

IoT System for Indoor Air Quality Control



Our project consists on the development of an air quality monitoring system, that measures air metrics in real time, and displays the data on a mobile application.

01 Problem

Indoor air quality directly impact the health, comfort, and productivity of occupants. Most people don't have access to real-time information about environment conditions.

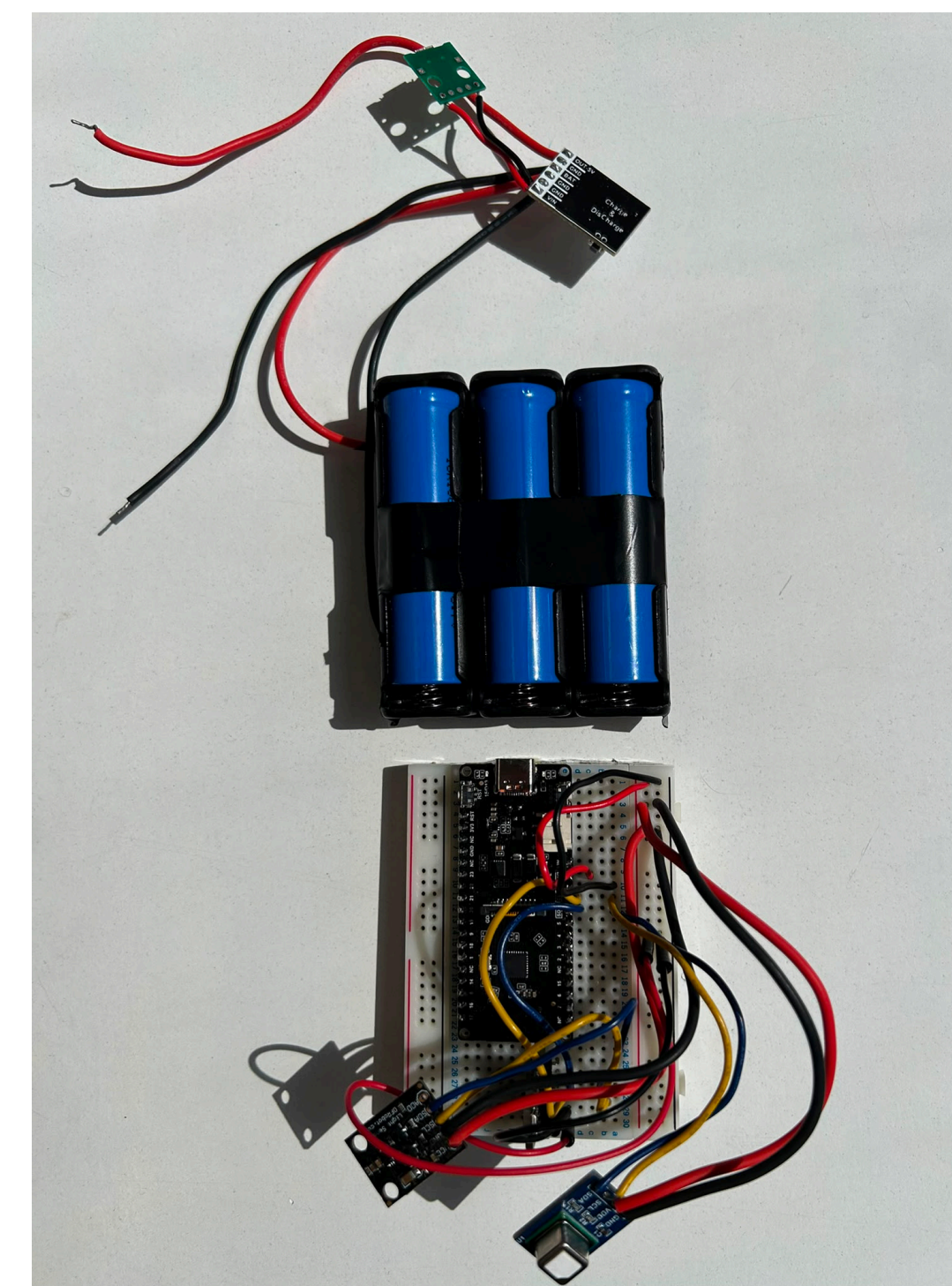
Indoor spaces exhibit:

- High CO₂ concentrations
- Volatile organic compounds (VOCs)
- Inadequate temperatures
- Excessive or insufficient humidity

02 Solution

The project was developed with the following objectives:

- Monitor indoor air quality, and provide real-time information
- Alert users to inadequate air conditions
- Facilitate decision-making regarding ventilation and comfort

