

JustAqua

Our Team

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Our Guide

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Introduction

This project aims to revolutionize the aquaculture industry by integrating Internet of Things (IoT) , a powerful tool that can greatly enhance productivity and sustainability in aquaculture.

In this project, we will explore how IoT can be used to monitor and control various aspects of aquaculture, such as water quality, and fish health.

Problem Statement

The aquaculture farming sector faces significant challenges due to low labor participation among young adults and an aging agricultural population. Labor shortages are affecting aquaculture production, posing a threat to the industry's sustainability and efficiency. Conventional fish farming techniques that rely on manual labor are becoming increasingly costly and less feasible.

Proposed System

- The proposed Aquaculture Monitoring System integrates IoT technology with a network of sensors, microcontroller units, a central server, and user interfaces to provide comprehensive monitoring and management of aquaculture environments.
- By deploying sensors such as temperature, ammonia, pH, and turbidity sensors strategically within aquaculture setups, the system continuously collects crucial data on water quality parameters. Microcontroller units process and transmit this data to a central server, which performs real-time processing, storage, and analysis. Users access the system through mobile, allowing them to monitor real-time sensor readings, set up custom alerts, and receive notifications for abnormal conditions.
- Administrators can configure system settings, analyze historical data trends, and manage user accounts through an administrative web dashboard. Overall, the system facilitates data-driven decision-making, enhances monitoring efficiency, and promotes sustainability in aquaculture operations.

Module Description

Authentication Module

Aadit V Biju

The authentication module within the proposed Aquaculture Monitoring System serves as a vital component ensuring secure access to the system's functionalities while safeguarding user data. It is responsible for verifying the identity of users seeking access to the system, thereby preventing unauthorized access and maintaining the integrity of sensitive information.

Module Description

Application interface

Lloyd Sibi, Alvin Varghese

The application interface module of the proposed Aquaculture Monitoring System serves as the bridge between users and the system's functionalities, providing an intuitive and user-friendly interface for accessing and interacting with the system.

Module Description

Sensor Integration

Ajo Thomas

The sensor integration module within the proposed Aquaculture Monitoring System serves as the backbone for collecting, processing, and transmitting data from various sensors deployed within the aquaculture environment. This module facilitates seamless integration of sensors, ensuring continuous monitoring of critical parameters such as temperature, ammonia levels, pH, and turbidity.

Module Description

RealTime Database Integration

Alvin Varghese, Lloyd Sibi

The Realtime Database integration using Firebase module within the proposed Aquaculture Monitoring System facilitates seamless storage, synchronization, and real-time updates of sensor data collected from the aquaculture environment.

