WEATHERWI

IoT Weather and Environment Monitoring System - Final Project Report

Project Objective

The main objective of the **WEATHERWI IoT Weather and Environment Monitoring System** is to provide real-time and historical data related to weather conditions, light intensity, air quality, and climate. This project aims to offer a user-friendly interface through a web application and an Android application, allowing users to make informed decisions based on their local environmental conditions.

Design Thinking Process

The project followed a design thinking process to ensure the system's effectiveness and user-friendliness:

1. **Empathize:** Understanding the user's needs and the importance of real-time environmental data for decision-making.
2. **Define:** Defining the key components and objectives of the system, including sensor selection and data storage.
3. **Ideate:** Brainstorming solutions for data visualization and user accessibility through web and Android applications.
4. **Prototype:** Creating a sample circuit and simulation using Wokwi to test the feasibility of the system.
5. **Test:** Testing the prototype, refining the system, and ensuring accurate data collection.
6. **Implement:** Developing the final system with the chosen components and technologies.
7. **Evaluate:** Continuously evaluating the system's performance and user feedback for improvement.

Development Phases

The development of the WEATHERWI IoT Weather and Environment Monitoring System was divided into several phases:

Phase 1 - Planning and Design

- **Objective Definition:** Clearly defining the project's objectives, including data collection and user accessibility.
- **Component Selection:** Choosing appropriate sensors (DHT22, LDR, MQ-135) and the ESP32 microcontroller.
- **Data Storage:** Selecting GitHub as the data storage solution with timestamping for data analysis.
- **Web and Android Applications:** Planning the user interface for data visualization.
- **Simulation:** Conducting simulations using Wokwi to validate the chosen components.

Phase 2 - Implementation and Coding

- **Microcontroller Programming:** Using MicroPython to program the ESP32 microcontroller for data collection and communication.
- **Sensor Setup:** Physically connecting the sensors to the microcontroller as per the sample circuit.
- **Web Application:** Developing the web application for real-time data visualization using Chart.js.
- **Android Application:** Creating an Android application for Android users' convenience.
- **Simulation:** Further refining and validating the system through Wokwi simulations.

Phase 3 - System Integration and Testing

- **Data Collection:** Implementing data collection from sensors and storing it in GitHub with timestamping.
- **Web Application Integration:** Integrating the web application with the ESP32 for real-time data display.
- **Android Application Integration:** Connecting the Android application to the microcontroller for mobile accessibility.

- **Testing:** Rigorous testing to ensure the system's accuracy, reliability, and user-friendliness.

Phase 4 - Documentation and Reporting

- **Project Documentation:** Preparing a comprehensive project document detailing all project phases and achievements.
- **User Manual:** Creating a user manual to guide users on accessing and utilizing the system.
- **Image Capture:** Capturing screenshots and images of the platform's user interface.

Technical Implementation Details

Platform Layout

The WEATHERWI IoT Weather and Environment Monitoring System consists of the following key components:

- **Microcontroller:** ESP32 with network capabilities.
- **Sensors:** DHT22 for temperature and humidity, LDR for light intensity, and MQ-135 for air quality.
- **Data Storage:** GitHub for secure data storage with timestamping.
- **Web Application:** A static site with Chart.js for real-time data visualization.
- **Android Application:** An Android app for mobile access.

