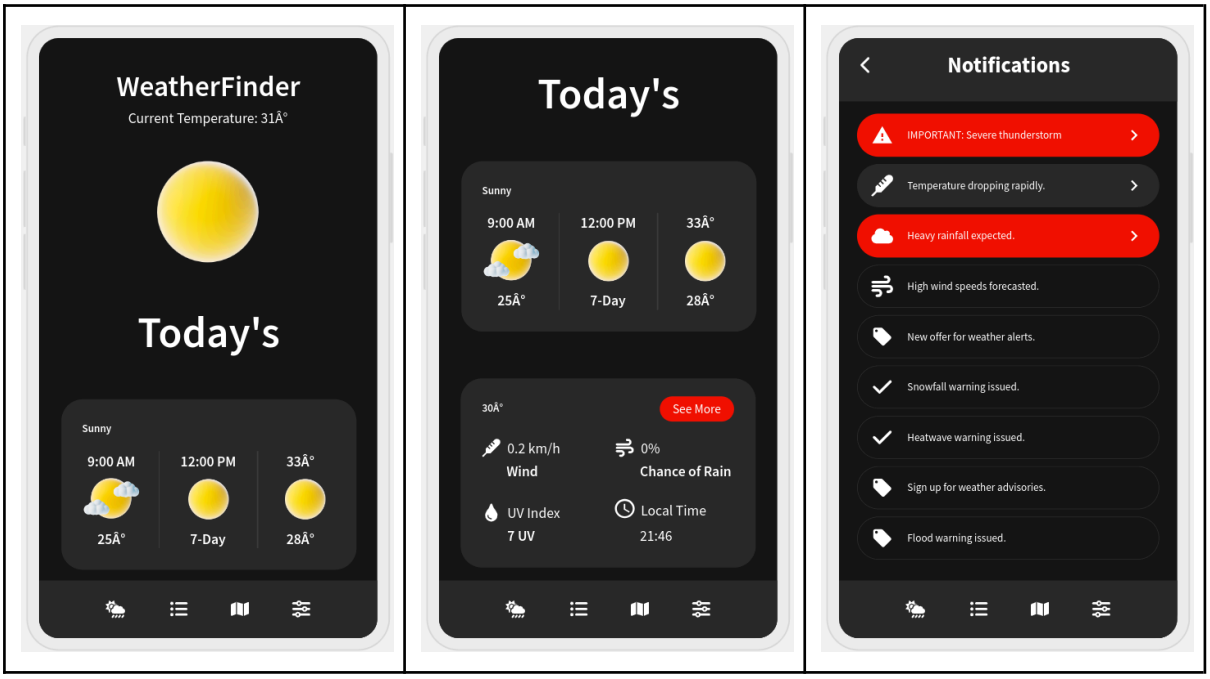
IoT-Based Smart Weather Finder Using M5Stack

This paper introduces an IoT-based weather monitoring system that integrates the M5 Stack development kit, Environmental (ENV III) sensor, GPS sensor, and RGB LED sensor. The system is designed to collect, analyze, and visualize real-time weather data and the GPS sensor provides precise location information for geolocation tagging of weather data and will also give the predictability of rain (in % may be). By harnessing the capabilities of the M5 Stack platform and the selected sensors, the system provides an advanced and feature-rich weather monitoring solution. This project aims to create an efficient and comprehensive weather monitoring system using IoT technologies like M5 Stack (sensors attached to it), Blocky and Micropython (UIFlow). Below are few mockup screenshots attach for idea, how app will look like, note that these screenshot content is not final, as by time app can have features changed but core of the app will remain same.



Components and Accessories:

M5 Stack: The core platform for developing the Weather Monitoring System.
UI Components: The IoT-based weather monitoring system will feature a unique and interactive user interface (UI) for both the M5 Stack screen and mobile device. The UI will be visually appealing, incorporating components like title bars, shapes, images, and labels. It will provide intuitive navigation and easy access to weather information. On the M5 Stack screen, users can easily view and interact with weather data, while the mobile UI will be optimized for smaller screens, ensuring convenient access to real-time updates, configuration options, and alerts. The UI design aims to enhance user engagement and usability of the weather monitoring system.
GPS Sensor: A GPS sensor compatible with the M5 Stack is incorporated to obtain precise location information, including latitude and longitude coordinates. This allows for geolocation tagging of weather data and enhances accuracy in tracking weather conditions.
Environmental (ENR) Sensor: The ENV III sensor is utilized to measure essential environmental parameters such as temperature, humidity, pressure, and air quality. It provides accurate and reliable data for comprehensive weather monitoring.
RGB LED Sensor: The system includes an RGB LED sensor to visualize weather conditions using color codes. The RGB LED can display a wide range of colors, representing

different weather states or alerts. For example, green can indicate favorable conditions, yellow for cautionary situations, and red for severe weather.