Technology Stack



Flutter



Firebase

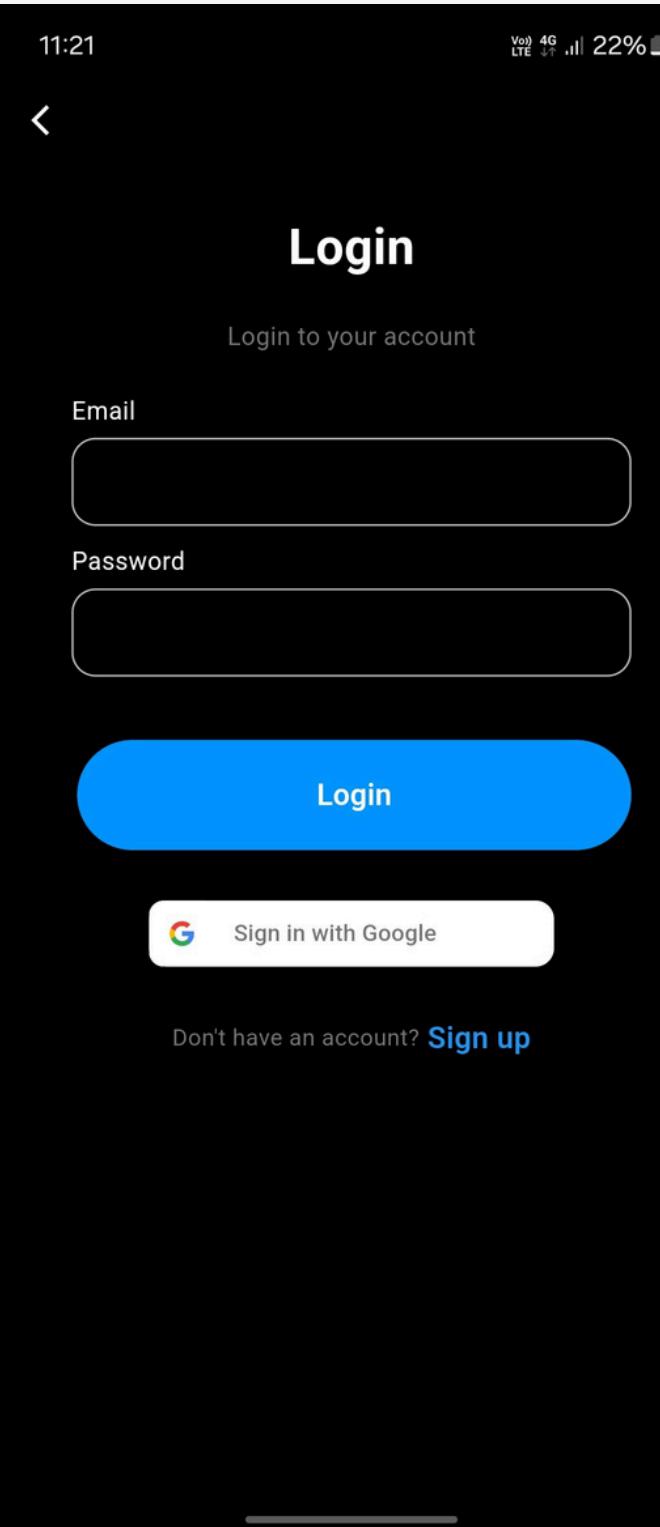


Arduino IDE

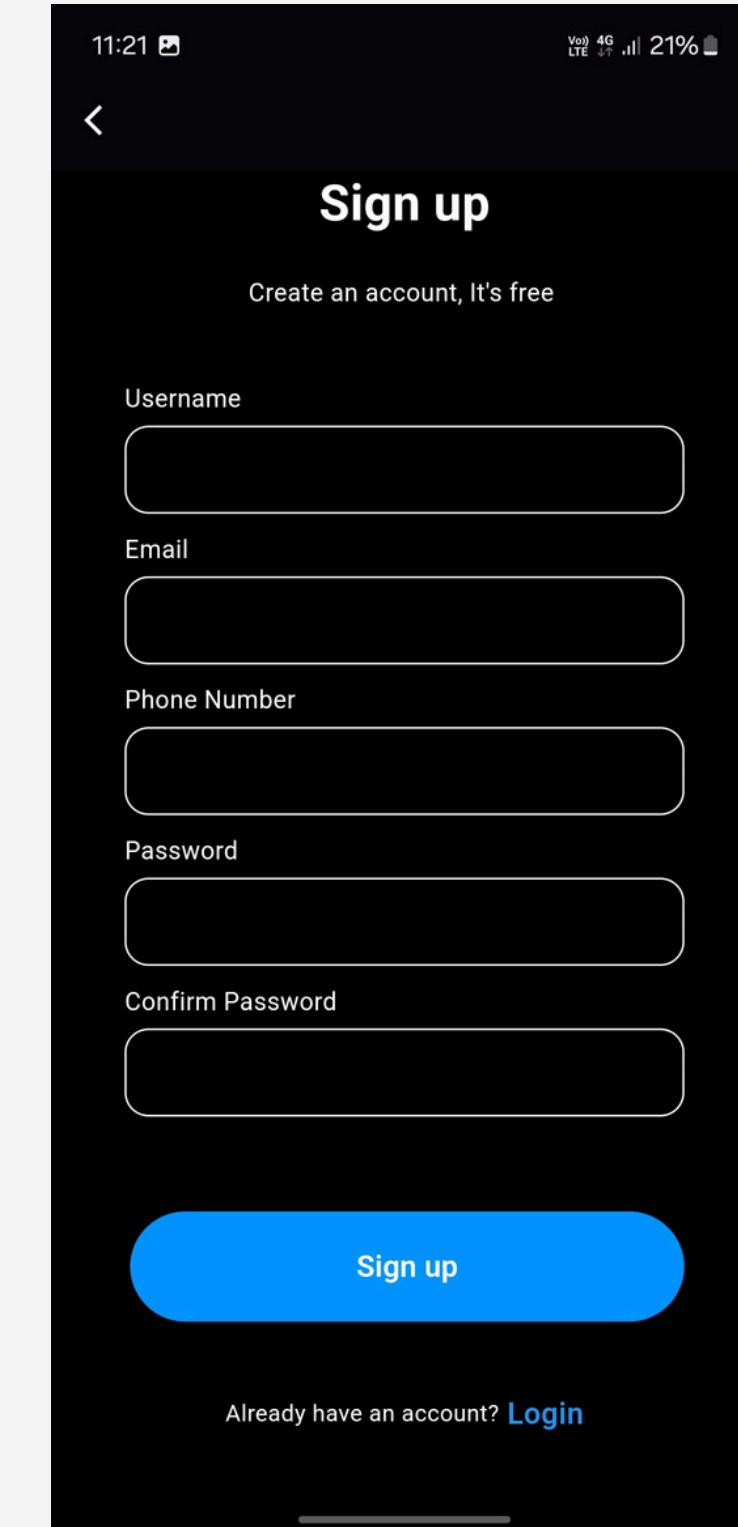
