IOT
SMART HOME
FCDS

Presented By:

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INTRODUCTION

THE IMPORTANCE OF SMART HOME PROJECT

Our project is a Smart Home System that combines monitoring, security, and automation. The system measures gas, temperature, and humidity using sensors connected to an ESP32. For secure access, it uses a keypad and password to control the door lock, and it automatically turns on the lights when the environment is dark.

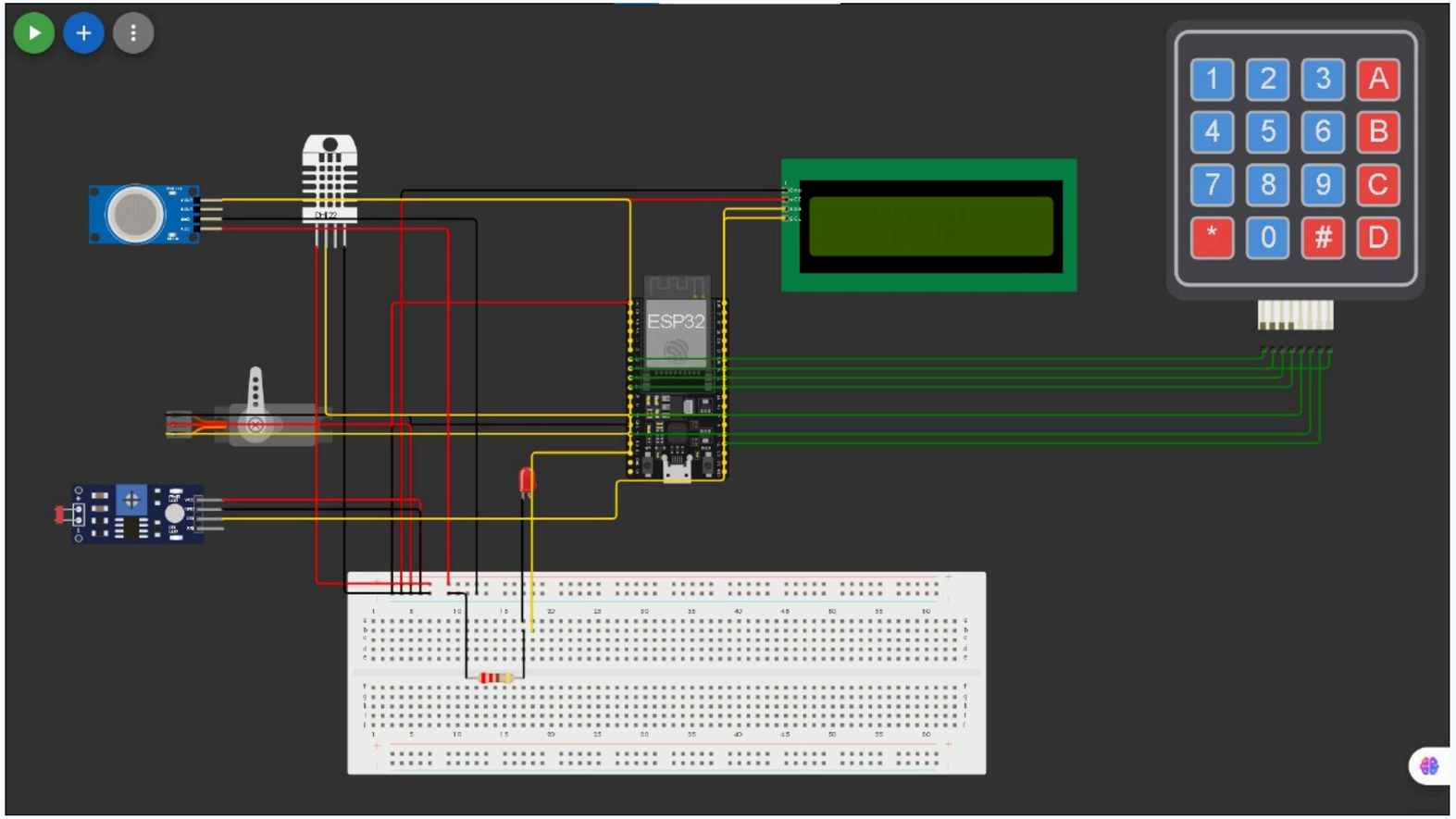
Beyond local control, the system is connected to a database to store readings and a web application where users can monitor data and control devices remotely. In addition, it integrates with an AI-powered chatbot that can understand user queries, provide real-time sensor updates, and perform control actions. This combination of IoT, cloud, and AI makes the system a modern and intelligent smart home solution.

PROJECT OBJECTIVES

- **To monitor gas, temperature, and humidity in real time for safety and environment tracking.**
- **To provide secure home access using a keypad and password with smart door control.**
- **To automatically control lighting based on darkness detection for comfort and energy efficiency.**
- **To store and manage data in a database for logging and analysis.**
- **To enable remote monitoring and control through a web application.**
- **To integrate an AI chatbot that understands user queries, sends sensor readings, and controls devices.**

SYSTEM OVERVIEW

The Smart Home System integrates sensors, actuators, and cloud services to create a secure and automated environment. The ESP32 microcontroller collects data from gas, temperature, humidity, and light sensors, then processes it to take actions such as turning on lights automatically when it is dark and controlling a servo motor for door access using a keypad and password.



The system is connected to a database for storing sensor readings and access logs, while a web application allows users to monitor conditions and control devices remotely. In addition, an AI-powered chatbot enables natural interaction, providing sensor updates and executing control commands on demand.

This combination of IoT hardware, cloud integration, and AI ensures safety, comfort, and intelligent home management.

USE CASES

1. **Home Safety Monitoring**

The system measures gas, temperature, and humidity in real time to ensure a safe home environment.

