

IOT Weather Reporting System

Abstract

The IoT Weather Reporting System is designed to automate real-time weather monitoring and reporting using IoT technology. It uses various environmental sensors to collect data such as temperature, humidity, and rainfall, which is then transmitted to the cloud via a Raspberry Pi. The system removes the need for manual weather updates by providing continuous and accurate weather information accessible from anywhere via the internet.

Aim

To develop an IoT-based smart weather monitoring system that collects real-time data using sensors and displays it online for public and institutional access.

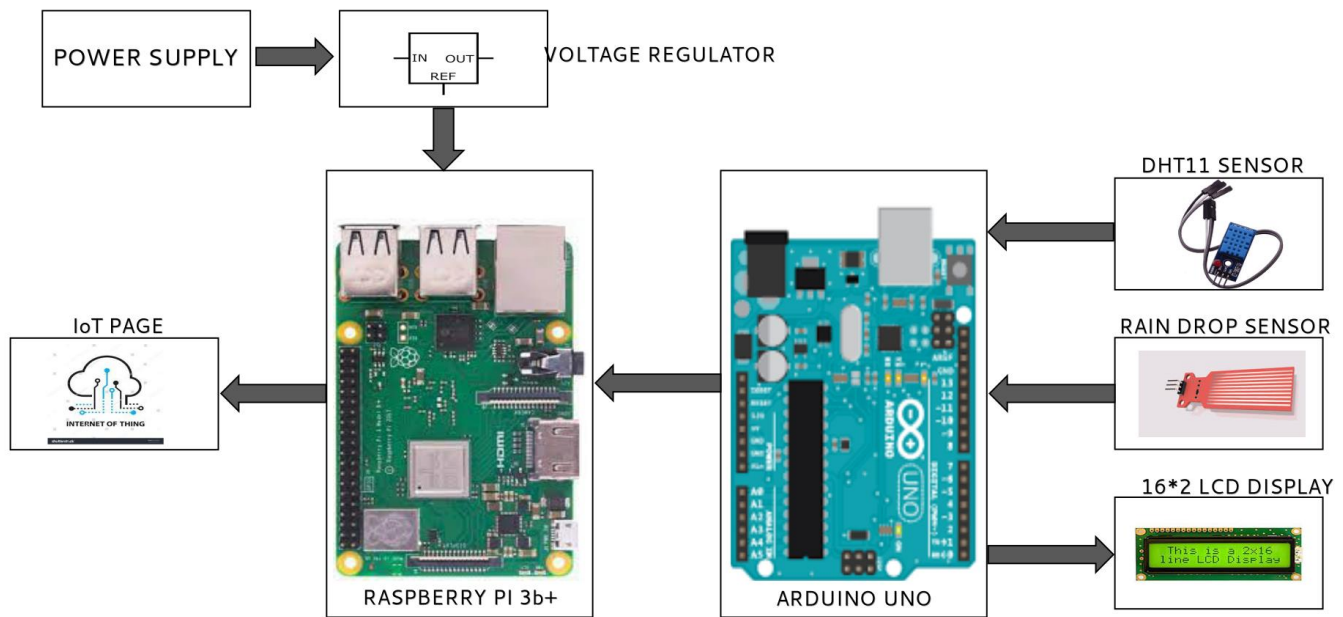
Objectives

- To sense real-time environmental parameters such as temperature, humidity, and rainfall.
- To transmit collected data wirelessly via IoT to an online platform.
- To display live weather data on an LCD display and cloud interface.
- To enable remote access of data through web browsers anytime.
- To improve the speed, accuracy, and reliability of weather data transmission.

Working

The system uses an Arduino Uno to interface with a DHT11 (temperature and humidity sensor) and a rain sensor. It collects environmental data and sends it via serial communication to a Raspberry Pi. The Raspberry Pi, connected to Wi-Fi, uploads this data to the IoTGecko server. Users can then log in to the server from any location and view live weather updates. An LCD display also shows the current local readings in real-time.

Block Diagram



Components

Hardware:

- Arduino Uno
- Raspberry Pi
- Temperature and Humidity Sensor (DHT11)
- Rain Sensor
- 16x2 LCD Display
- Voltage regulator circuit
- PCB board
- Switches, LEDs, Resistors, Capacitors, Transistors
- Connecting wires, cables, and connectors

Software:

- Arduino IDE for programming Arduino
- Python on Raspberry Pi for data handling
- IoTGecko for cloud data visualization
- Web browser for live monitoring

Advantages

- Real-time and remote weather monitoring
- Compact and portable system

- Reduces human dependency
- Easy web-based access to data
- Fast and reliable weather alerts

Disadvantages

- Limited sensor range for large-scale applications
- Internet connectivity is mandatory
- Slight delay in cloud data reflection
- No AI or data prediction feature

Applications

- Meteorological departments
- Disaster warning systems
- Agriculture and irrigation planning
- Smart city weather dashboards
- Marine and shipping navigation planning

Future Scope

- Integration with mobile app for notifications
- Expansion with wind speed, UV index, and pressure sensors
- AI-based weather forecasting and analysis
- Solar-powered system for remote rural areas
- Integration with voice assistant systems

Conclusion

The IoT Weather Reporting System provides a cost-effective and efficient method for capturing and sharing live weather data. By automating weather monitoring with internet-enabled sensors, it offers reliable, real-time updates that are easily accessible. It has vast potential in agriculture, disaster management, and smart cities, making it a valuable tool for future-ready infrastructure.