Results



Launch Screen

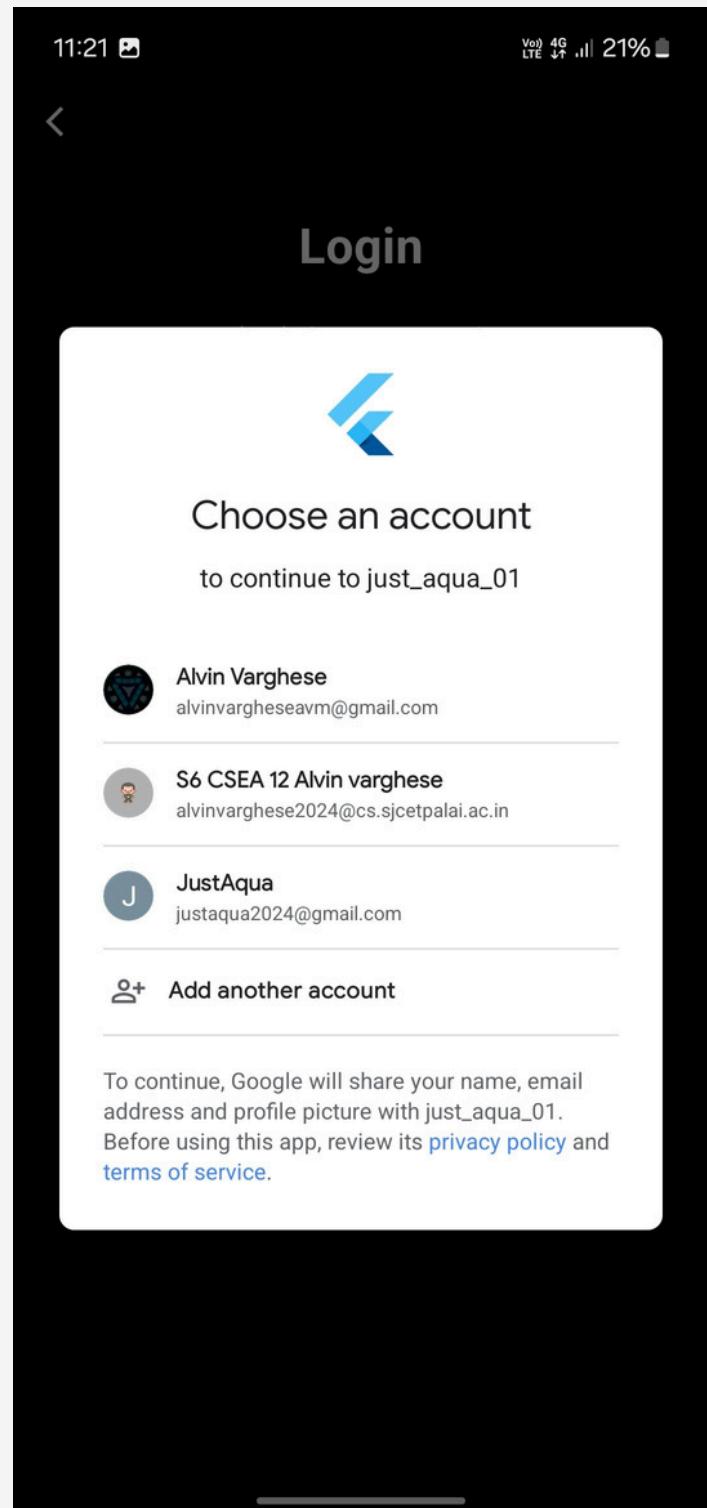


Login Page

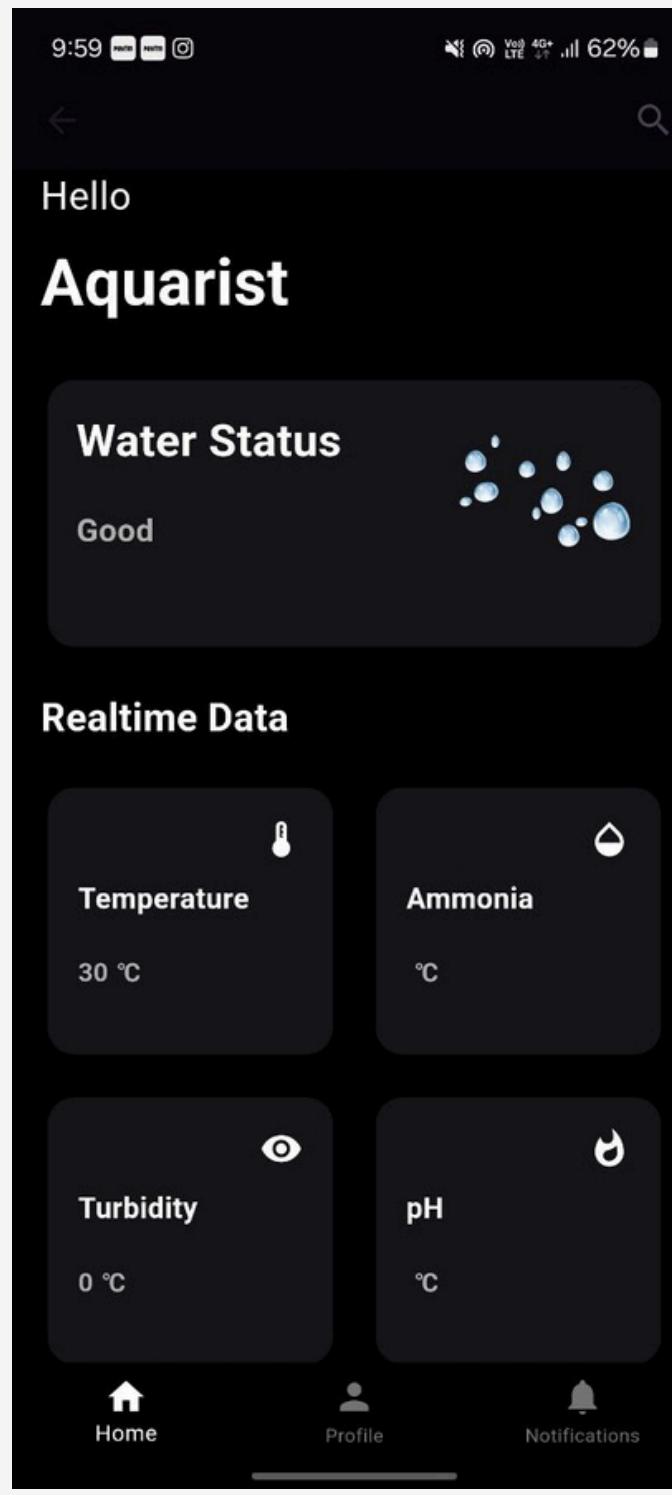


Signup Page