2.Smart Access Control

- **The door can be locked and unlocked securely using a keypad and password connected to a servo motor.**

3.Automatic Lighting

- **Lights are turned on automatically when darkness is detected using a light sensor for comfort and energy saving.**

USE CASES

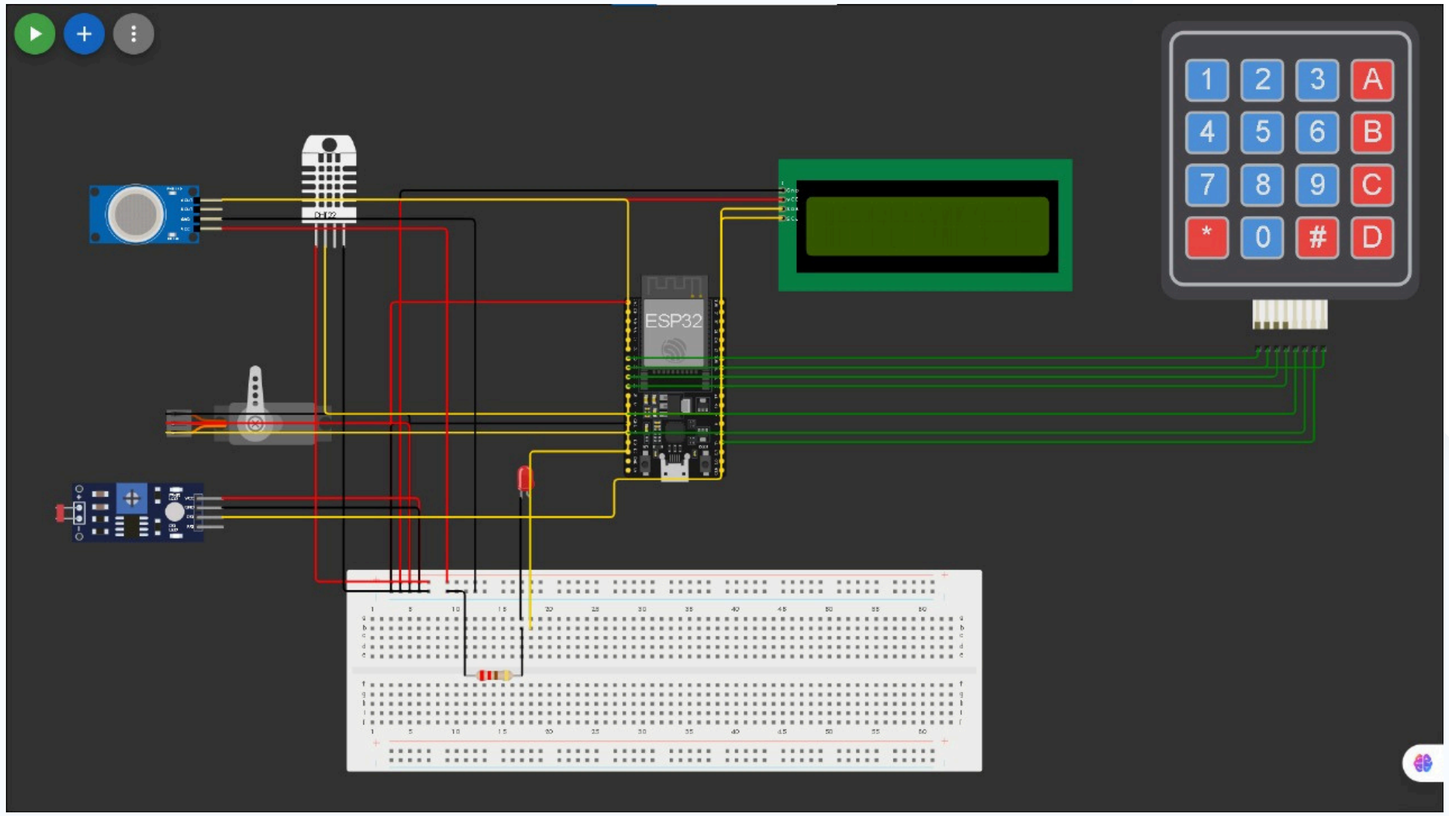
4. Remote Monitoring & Control
   - Users can check sensor data and control devices remotely through a web application

5. AI Chatbot Interaction
   - An AI-powered chatbot allows users to ask questions like ‘What is the gas level now?’ and control the system by chat.

6. Data Logging & Alerts
   - All readings are stored in a database. If abnormal values are detected, the system can generate alerts.

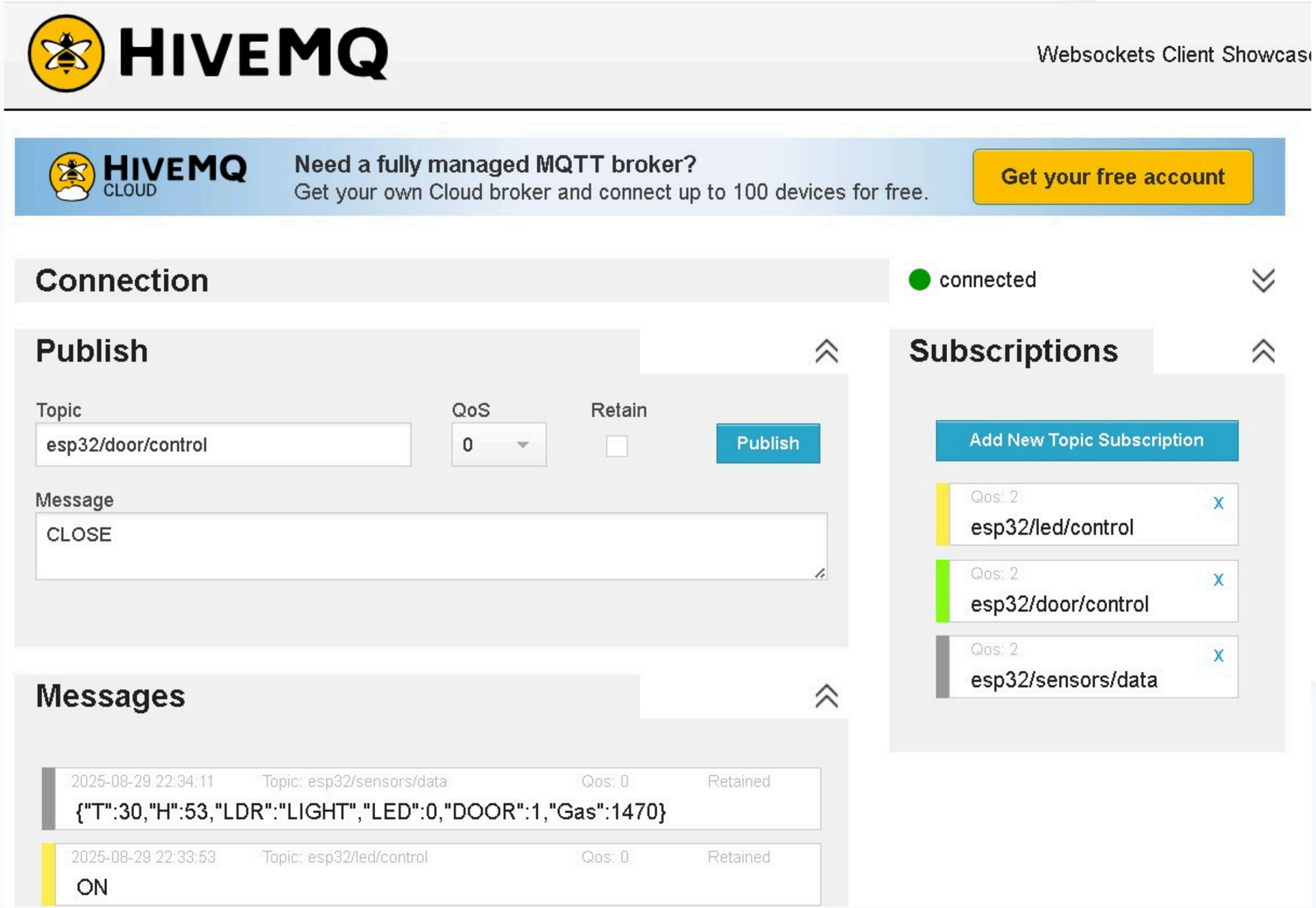
TECH STACK

Hardware: ESP32 microcontroller (sensor readings + actuator control).