Cloud Handling: For the cloud handling aspect of the IoT-based weather monitoring system, the EZData Database will be utilized. The EZData Database, a cloud-based database service, will serve as the storage solution for the collected weather data. It provides a scalable and reliable platform for storing and managing the sensor readings, GPS data, and RGB LED color codes.

Button Controls: Integrated into the M5 Stack to perform various actions within the system.

SD Card: Utilized for reading and writing activity and error logs.

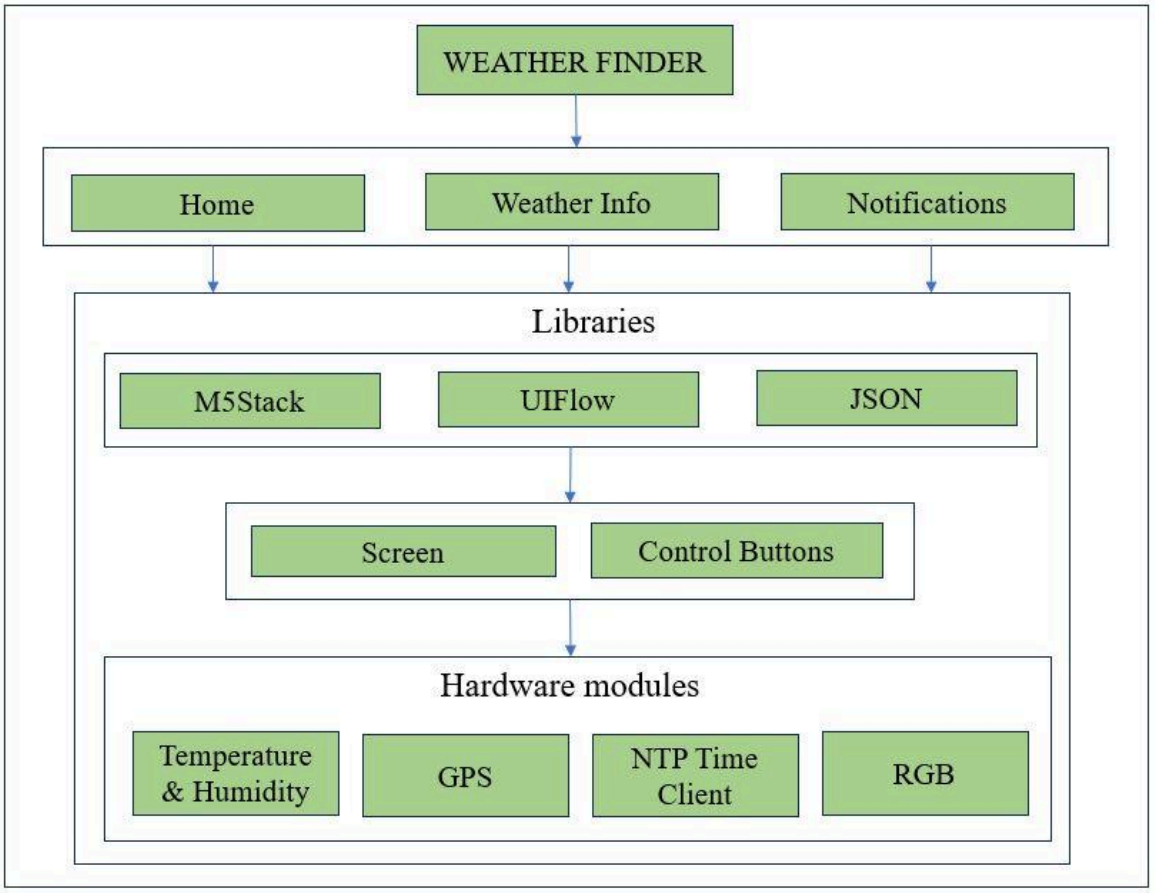
Wi-Fi Connection: Enables the system to access API data for dynamic labels and call online web service methods.

JSON Data Storage: Sensor data is stored as JSON payloads on the SD card in a designated JSON folder.

Mobile Device Integration: Allows configuration and status monitoring of the application through integration with mobile device.

Speaker: Used for handling user alerts or notifications through sound.

IMU Sensors: Incorporated to enhance the functionality of the Weather Monitoring System.



Conclusion:

In conclusion, the IoT-based weather monitoring system, leveraging the M5 Stack development kit, Environmental (ENV III), GPS, RGB LED sensors, and an intuitive user interface, provides a comprehensive solution for real-time weather data collection, analysis, and visualization. The system's unique UI ensures seamless interaction on both the M5 Stack screen and mobile devices, offering an engaging experience. With its enhanced functionalities, including sensor integration, cloud handling, and IMU sensor support, the system delivers accurate and personalized weather information. This project opens avenues for personal and professional interests in weather monitoring, enabling users to make informed decisions based on real-time weather data.

Sources:

1) "M5Stack: A Modular Stackable Development Kit for IoT Devices." M5Stack. https://m5stack.com/
2) https://shop.m5stack.com/products/env-iii-unit-with-temperature-humidity-air-pressure-sensor-sht30-qmp6988
3) https://app.uizard.io/