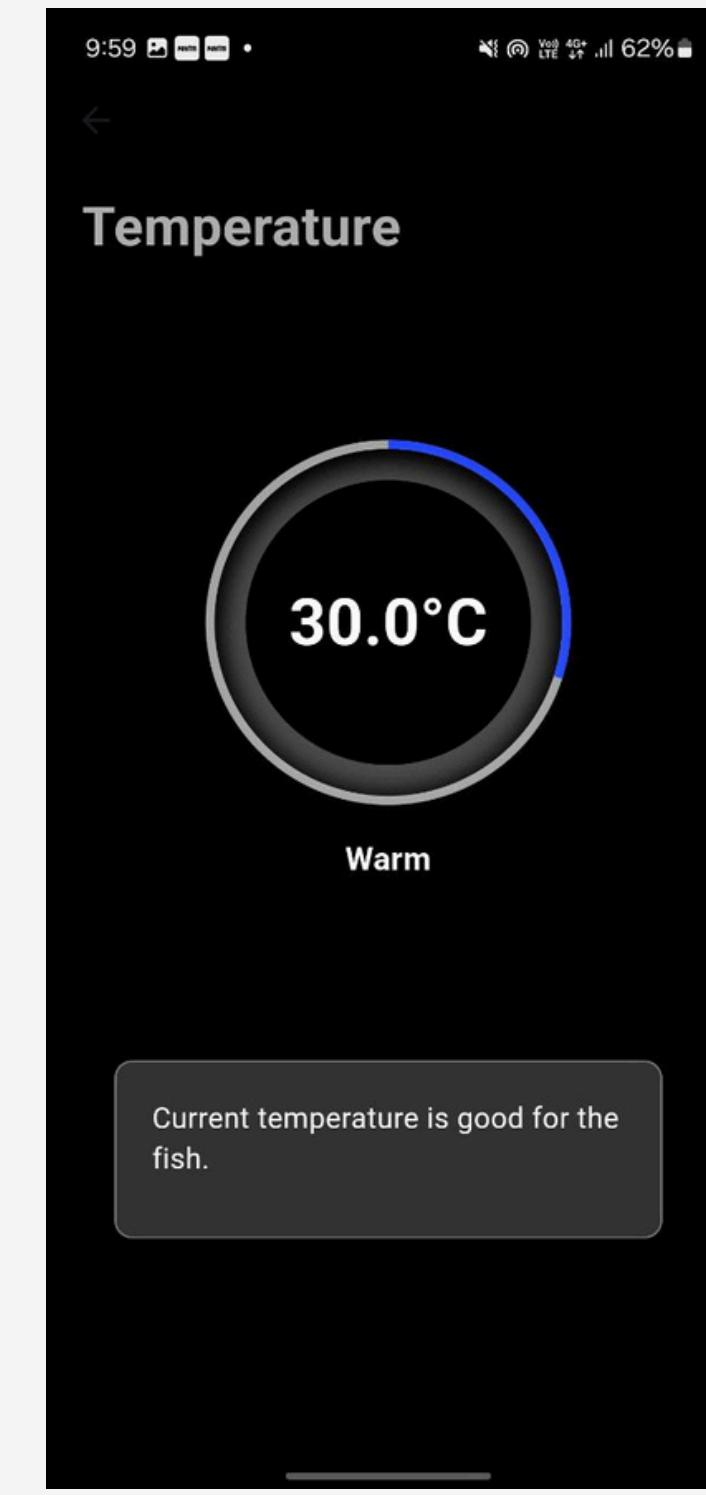
Results



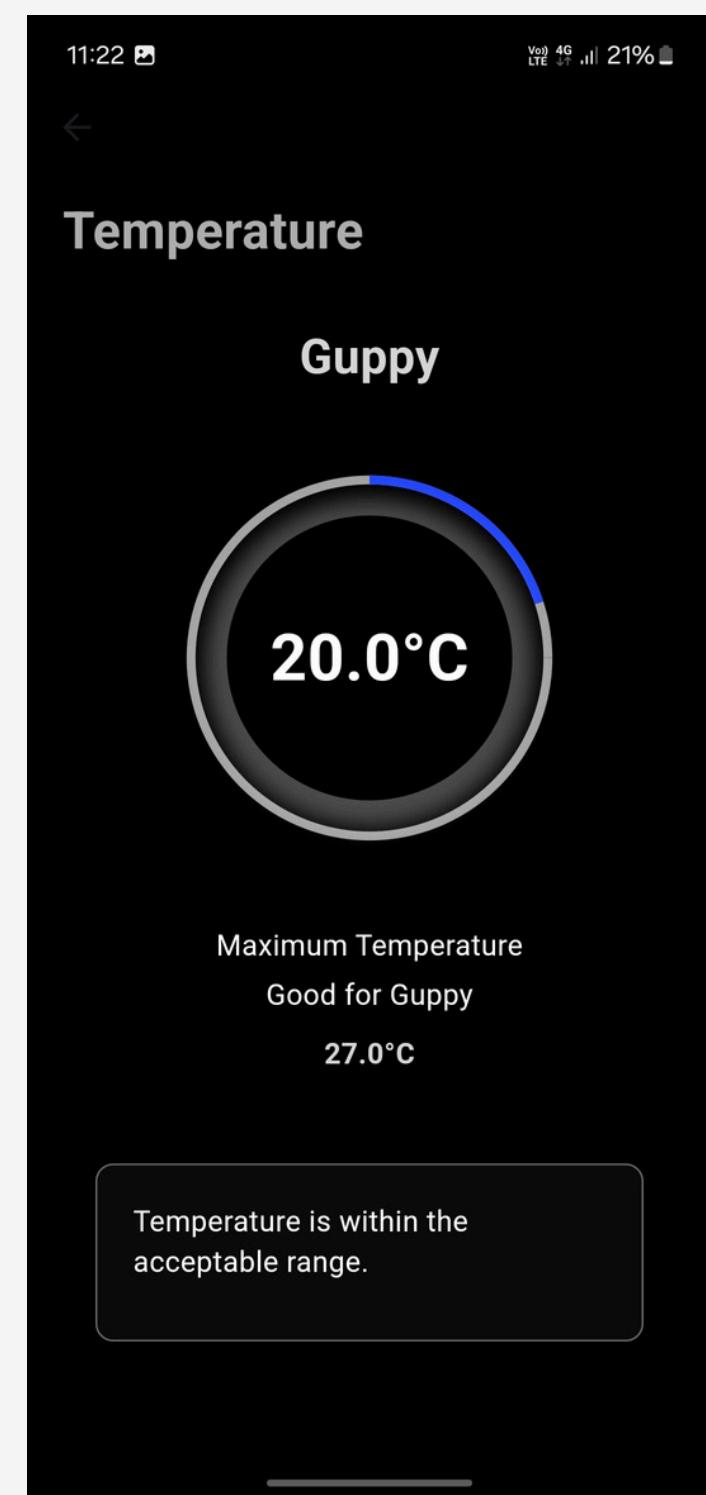
Google Signup



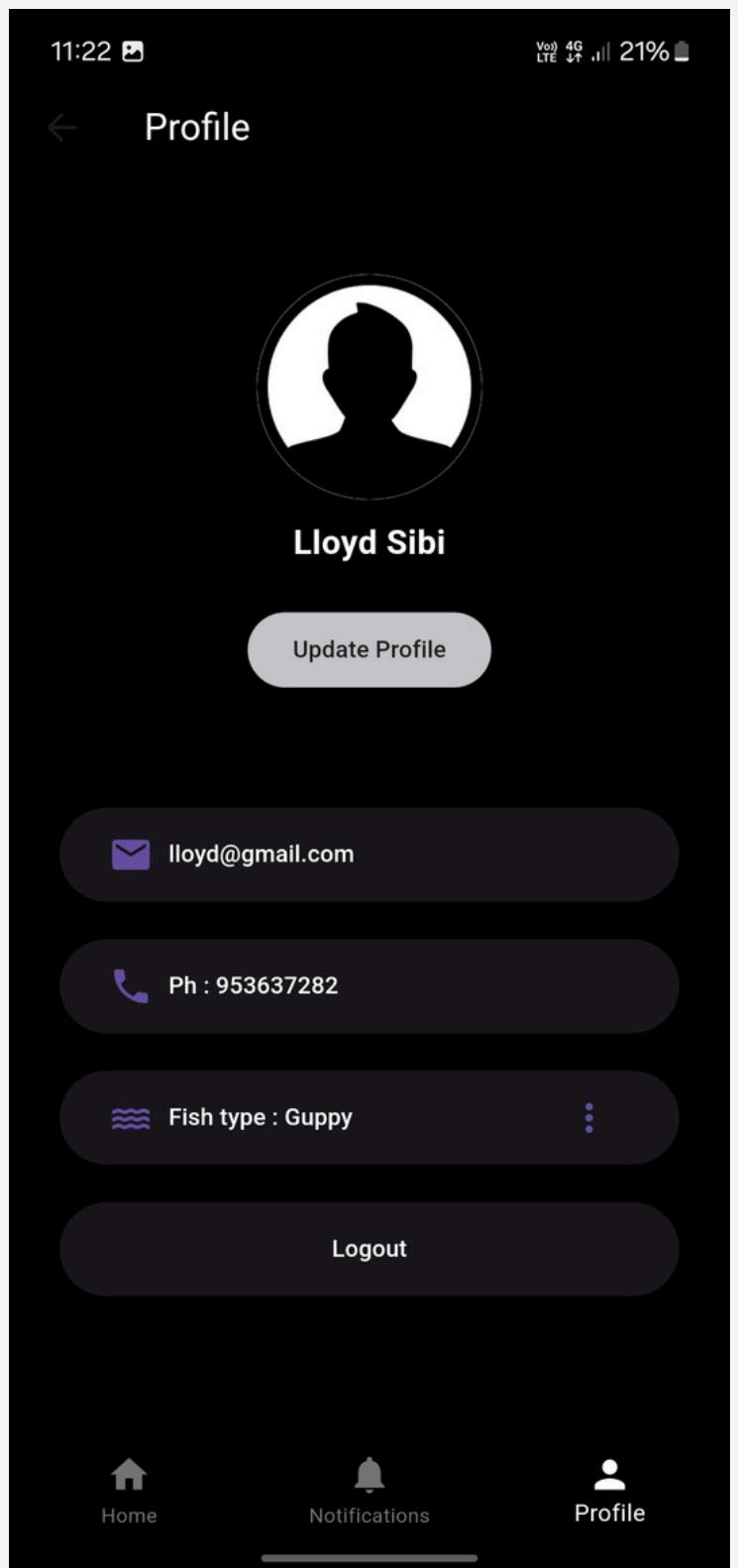