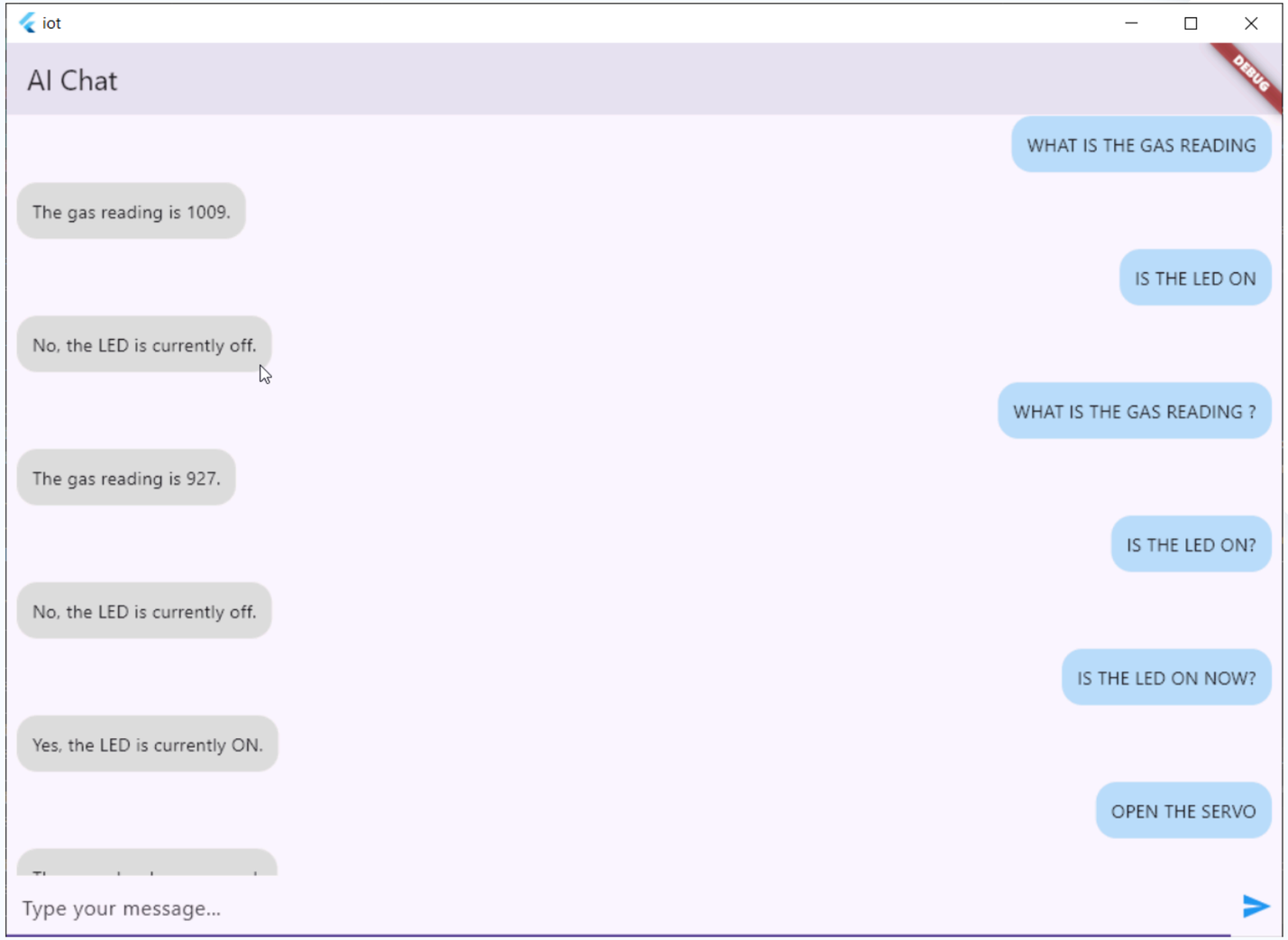
TECH STACK

- **Communication: HiveMQ MQTT broker for publish/subscribe messaging.**



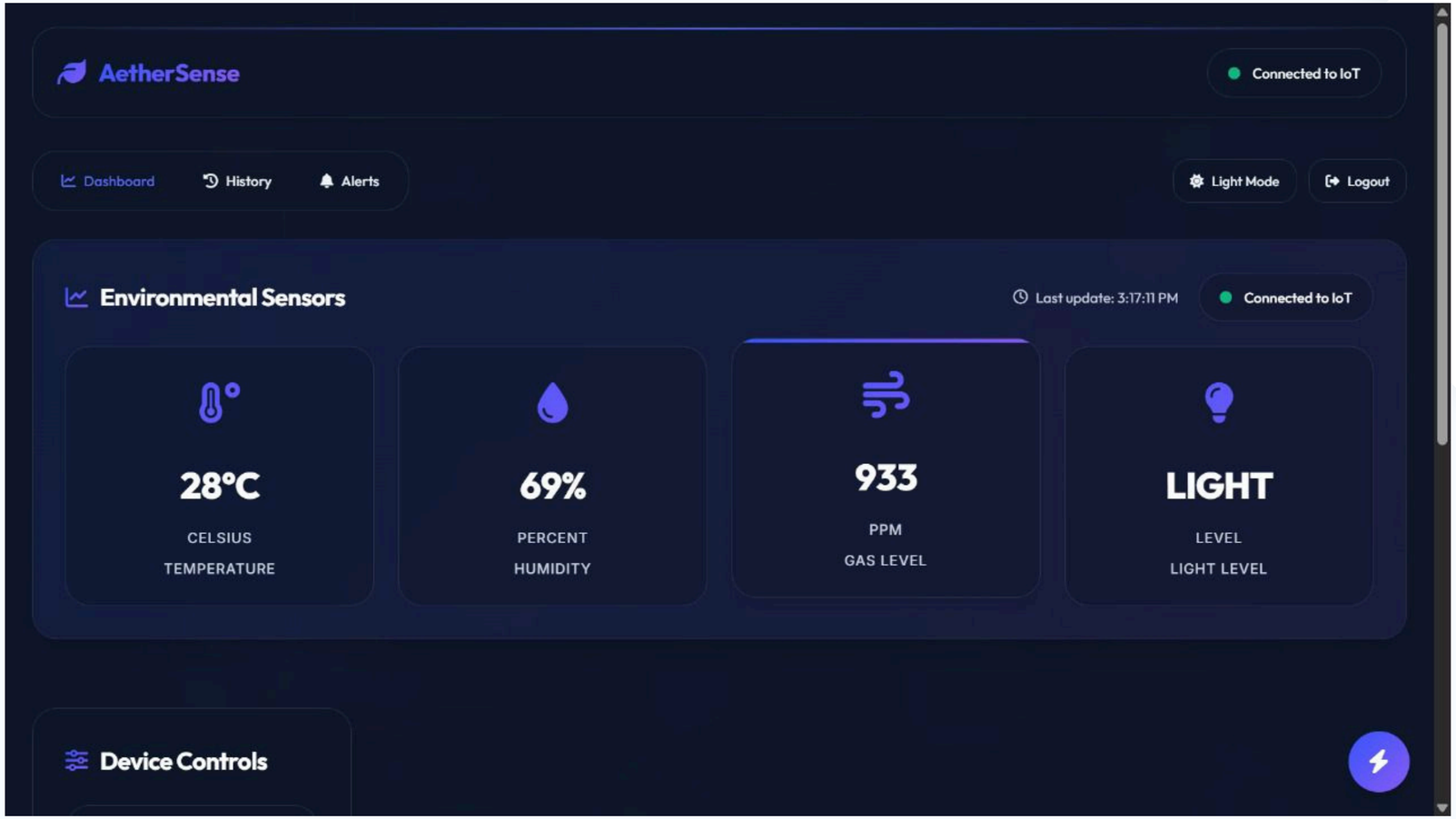
TECH STACK

AI Integration: FastAPI + LangChain for chatbot interaction and system queries.



