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WHEATHER MONITORING SYSTEM USING IOT

Abdulraheman Jakirhusen Patil
Vinayak Balasaheb Mali
Abhijeet Jitendra Sonwane
Diploma Student, Department of Electrical Engineering,
V. V.P Polytechnic, Solapur, Maharashtra, India

Prof. Shaikh Z. A. R.
H.O.D., Department of Electrical Engineering,
V.V.P Polytechnic Solapur, Maharashtra, India

ABSTRACT
This paper presents the design and implementation of an IoT-based weather monitoring system used to measure environmental parameters such as temperature, humidity, atmospheric pressure, and rainfall. The system uses sensors connected to a microcontroller (ESP32/Arduino) to collect real-time data. The collected data is transmitted over the internet using Wi-Fi technology and displayed on a cloud platform or mobile application.
The system provides accurate and continuous monitoring of weather conditions, which can be useful for agriculture, environmental studies, and disaster management. The proposed system is cost-effective, easy to install, and reduces human effort. It also supports real-time alerts and data logging for future analysis.

1. INTRODUCTION

Weather monitoring plays an important role in agriculture, industry, and daily life. Traditional weather monitoring systems are expensive and require manual observation. With the advancement of Internet of Things (IoT), it is now possible to monitor weather conditions remotely and in real time.
An IoT-based weather monitoring system uses sensors and internet connectivity to collect and transmit environmental data. This system helps in accurate forecasting and efficient decision-making.
This project focuses on designing a smart weather monitoring system that continuously measures weather parameters and sends data to a cloud platform for monitoring and analysis.

2. OBJECTIVES

- To design a real-time weather monitoring system using IoT
- To measure temperature, humidity, pressure, and rainfall
- To transmit data using Wi-Fi technology
- To display data on mobile or web application
- To reduce human effort in weather monitoring
- To provide real-time alerts for extreme conditions

3. METHODOLOGY

The methodology used in this system includes:

- Selection of sensors (DHT11/DHT22, BMP180, Rain Sensor)
- Interfacing sensors with microcontroller (ESP32/Arduino)
- Programming using Arduino IDE
- Connecting system to Wi-Fi network
- Sending data to cloud platform (Thing Speak/Blynk)
- Displaying data on mobile dashboard
- Monitoring and analyzing real-time data

4. SYSTEM COMPONENTS

Equipment

Description

ESP32 / Arduino

Microcontroller for processing

DHT11 Sensor

Temperature and humidity measurement

BMP180 Sensor

Atmospheric pressure measurement

Rain Sensor

Rainfall detection

Wi-Fi Module

Internet connectivity

Power Supply

Provides required voltage

5. RESULTS AND DISCUSSION

The IoT-based weather monitoring system was successfully developed and tested. The system continuously measures environmental parameters and uploads the data to the cloud platform in real time.

The temperature and humidity values are obtained using the DHT11 sensor, while the BMP180 sensor measures atmospheric pressure. The rain sensor detects rainfall conditions. The ESP32 microcontroller processes all sensor data and sends it to the cloud using Wi-Fi.

The system provides accurate readings and allows users to monitor weather conditions remotely through a mobile application or web dashboard. Alerts can be generated when parameters exceed predefined limits.

This system is highly useful in agriculture for crop monitoring, in industries for environmental control, and in smart cities for weather analysis.

6. CONCLUSION

The IoT-based weather monitoring system is an efficient and reliable solution for real-time environmental monitoring. It reduces manual effort and provides accurate data for decision-making. The system is cost-effective, easy to implement, and suitable for various applications such as agriculture, industries, and smart cities. By using IoT technology, weather monitoring becomes more accessible and efficient.

7. FUTURE SCOPE

- Integration with mobile applications
- Use of AI for weather prediction
- Solar-powered system implementation
- Addition of more sensors (wind speed, air quality)
- Smart alert system using SMS/Email

REFERENCES

[1] IEEE Research Papers on IoT Weather Monitoring Systems
[2] Internet of Things by Raj Kamal, McGraw Hill
[3] Arduino Official Documentation
[4] ESP32 Technical Reference Manual
[5] ThingSpeak IoT Platform Documentation
[6] Ministry of Electronics and IT, IoT Guidelines

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