Landing Page



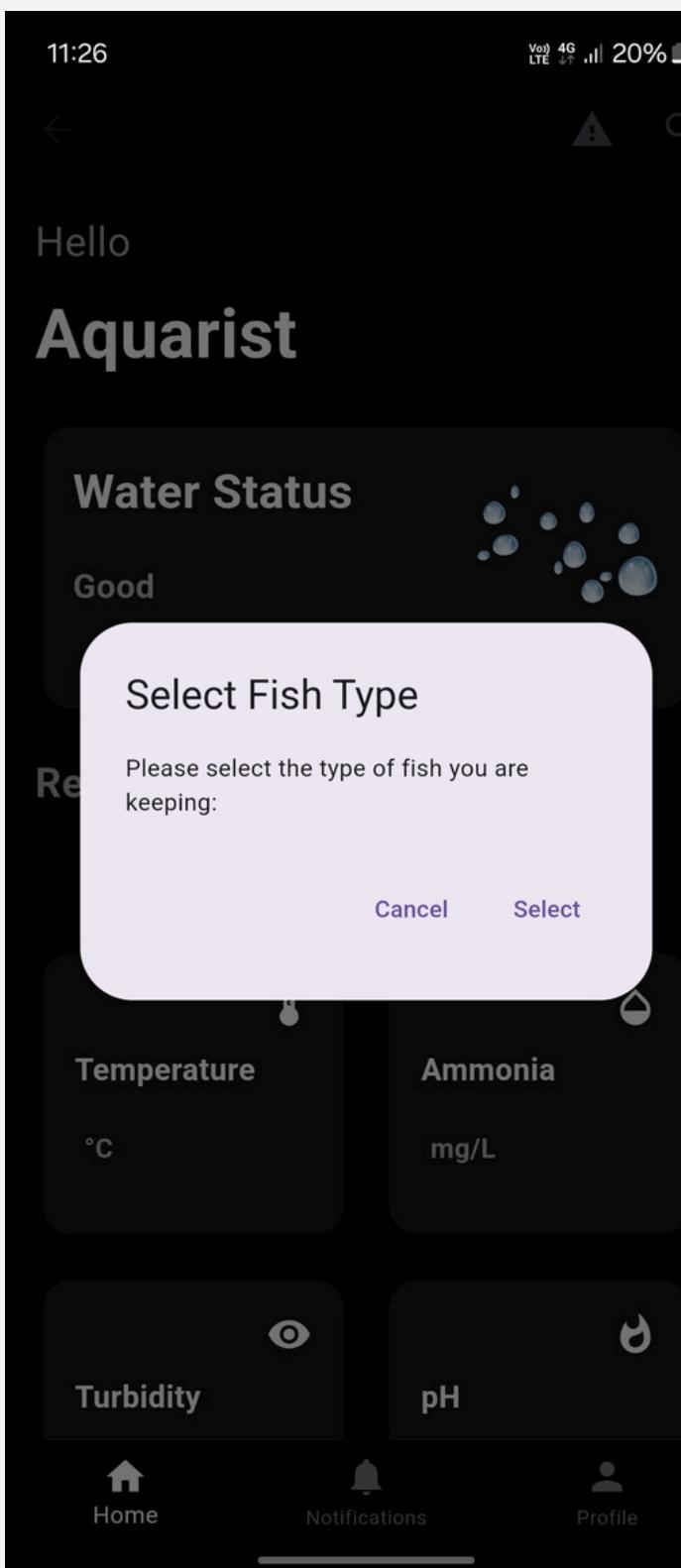
Temp. Sensor Integration



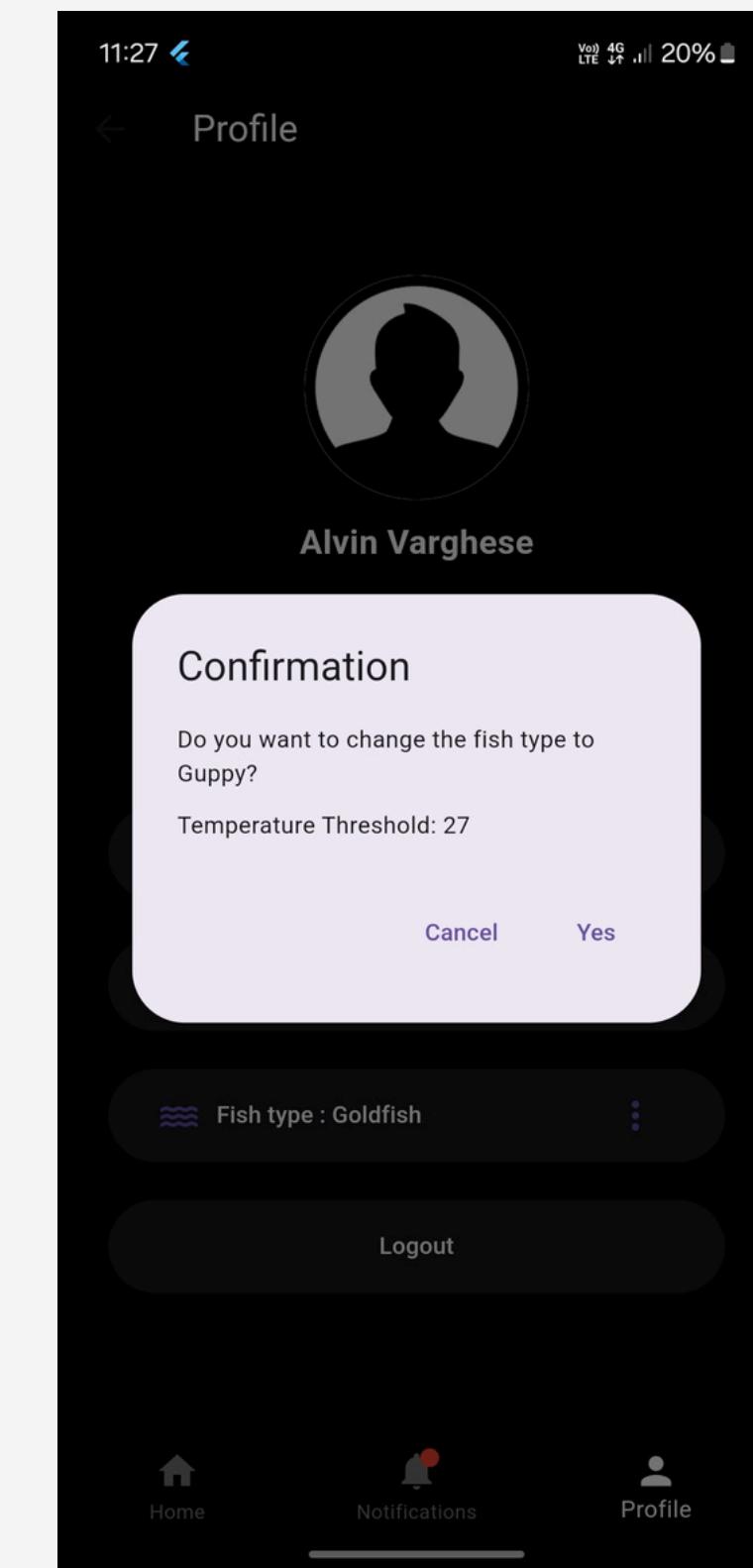
Results



