like NodeMCU ESP-12, ensuring rapid flame detection and real-time alerts for proactive responses.

3 — Buzzer

The buzzer, integral to fire detection systems, pairs seamlessly with devices like NodeMCU ESP-12. Its prompt activation enhances the system's responsiveness, providing audible alerts for swift and effective notification in fire-related scenarios.

4 — BLYNK IOT app

Blynk IoT app seamlessly integrates with NodeMCU and fire sensors, providing a user-friendly interface for real-time monitoring and swift, customizable alerts in fire detection systems.
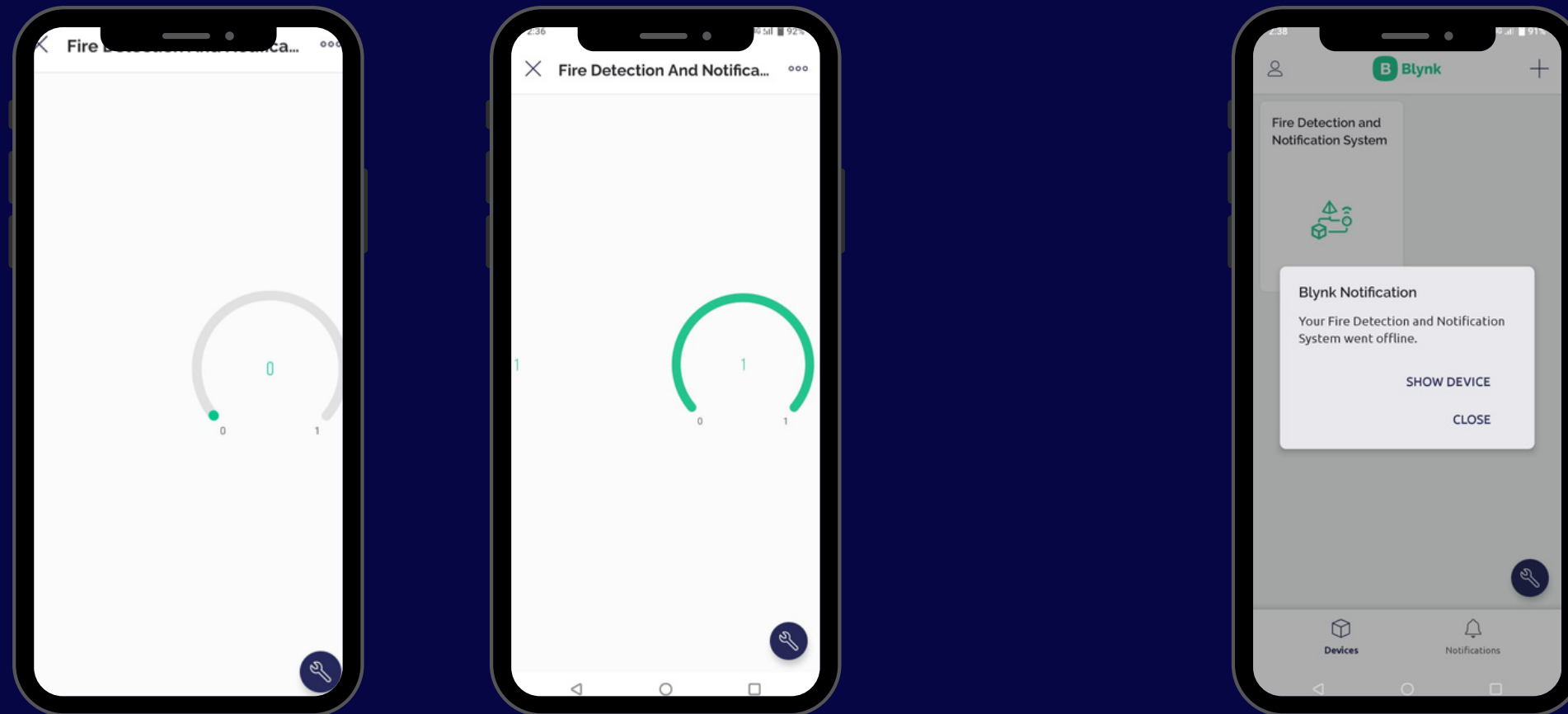
BLYNK IOT Interface
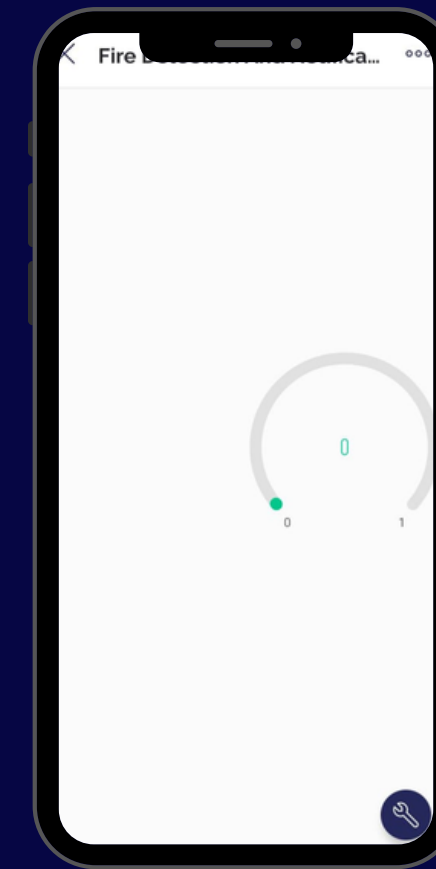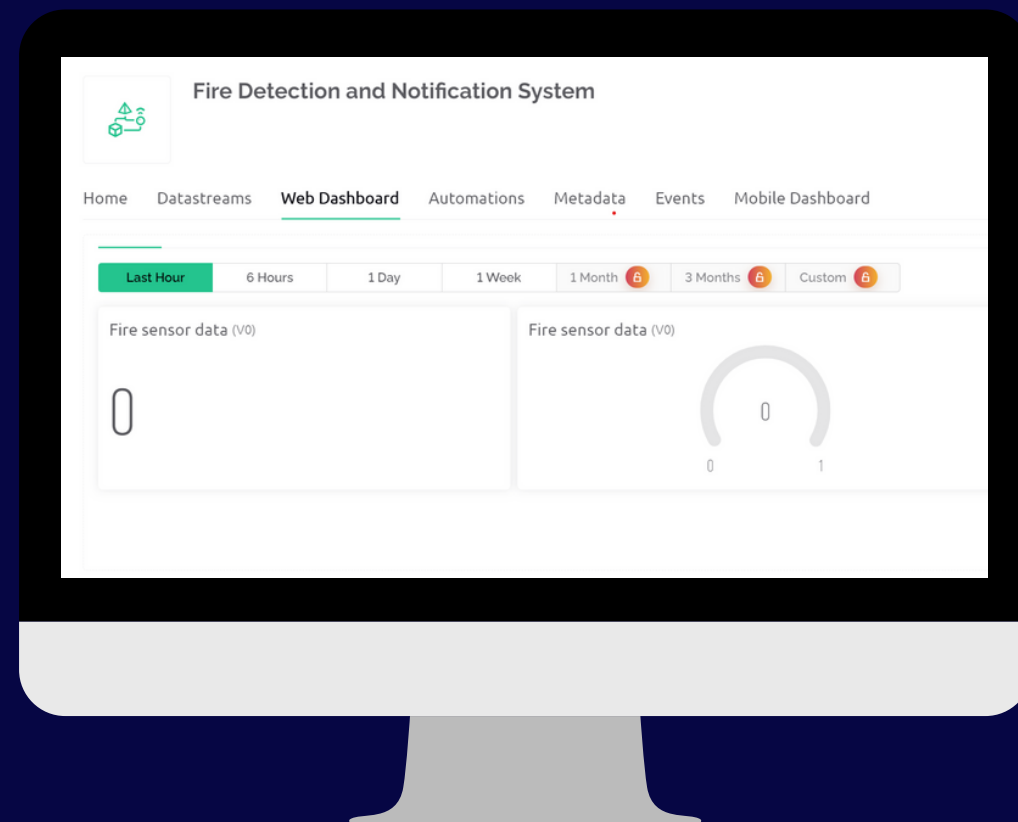
Empowering efficient control for fire detection and notifications.
Fig 1: Blynk IoT Desktop Interface
Fig 2: Blynk IoT Mobile Interface