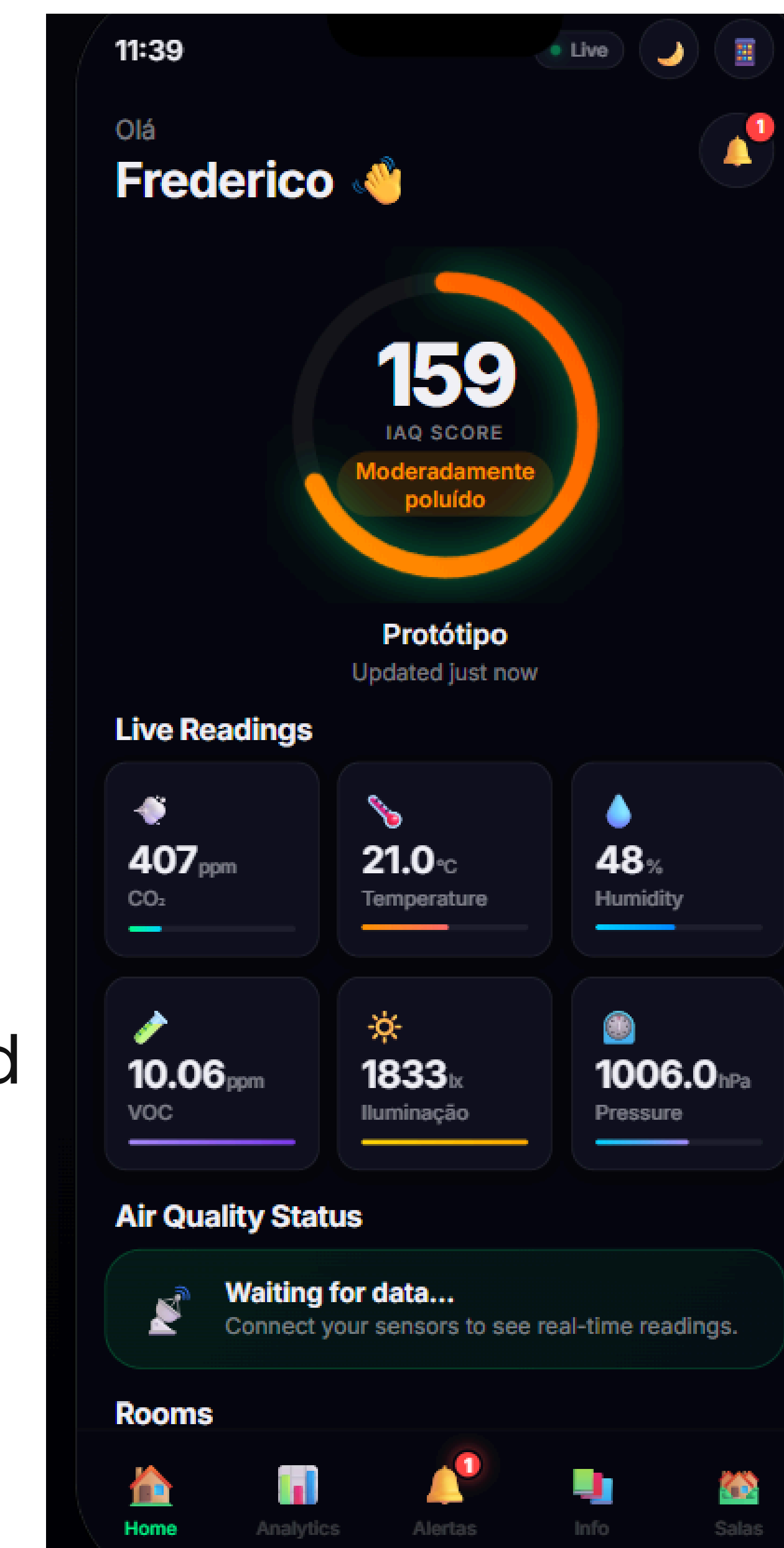


05 Analysis and results

To evaluate the performance of the device, tests were conducted under different indoor environmental conditions. The system was tested in both well-ventilated and poorly ventilated spaces, allowing variations in CO₂, VOCs, temperature, and light levels in real time.

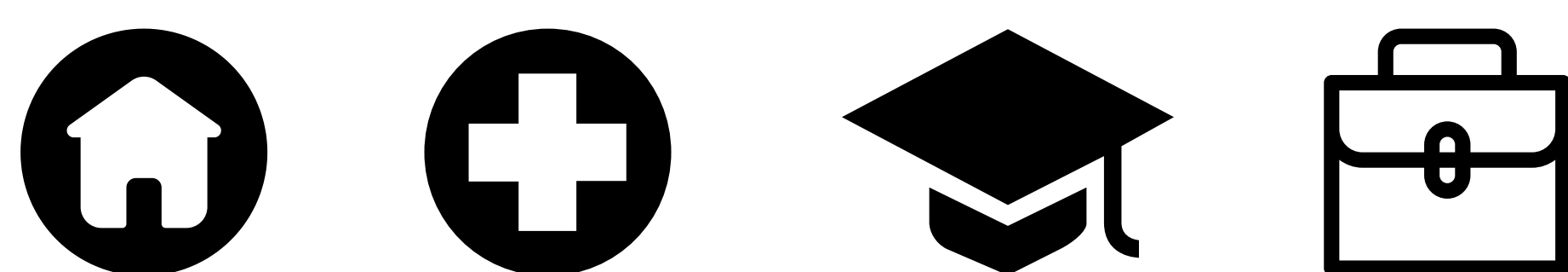
The monitored data was transmitted to a database and displayed through a mobile application, enabling the verification of sensor responsiveness and system reliability.