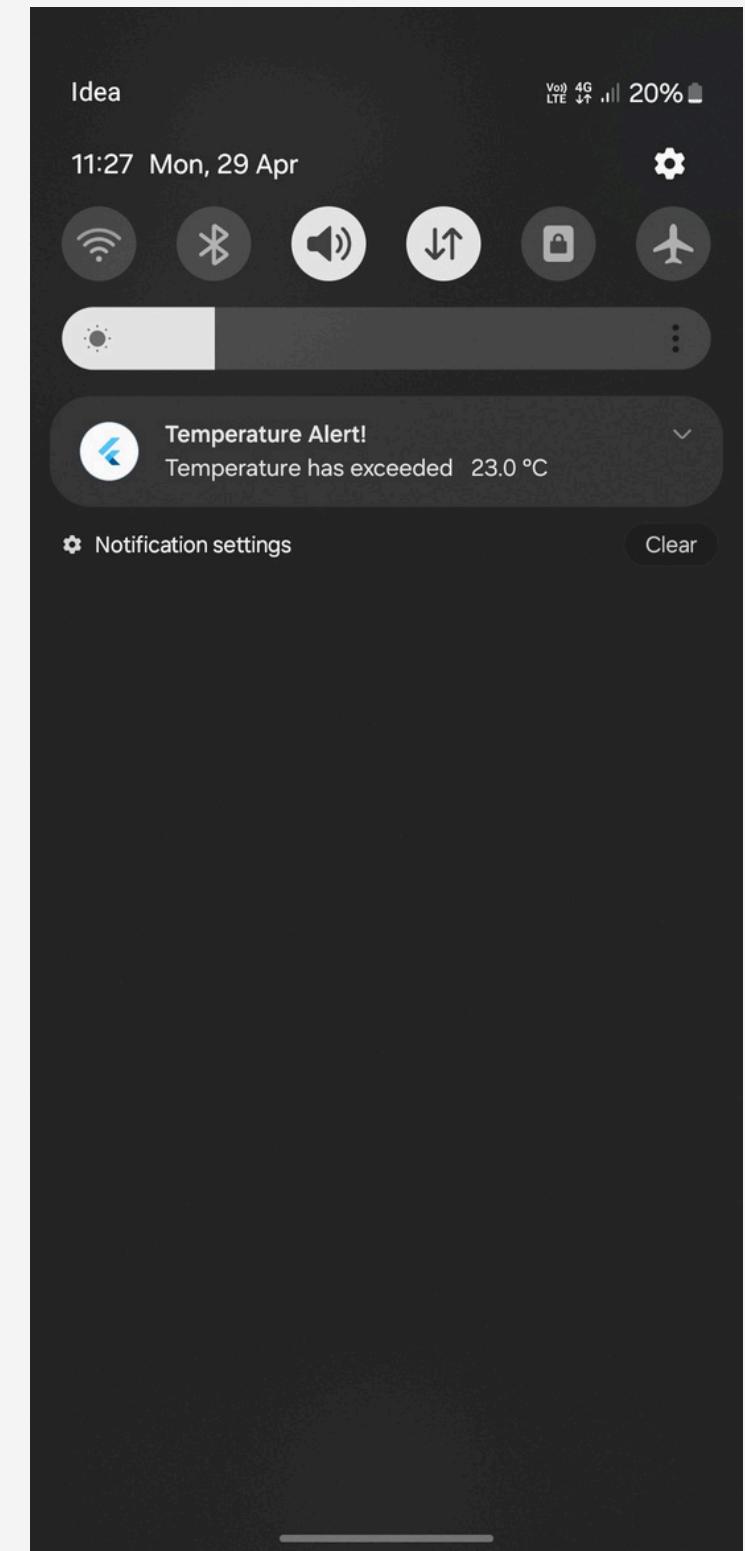
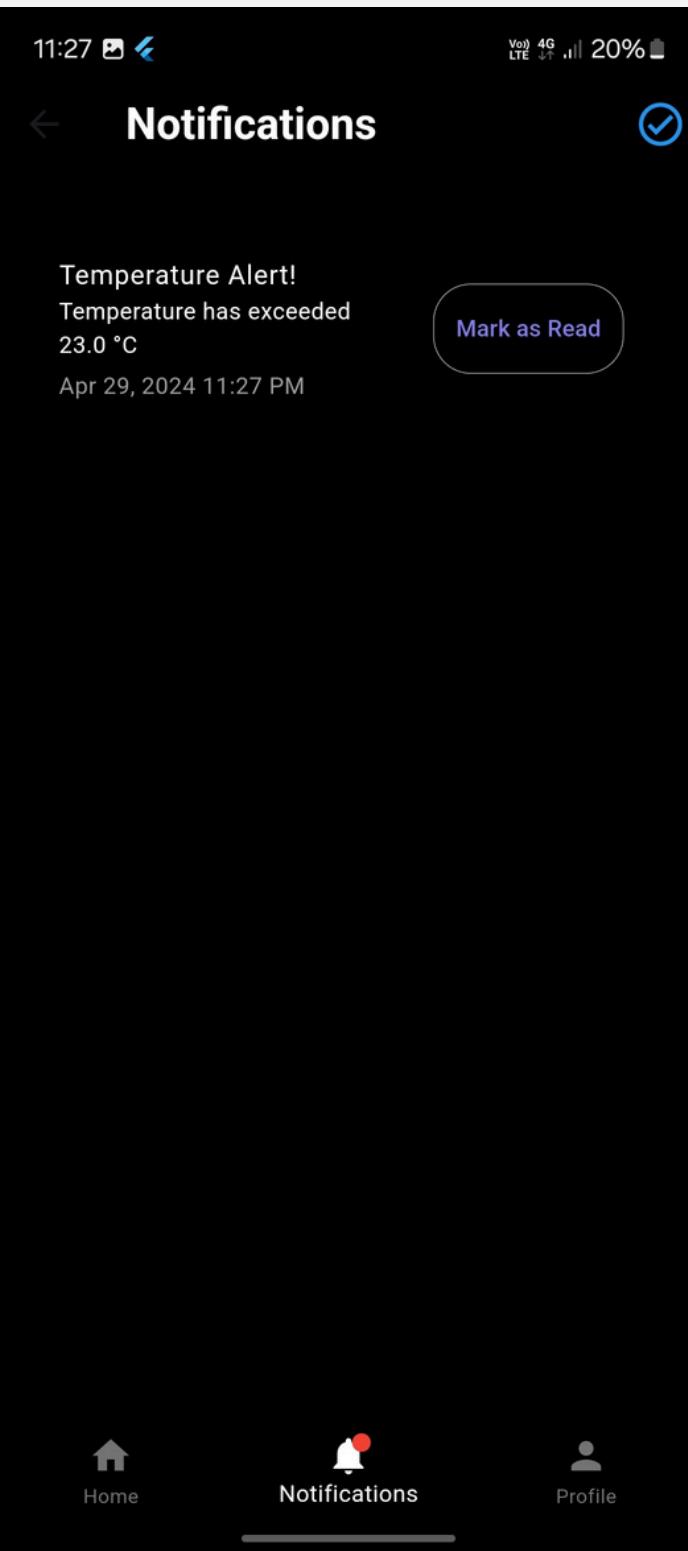
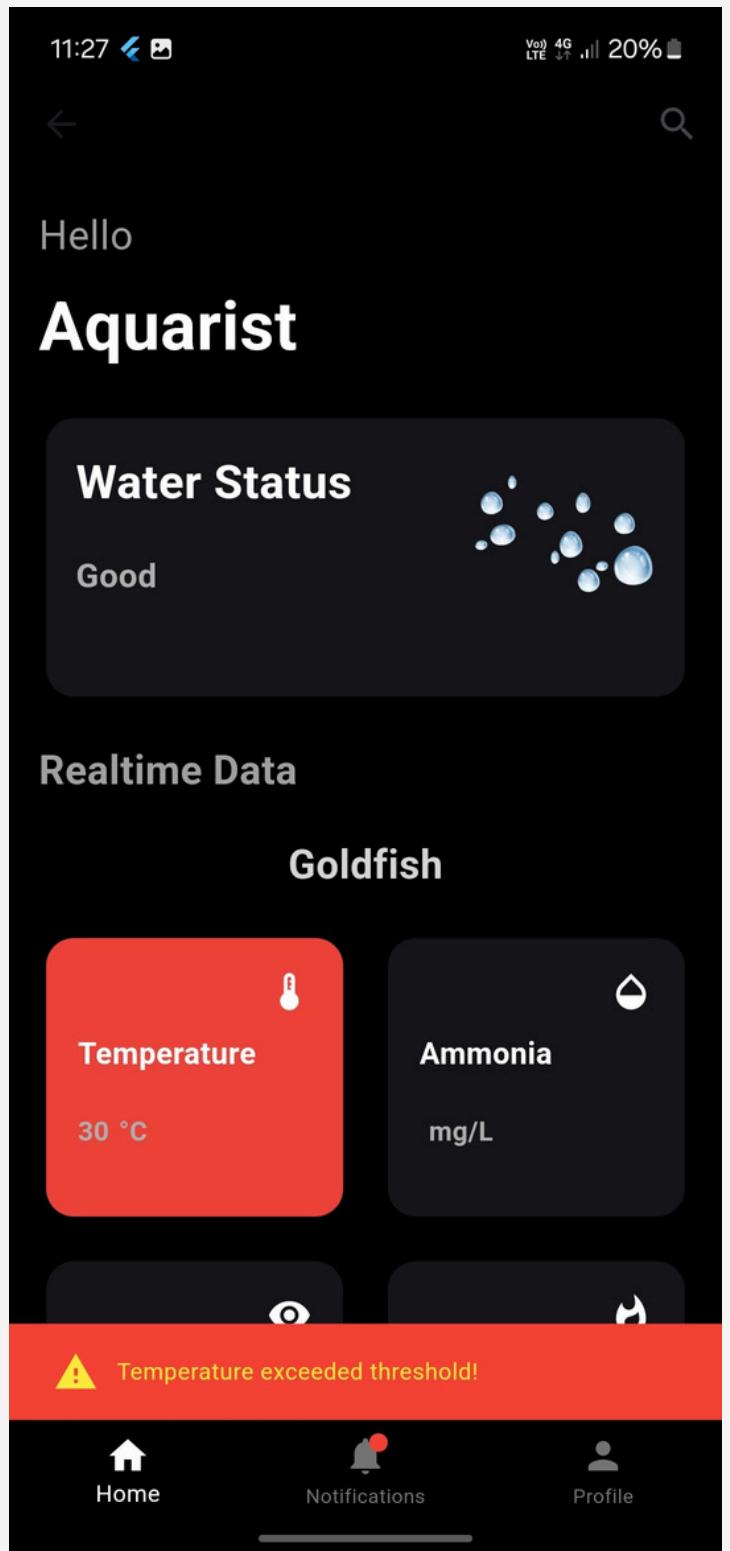
Profile Page