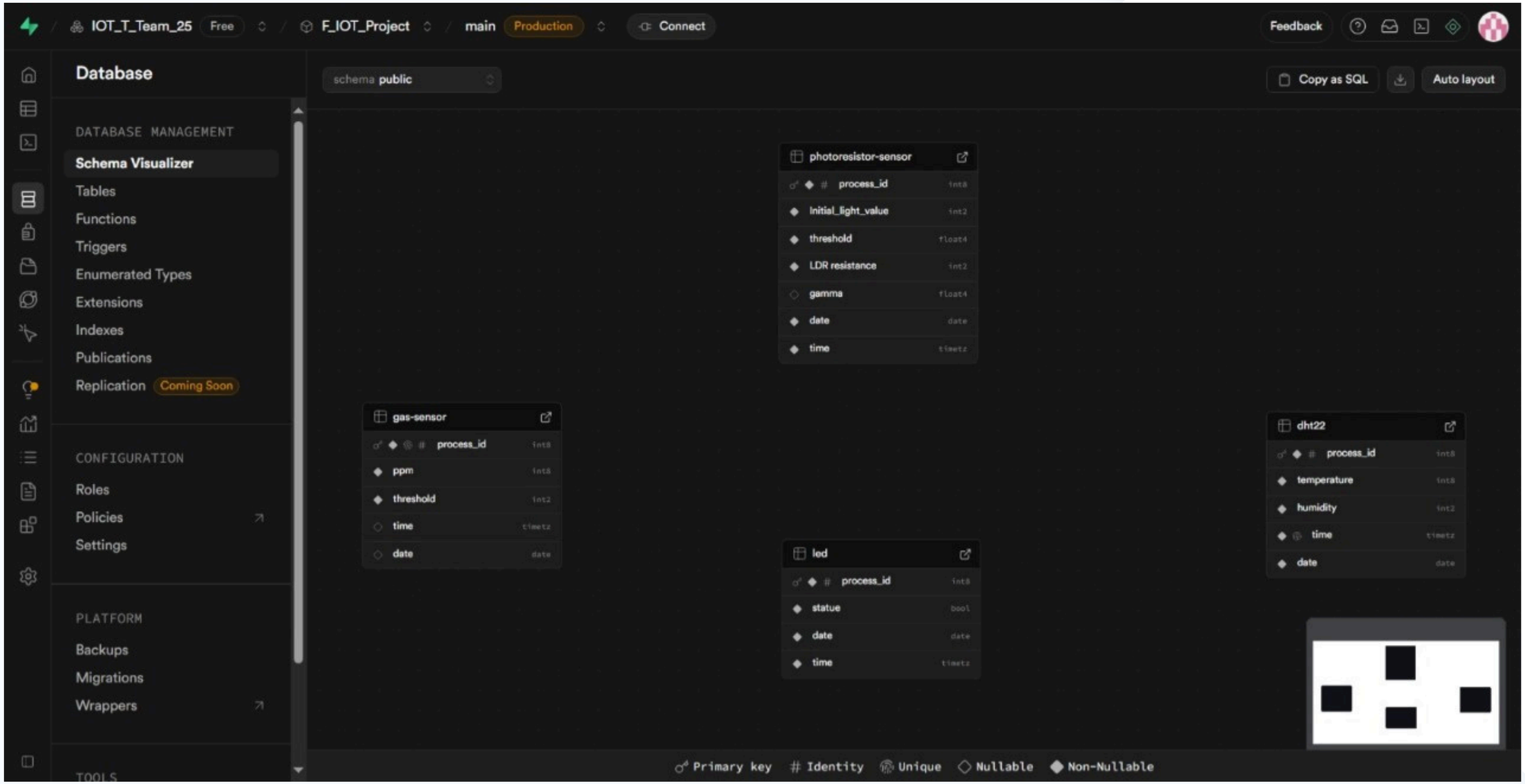
TECH STACK

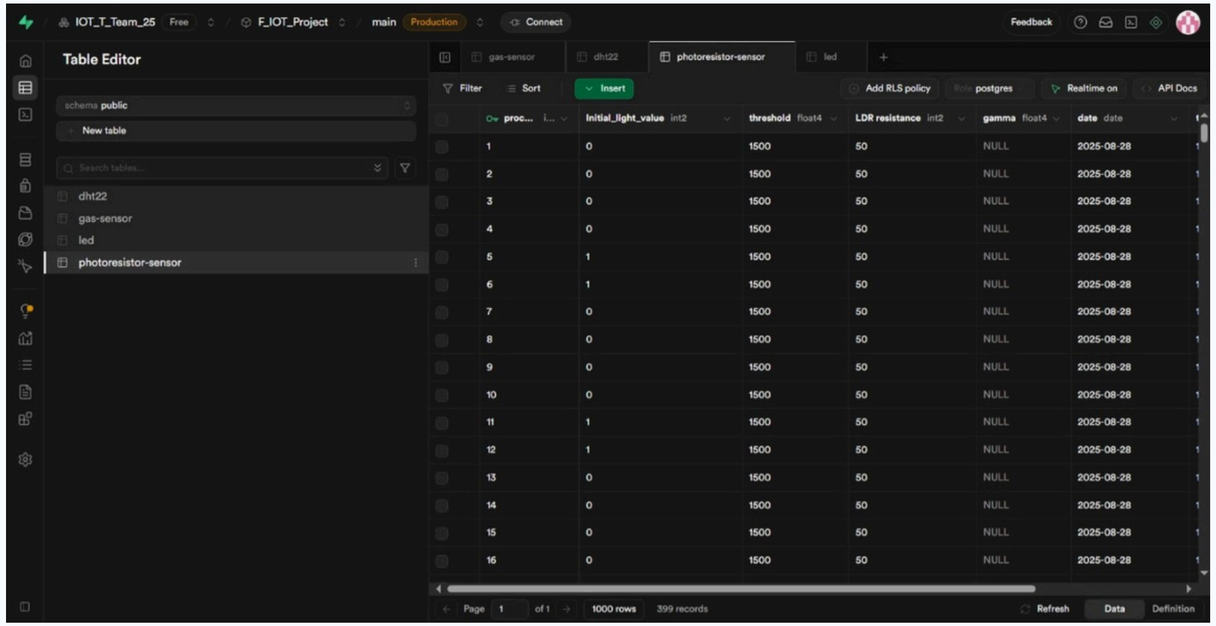
Frontend: Web Application (monitoring and remote control).



TECH STACK

Backend & Database: Supabase (data storage, REST API, authentication).

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API Docs
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gamma float4
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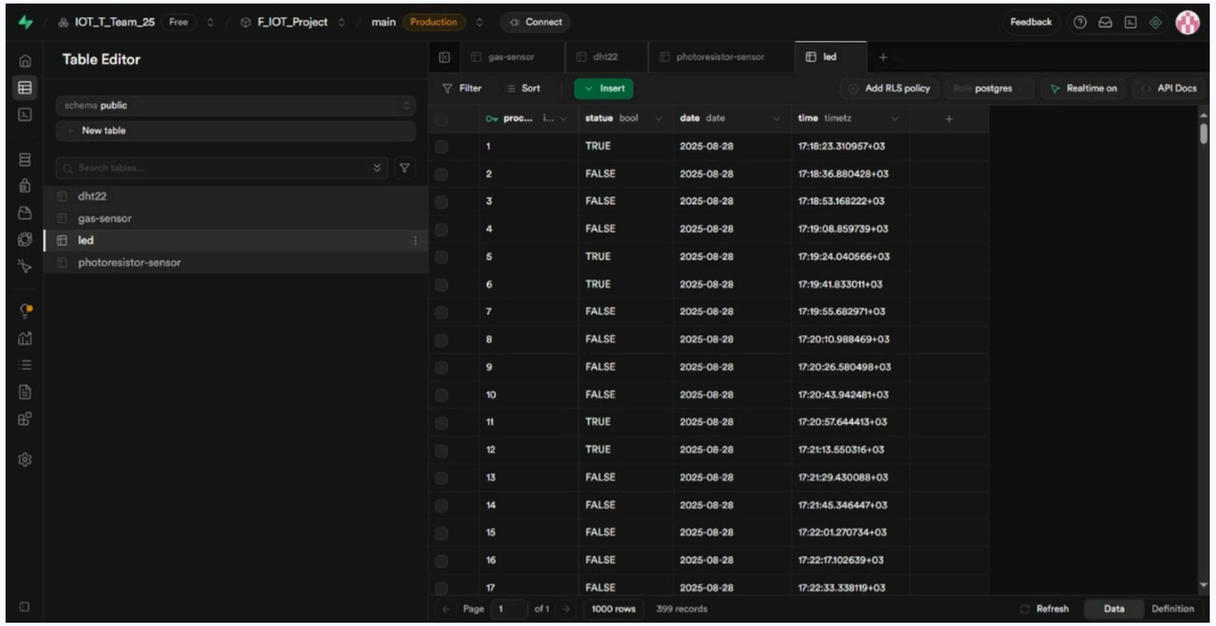
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4 FALSE 2025-08-28 17:19:08.859739+03
5 TRUE 2025-08-28 17:19:24.040566+03