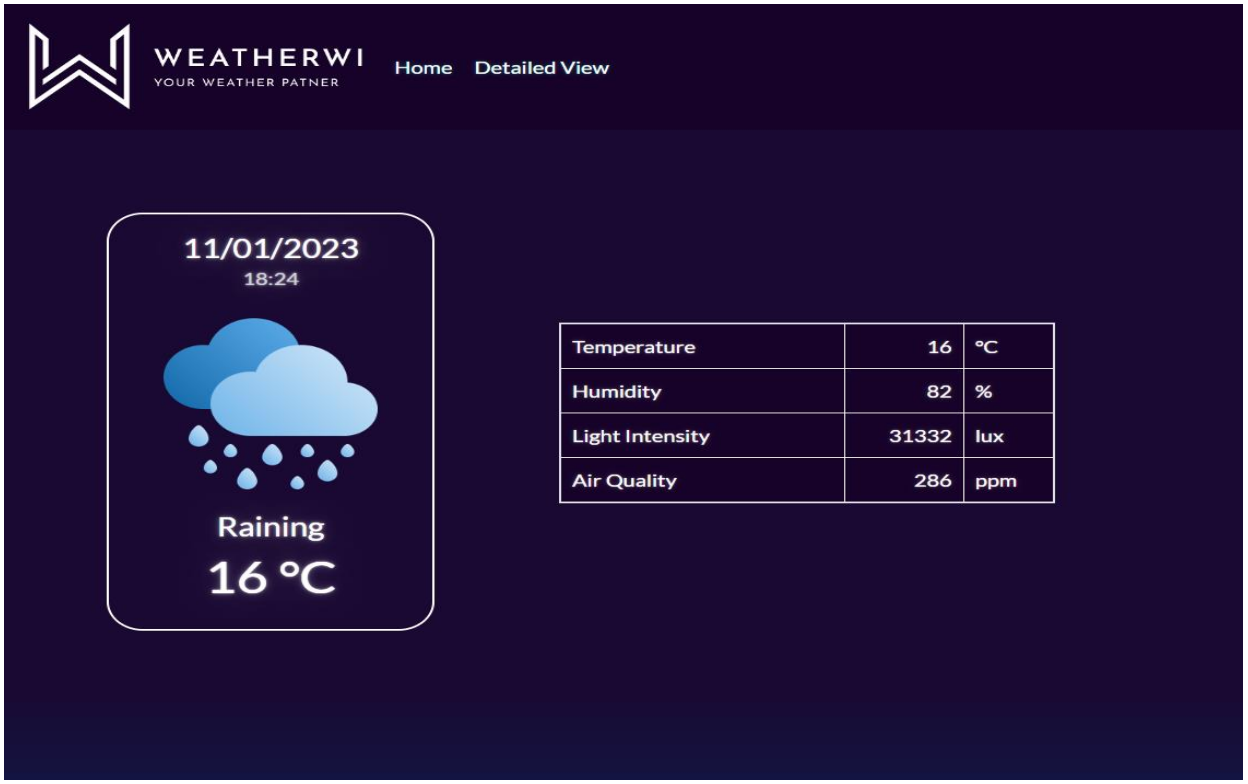
Features

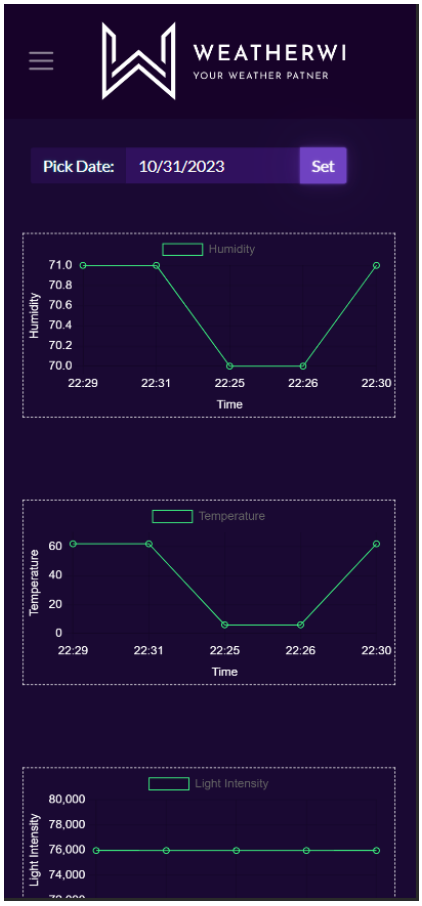
- Real-time temperature, humidity, light intensity, air quality, and climate data display.
- Historical data access for trend analysis.
- User-friendly web and Android applications.
- Data timestamping for research and analysis.

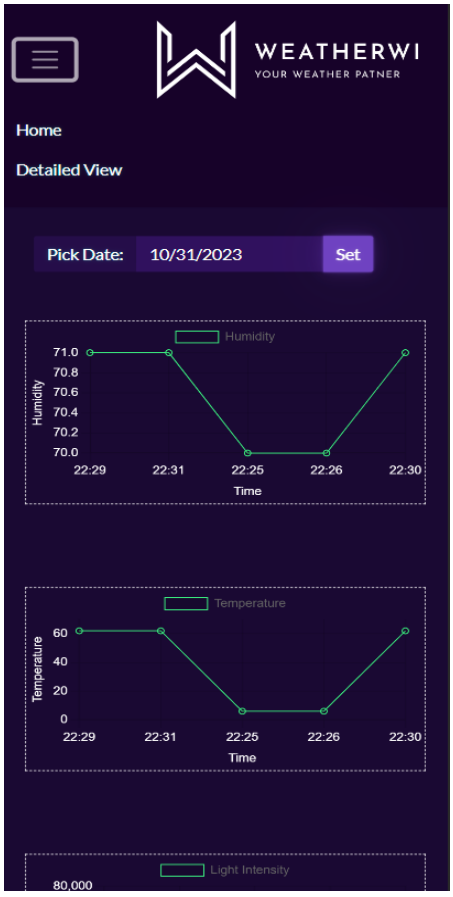
User Interface

Below are some screenshots of the platform's user interface:

Web Application:



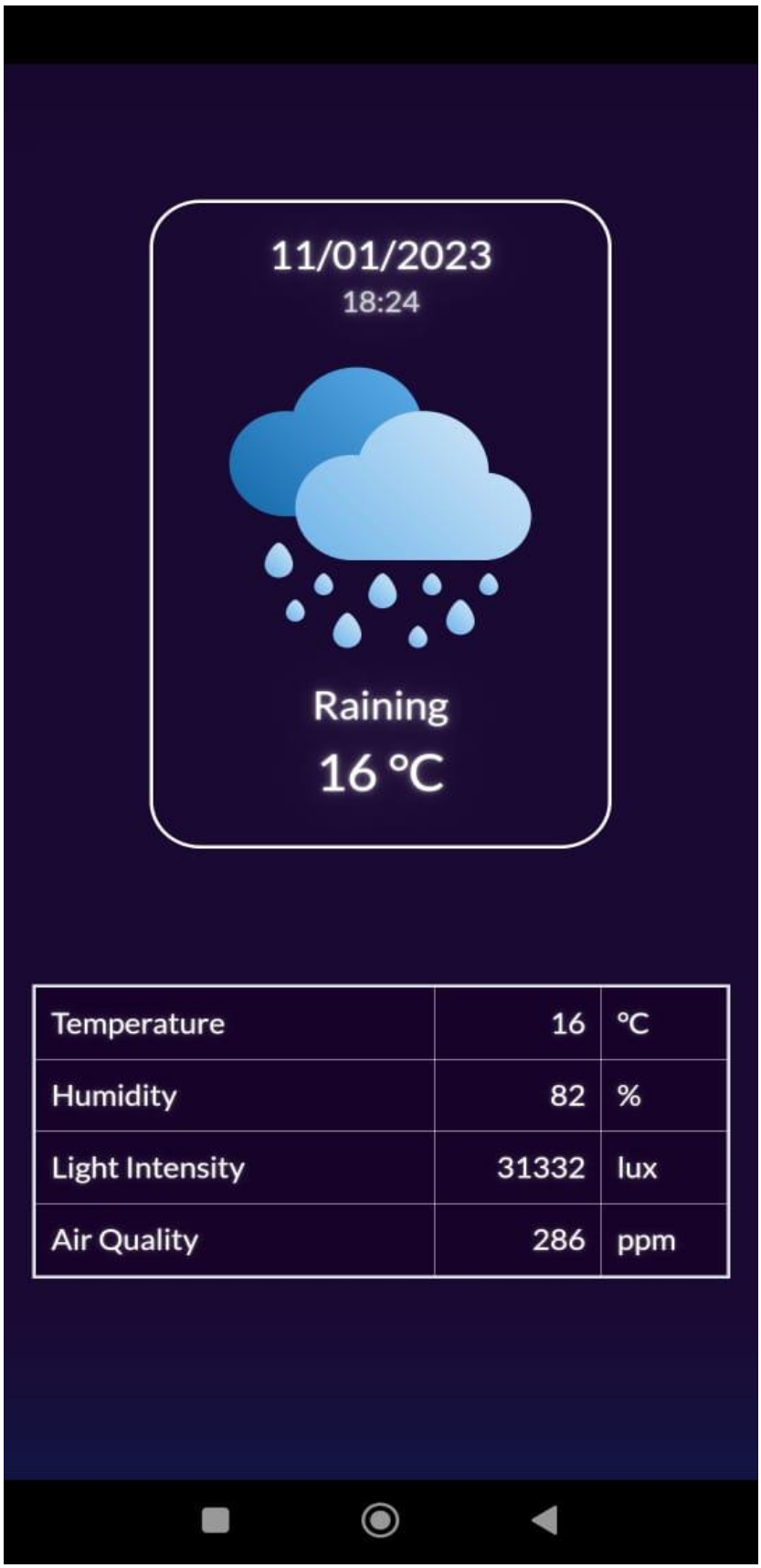

WEATHERWI
YOUR WEATHER PATNER
Pick Date: 10/31/2023
Set
Humidity
71.0
70.8
70.6
70.4
70.2
70.0
Humidity
22:29
22:31
22:25
22:26
22:30
Time
Temperature
60
40
20
0
Temperature
22:29
22:31
22:25
22:26
22:30
Time
Light Intensity
80,000
78,000
76,000
74,000
Light Intensity


WEATHERWI
YOUR WEATHER PATNER
Home
Detailed View
Pick Date: 10/31/2023
Set
Humidity
71.0
70.8
70.6
70.4
70.2
70.0
Humidity
22:29
22:31
22:25
22:26
22:30
Time
Temperature
60
40
20
0
Temperature
22:29
22:31
22:25
22:26
22:30
Time
Light Intensity
80,000


WEATHERWI
YOUR WEATHER PATNER
11/01/2023
18:24
Raining
16 ℃
Temperature 16 ℃
Humidity 82 %
Light Intensity 31332 lux
Air Quality 286 ppm


WEATHERWI
YOUR WEATHER PATNER
Home
Detailed View
11/01/2023
18:24
Raining
16 ℃
Temperature 16 ℃
Humidity 82 %
Light Intensity 31332 lux
Air Quality 286 ppm

Android Application:



Conclusion

The WEATHERWI IoT Weather and Environment Monitoring System has successfully achieved its objectives, providing a valuable tool for users to make informed decisions based on their local environmental conditions. The project followed a design thinking process, underwent various development phases, and implemented a user-friendly platform with a well-defined layout, features, and technical details.