BLYNK IOT Interface

Empowering efficient control for fire detection and notifications.
Fig 1: Blynk IoT - fire detection widget
Fig 2: Blynk IoT Notification

Programming Code

```
#define BLYNK_TEMPLATE_ID "TMPL3zFiOu4g7"
#define BLYNK_TEMPLATE_NAME "Fire Detection and Notification System"
#define BLYNK_AUTH_TOKEN "uUn6PIypuJuhAi89NszYPGApvVKLALs2"


#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "V2025"; // Change your Wifi/ Hotspot Name
char pass[] = "Swift_1234"; // Change your Wifi/ Hotspot Password

BlynkTimer timer;

const int fire= 2;
const int buzzer= 7;
int fire_Val;


void setup() //Setup function - only function that is run in deep sleep mode
```

```
void setup() //Setup function - only function that is run in deep sleep m

{


Serial.begin(9600);
pinMode(fire, INPUT);
pinMode(buzzer, OUTPUT);
WiFi.begin(ssid, pass);
#define BLYNK_DEBUG

  Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);//Splash screen delay
  timer.setInterval(2000L, mySensor);
}

void loop() //Loop function
{
  Blynk.run();
  timer.run();
}
```

Programming Code

```
void mySensor()
{
int fire_Val = digitalRead(fire);
Serial.println(fire_Val);
delay(200);

  if (fire_Val == 0)
  {
    digitalWrite(buzzer, HIGH);
    //Blynk.logEvent("fire alert");
```

```
    Serial.println(fire_Val);
}

else
{
  digitalWrite(buzzer, LOW);
  //Blynk.virtualWrite(V0, 0);
 // Serial.print("FIRE Level: ");
  Serial.println(fire_Val);

}
```

Scope of Usage

Image taken from Freepik

Early Detection and Notification of fire-saving from hazards!

Group Result

Result 1

The accuracy and performance of the fire detection and notification system undergo thorough evaluation. The assessment ensures its reliability and effectiveness in real-world scenarios.

Result 2

Comprehensive data and observations obtained from a variety of testing scenarios serve as a robust validation of the sensor's reliability.

Result 3

A detailed comparative analysis of expected versus actual results underscores the system's responsiveness, affirming its efficacy in diverse operational conditions.

Conclusion

In summary, this report underscores the significant strides achieved by the prototype in enhancing fire safety. The comprehensive evaluation highlighted the system's positive contributions, affirming its potential as a valuable addition to fire safety practices. Beyond its immediate applications, the implications extend to broader safety practices, opening avenues for integration into existing systems. Moreover, thoughtful recommendations for further development steps are provided, ensuring continuous refinement and optimization for a more robust and effective fire safety solution in diverse contexts.

THANK YOU