The results demonstrated stable operation, real-time monitoring capabilities, and successful detection of environmental changes, confirming the effectiveness of the proposed solution.

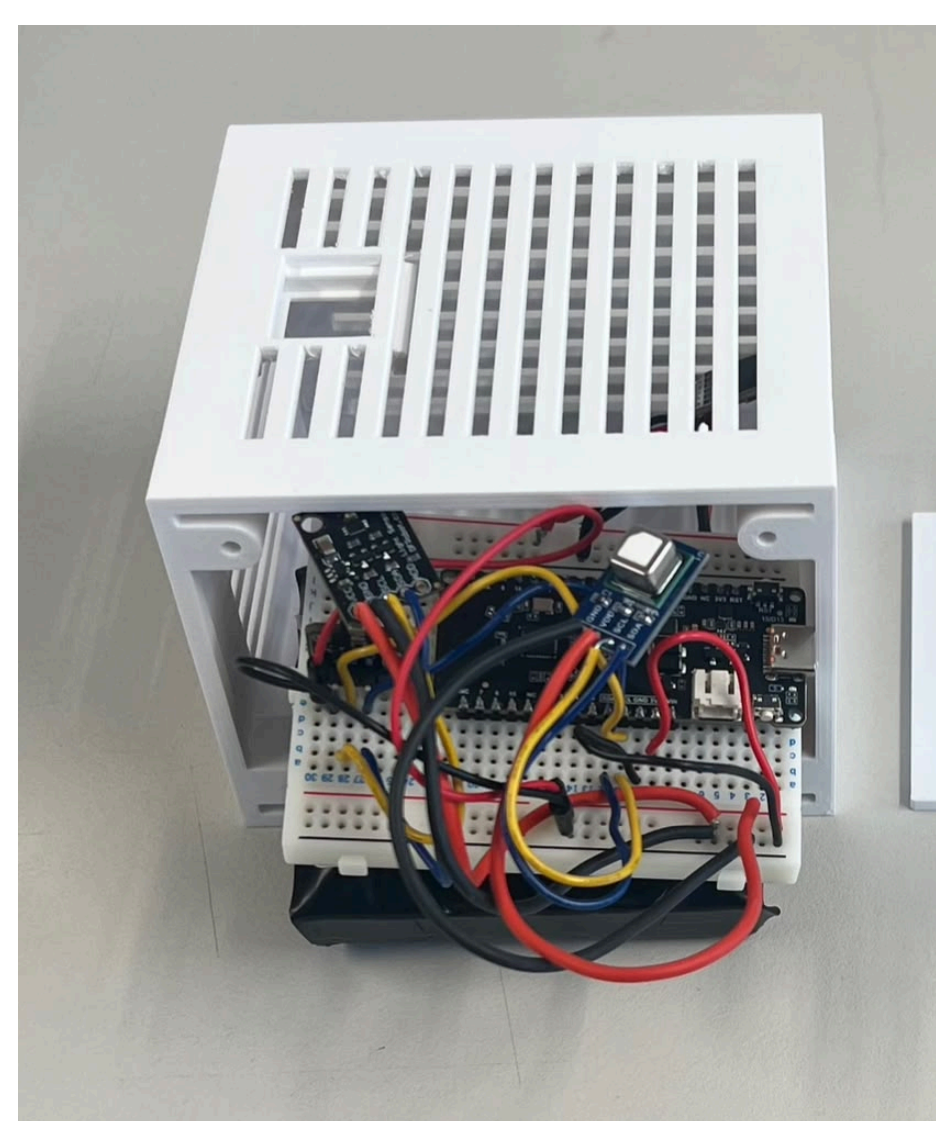


03 Beneficiaries and Impact

Designed for schools, offices, hospitals, and homes, Our project delivers a cost-effective and highly accessible system for indoor air quality monitoring. Through our dedicated mobile application, users can instantly retrieve real-time environmental data.



04 Challenges



The project's development presented various technical hurdles, primarily involving sensor and ESP32 hardware malfunctions, complex system integration, and the configuration of communication protocols. Developing and setting up the mobile application was an additional challenge that we successfully resolved.



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As future work, we plan to integrate the system into smart building networks (such as Mitsubishi HVAC systems). The primary focus will be its application in highly vulnerable environments, such as hospitals, schools, and offices. The ultimate goal is to create an automated control system that actively stabilizes air quality, helping to prevent the spread of airborne diseases and ensuring healthy and comfortable environments.



Authors: Afonso Sousa, Frederico Fernandes, Fernando Silva, Guilherme Romeiras, Ricardo Bonfim, Vitor Mourão

Coordinators: Professor Francisco Alegria and Duarte Marques