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IoT Based Weather Monitoring System using ESP32 Microcontroller

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Abstract: *Weather prediction today has become unreliable due to constant changes in atmosphere compositions, unreliable data quality or low quality data being fed to operational models. To address this issue, this research paper proposes a solution to this problem by developing a Smart IoT based Weather Monitoring System powered by ESP-32 WROOM DEVKIT microcontroller that integrates BME-280 Sensor for temperature, humidity, sea level pressure; MQ-135 Gas Sensor to measure approximate Air Quality Index, ML8511 to measure approximate UV Intensity, Rain sensor module for detecting rain and three LEDs for indicating suitability of outdoor activities. The data is collected and displayed on a custom HTML Web Dashboard with real time data and charts; data is sent to Google sheets and e-mail alerts are sent. The web dashboard, Google sheets are publicly accessible and e-mail alerts are sent to all members living in the community. The prototype demonstrated functional accuracy within ±5% for temperature and humidity and ±15% for air quality and UV Index compared to reference datasets from official channels [8-10]..*

Keywords: IoT, Weather monitoring, Sensor, Microcontroller, UV-intensity

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