6 TRUE 2025-08-28 17:19:41.833011+03
7 FALSE 2025-08-28 17:19:55.682971+03
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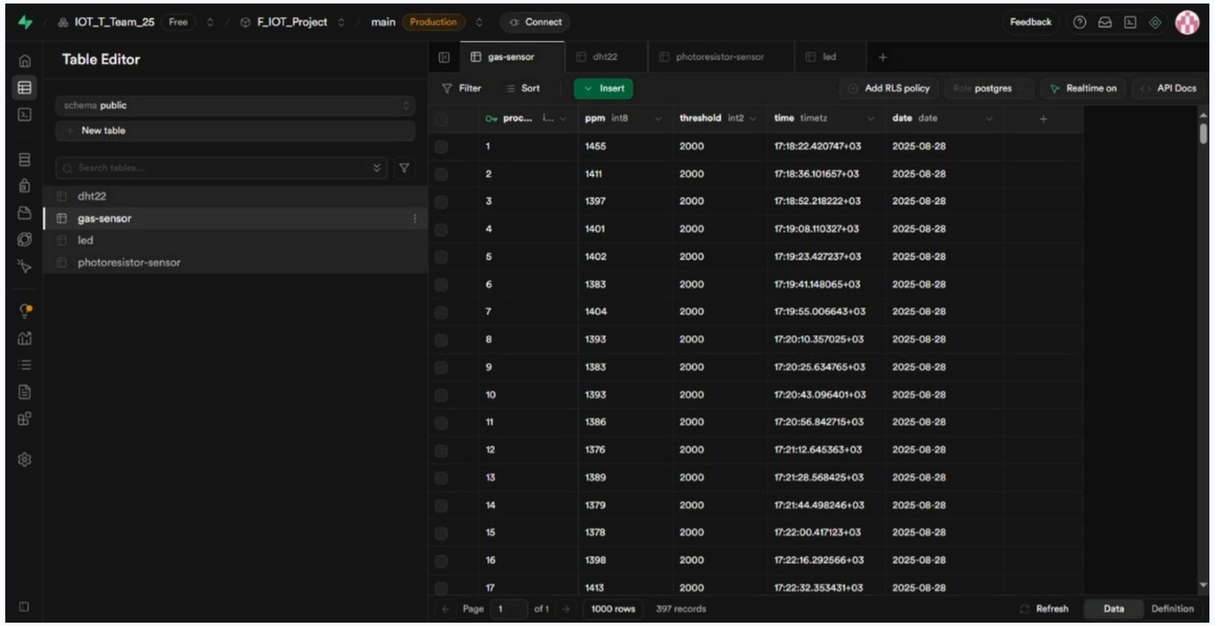
Definition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New table
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dht22
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led
photoresistor-sensor
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17 1413 2000 17:22:32.353431+03 2025-08-28
Page 1 of 1
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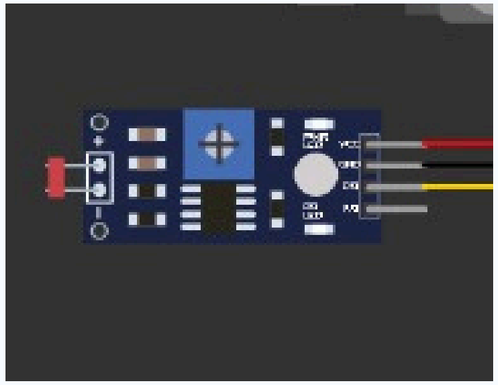
Refresh
Data
Definition