Fish Type Configuration

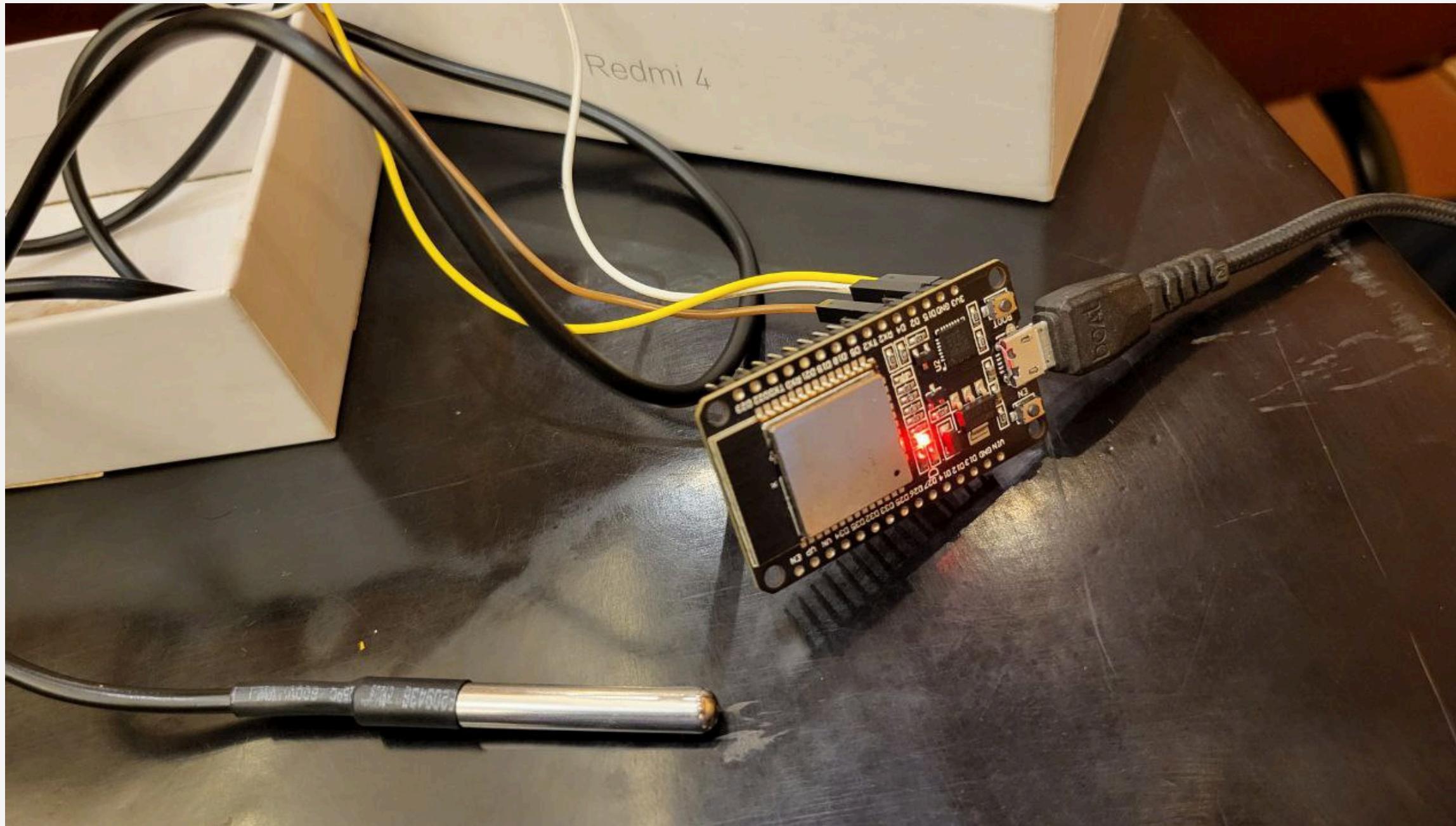


Results



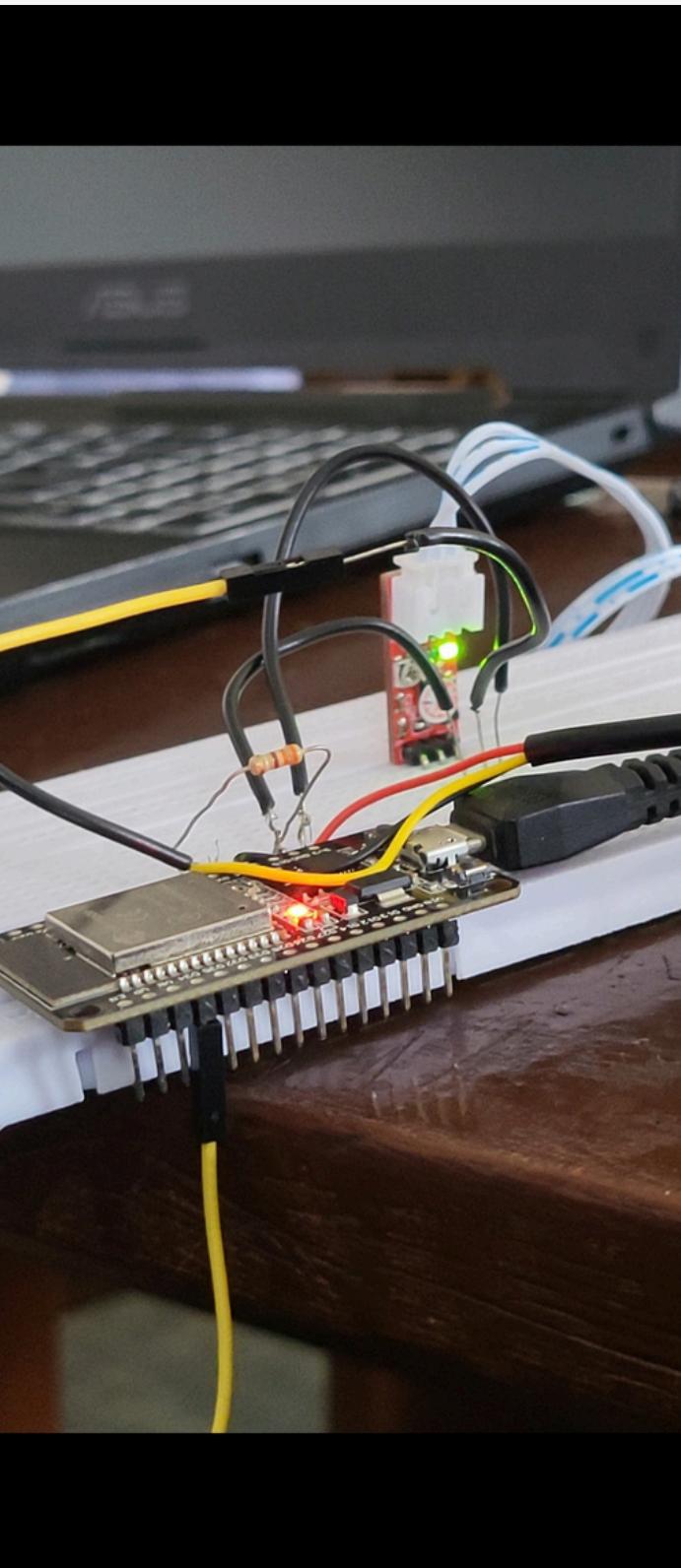
Alert and Notification System

Results



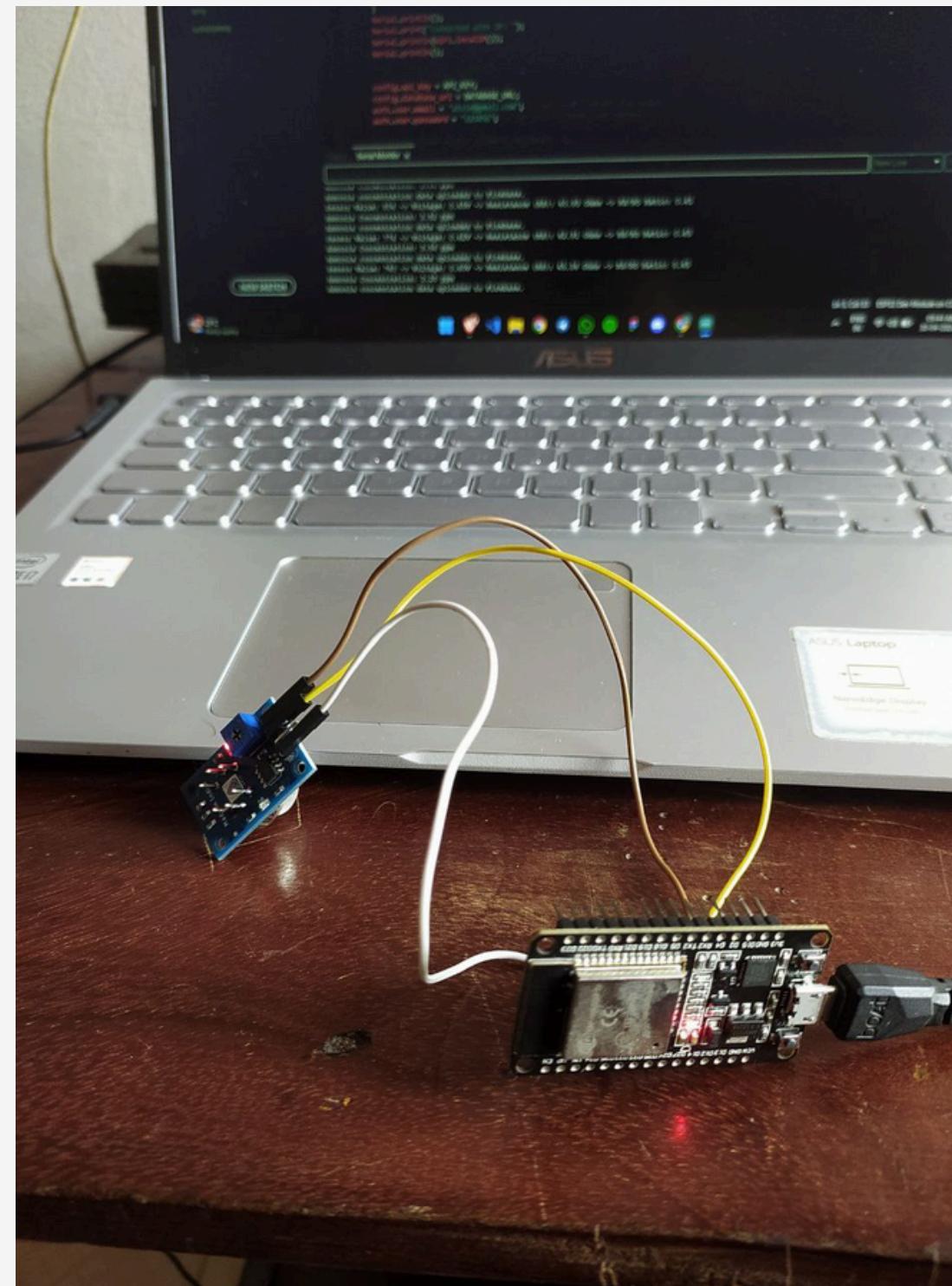
Temperature Sensor Integration

Results



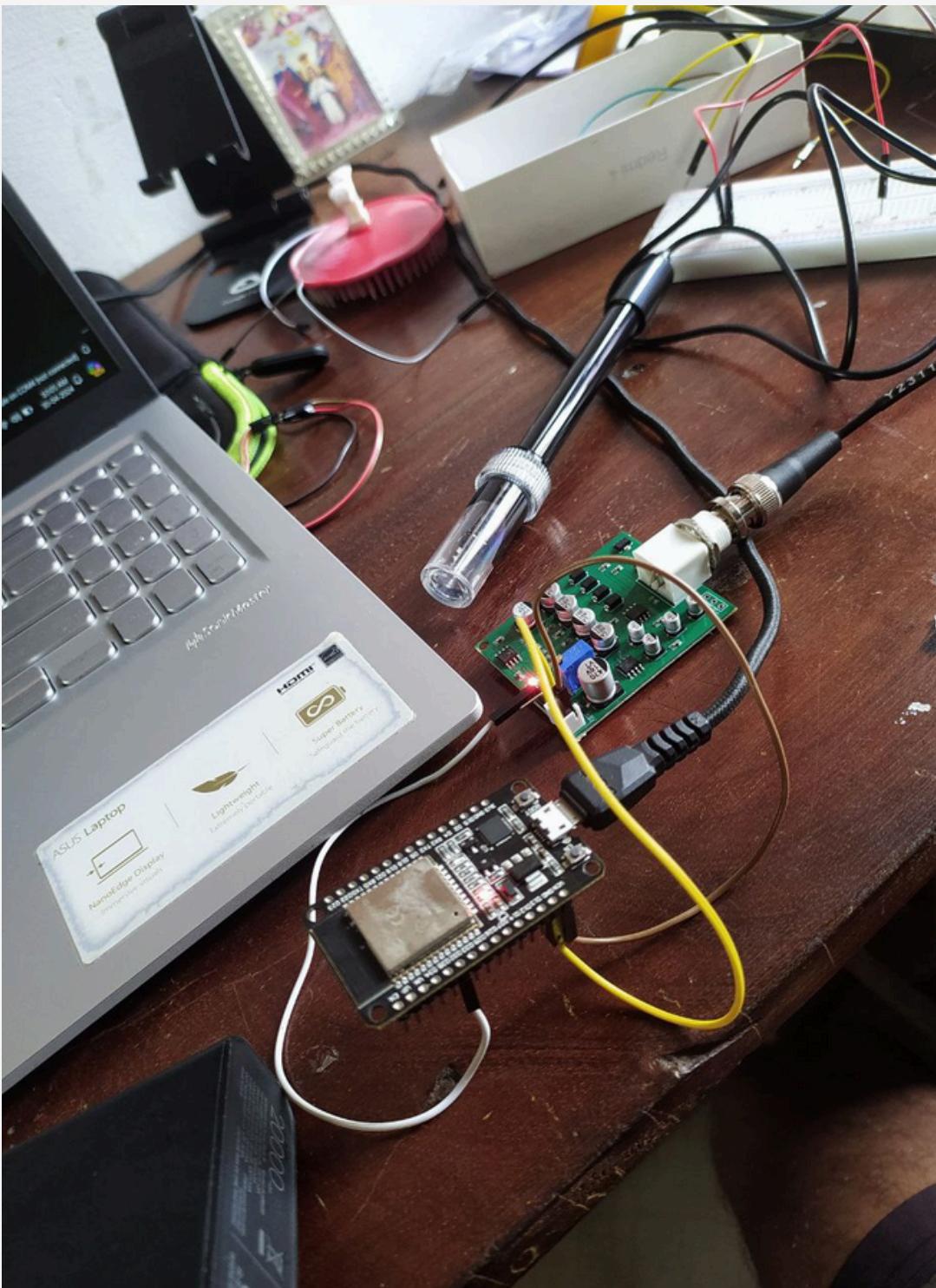
Turbidity Sensor Integration

Results



Ammonia Sensor Integration

Results



pH Sensor Integration

Results

Firebase Integration

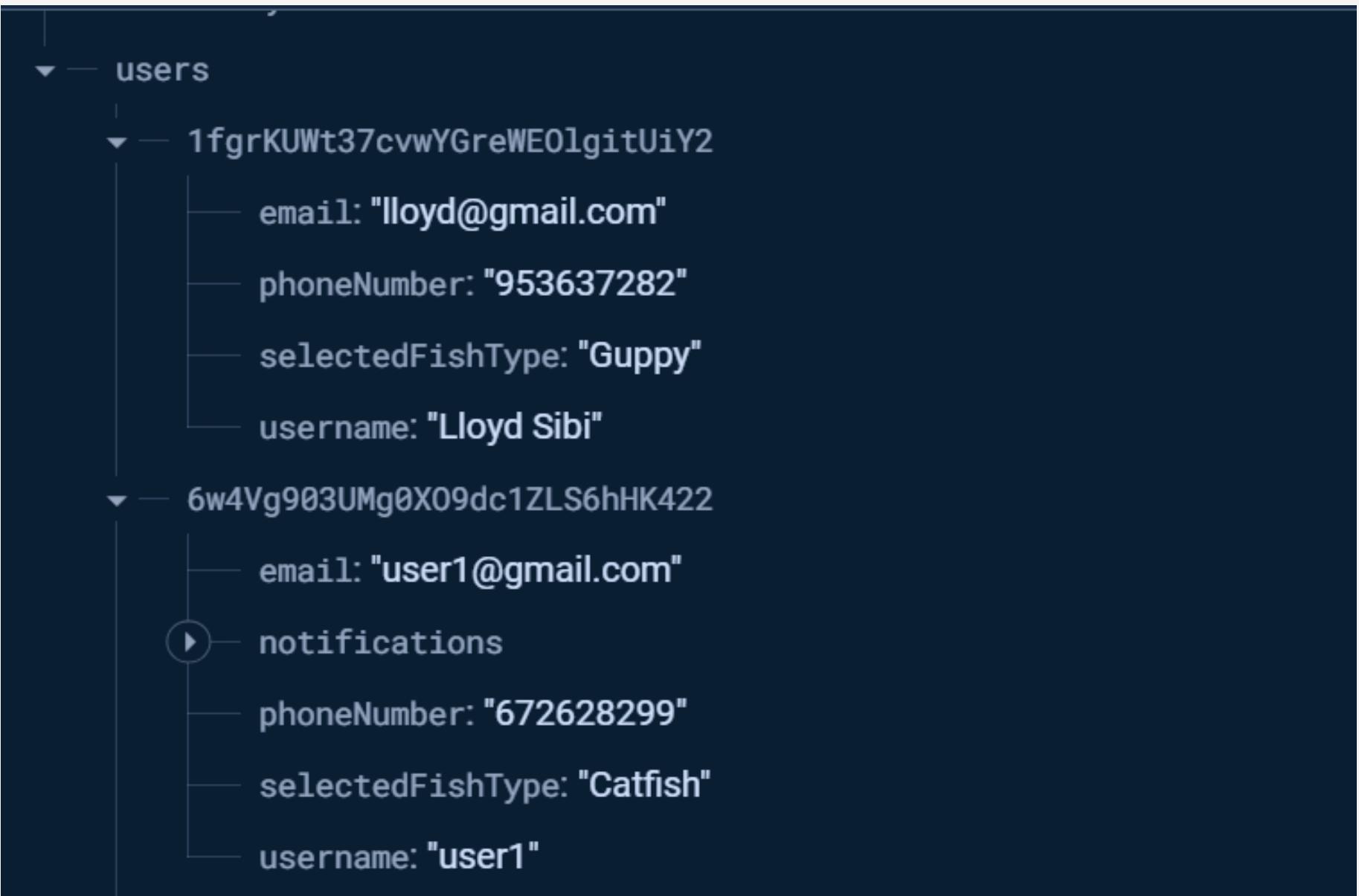
The screenshot shows the Firebase Realtime Database console for a project named "JustAqua". The left sidebar contains navigation links for Project Overview, Authentication, Realtime Database (which is selected and highlighted in blue), Realtime Analytics, Firestore Database, Storage, Product categories, Build, Release & Monitor, Analytics, Engage, and All products. The main area displays the Realtime Database interface with the URL <https://justaqua-68887-default-rtbd.firebaseio.com/>. The database structure is as follows:

- Ammonia
 - Concentration: 2.10685
- Fish
 - Catfish
 - Goldfish
 - Guppy
- Temperature
 - Celsius: 20
- Turbidity: 1934
- users
 - 1fgrKUWt37cvwYGreWE0lgitUiY2

At the bottom, it says "Database location: Singapore (asia-southeast1)".

Results

Firebase Integration



Conclusion

In conclusion, our Smart Aquaculture System utilizing IoT technology represents a significant leap forward in the sustainable and efficient management of aquatic environments. By seamlessly integrating real-time data monitoring, automated control systems, and predictive analytics, we aim to revolutionize the aquaculture industry. This project not only enhances operational efficiency but also contributes to the responsible stewardship of our aquatic resources. As we move forward, the potential for scalability and adaptability of our system positions it as a cornerstone for the future of smart aquaculture.

Thank you