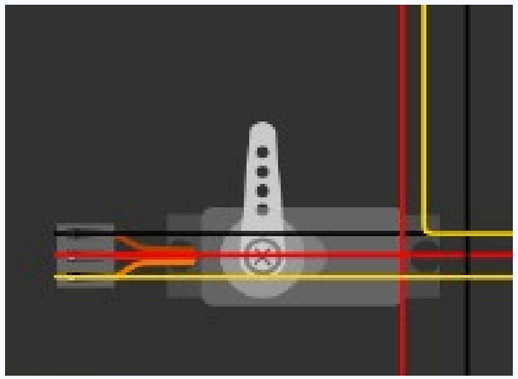
HARDWARE COMPONENTS

- LDR (Light Dependent Resistor) (connected to pin 23) → detects darkness for automatic lighting.

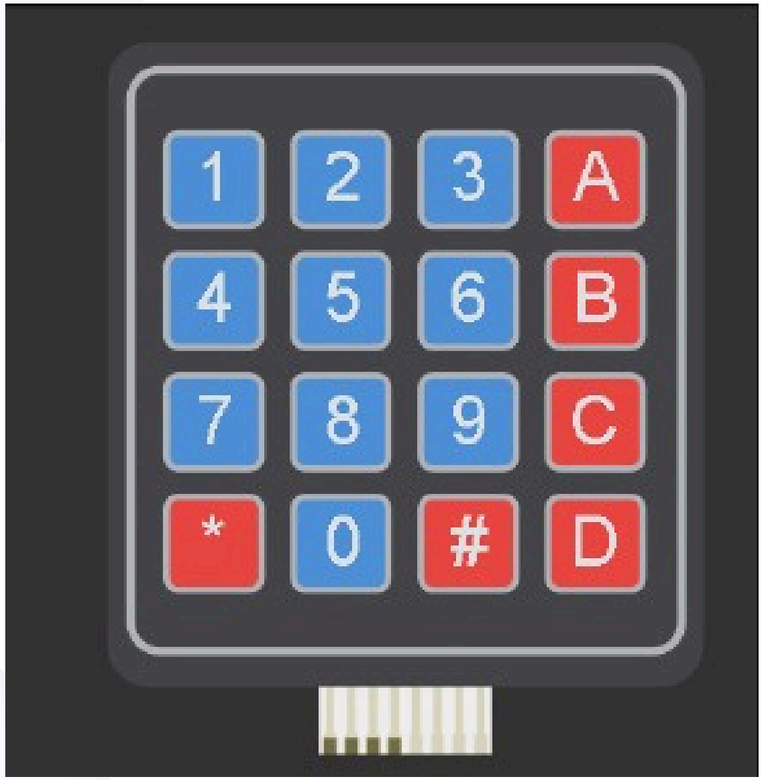


LCD Display (I2C, 16x2) .1
shows real-time →
sensor data and system
.status

- Servo Motor (connected to pin 14) → controls door lock (open/close).

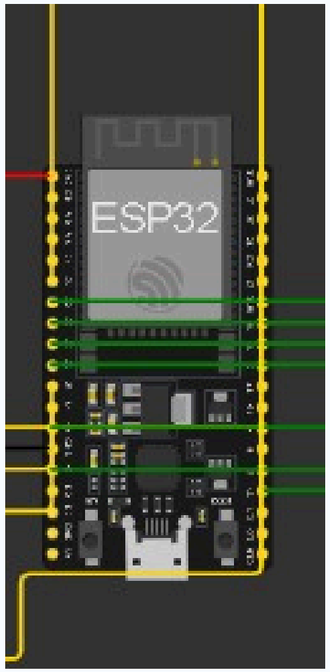


- Keypad (4x4) (connected to pins 32, 33, 25, 26, 12, 13, 15, 19) → used for password-based access control.

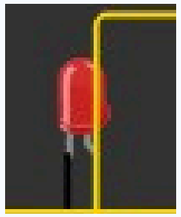


HARDWARE COMPONENTS

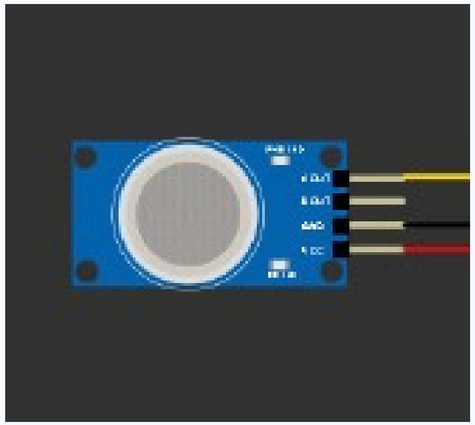
ESP32 Microcontroller → main controller for sensors, actuators, and communication.



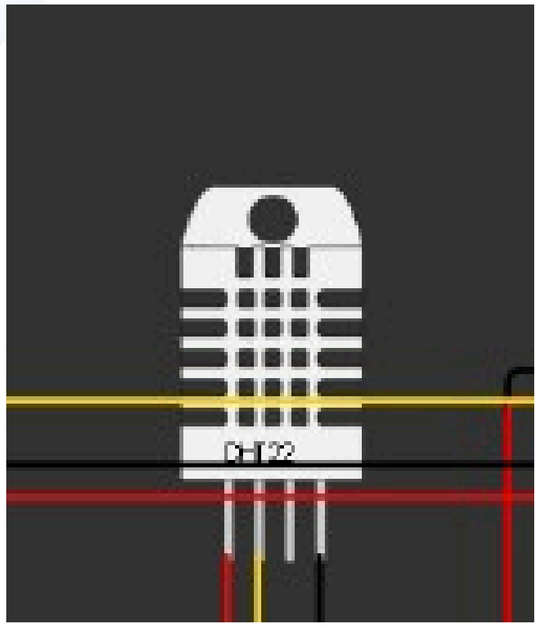
- **LED (connected to pin 27) → represents light control based on LDR or remote commands.**



- **Gas Sensor (connected to pin 35) → detects harmful gas levels.**



- **DHT22 Sensor (connected to pin 4) → measures temperature and humidity.**



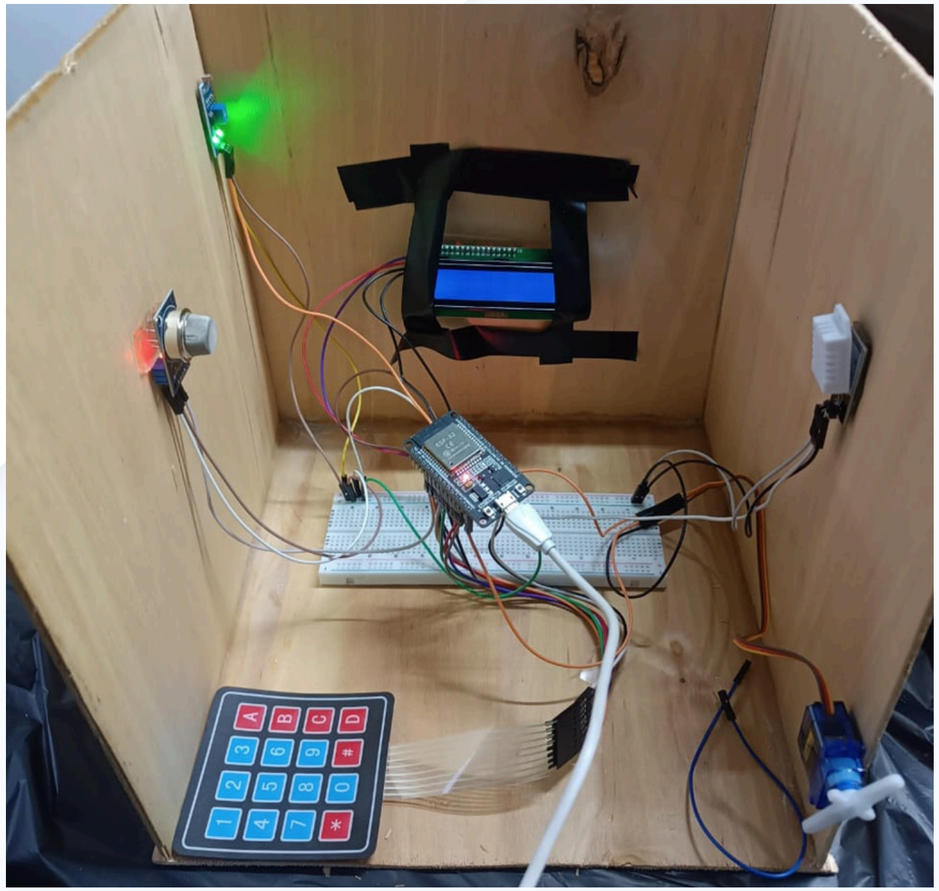
APP FLOW

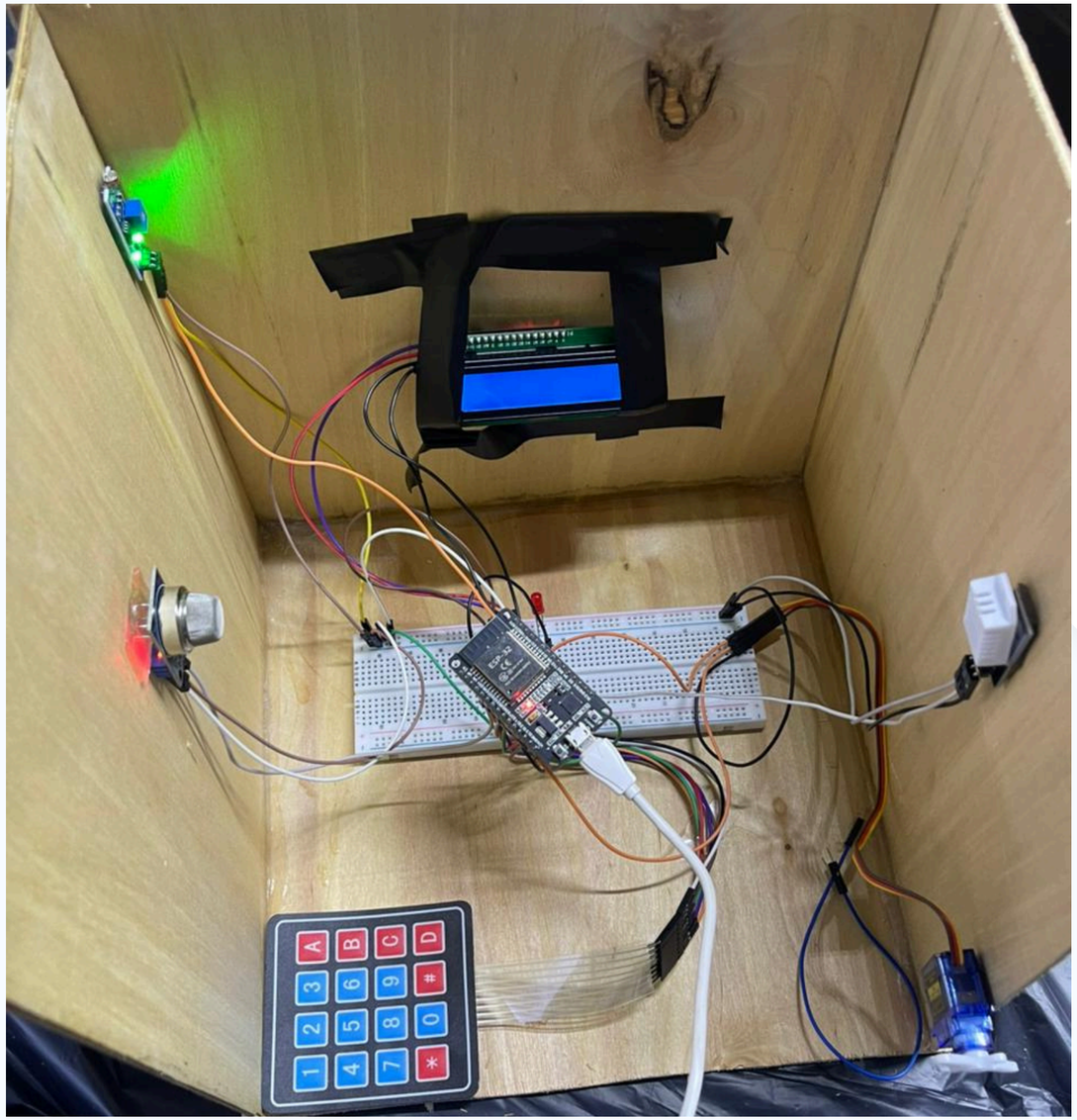
1. **Login / Signup**
   - **User registers or logs in through the web application using Supabase authentication.**
2. **Dashboard (Real-time Data)**
   - **User views gas, temperature, humidity, light status, and door state updated in real time from the ESP32 via MQTT and Supabase.**
3. **Alerts & History Logs**
   - **Alerts appear if abnormal conditions are detected (e.g., gas leak or high temperature).**
   - **Historical sensor data and access logs are stored in the Supabase database and can be reviewed by the user.**
4. **Remote Door Control**
   - **User can send commands from the web app to open/close the door securely.**
   - **Door can also be managed locally via the keypad and password.**
5. **AI Chatbot Interaction (Extra Feature)**
   - **User interacts with the chatbot (FastAPI + LangChain) to ask questions like “What is the gas level now?” or to control devices directly by text commands.**

- **User → Web App → Supabase → ESP32 → Devices**

- **User → AI Chatbot → FastAPI/LangChain → ESP32 → Devices**

PROTOTYPE





CONCLUSION

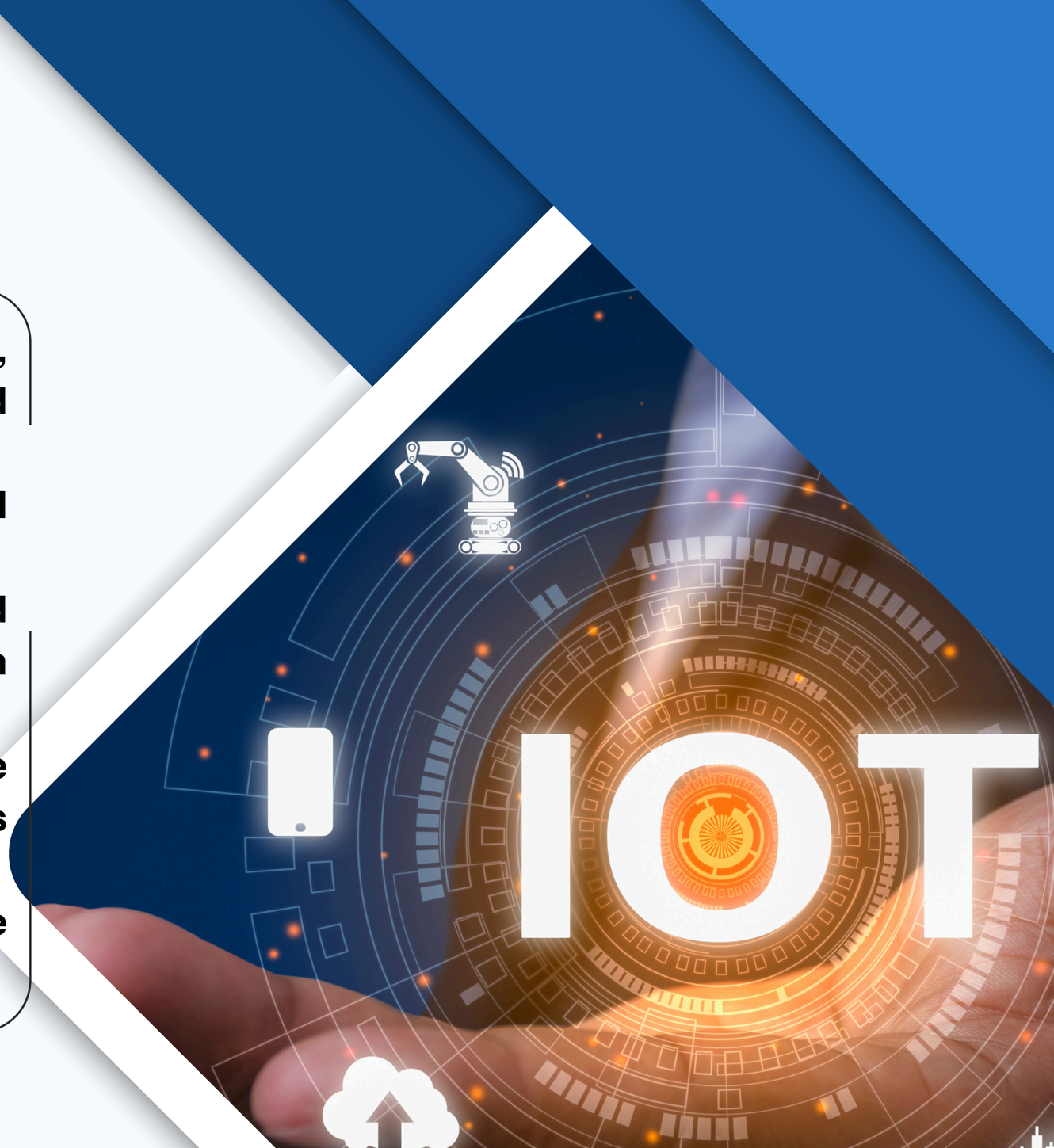
Our Smart Home System combines sensors, actuators, and IoT technologies to improve safety and comfort.

It monitors gas, temperature, and humidity in real time.

The system provides secure access using a keypad and password, and automatic lighting based on darkness.

Through Supabase and a web app, users can store data, monitor conditions, and control devices remotely.

An AI chatbot adds smart interaction, making the home more intelligent and user-friendly.



THANK YOU

FOR YOUR ATTENTION

IOT FCDS