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# IoT Based Real-Time Monitoring of Meteorological Data: A Review

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## Abstract

This review paper gives a brief overview of recent and current advancements in real-time meteorological (weather forecasting) data collected using various wireless techniques. Remote sensing technology has prepared the way for real-time weather data processing and has revolutionized the way weather data is gathered, analyzed, and stored to give reliable weather forecasts. For more than half a century, weather prediction has been one of the world's most difficult issues. Wireless weather station monitors environmental parameters like temperature, humidity, atmospheric pressure, rainfall, solar radiation, and light intensity. Since the world is developing so rapidly, climate change and environmental weather parameter monitoring have recently attracted considerable attention. The main purpose of this review paper is to survey and study the most recent technologies for real-time meteorological data monitoring and stay updated with the current weather conditions in any location.

*Keywords: Temperature, humidity, pressure, rainfall, IoT, LoRa, Gateways, Weather forecasting, Wi-Fi; Bluetooth; Zigbee*

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## 1. Introduction

Weather forecasting is the science of weather prediction in the near future. Weather forecasting is vital in the online world for a variety of reasons, including saving people's lives and assisting when natural disasters like as rains, cyclones, and earthquakes hit. Weather forecasting can help anticipate when natural catastrophes will occur. The more warning individuals receive, the more prepared they will be for approaching crises. Weather may have a significant impact on our everyday lives; if we did not receive timely weather information, we would have been in great danger. It can have an impact on sports, outdoor activities, farming, navigation, and transportation, among many other things.

Farmers are exposed to weather risks since agricultural processes such as soil preparation, planting; irrigation, harvesting, and crop storage are all directly reliant on weather conditions. As a result, IoT-based weather forecasting technology will provide crucial weather predictions to farmers, who can then utilize the knowledge to increase crop fertility. As a result, fast and accurate weather prediction delivery will boost production while reducing the danger of weather hazards [1][2].

Similarly, IoT-enabled weather systems are designed to collect data from multiple cars on the road, with vehicles travelling on the road electronically communicating weather and road condition data. This information assists in the development of more accurate forecasts and the delivery of flexible real-time monitoring over a range of time horizons. Without the assistance of humans, meteorological parameters are monitored using an automated weather station with sensors. The measured parameters can be saved in a built-in data logger or sent across a communication link to a distant location. A data logger is used to store the information [3] [4].

At a later date, the captured data might be physically transferred to a computer for additional processing. In an automated weather station, the communication system is very essential. Automated weather stations, which are offered as commercial products, include a wide range of features and possibilities.

In order to effectively observe new weather patterns, monitoring the weather in isolated, off-grid regions has become more essential as climates change. Residents may better manage agricultural development, follow local extreme weather situations and expand their knowledge of earth weather conditions for remote or difficult-to-reach regions with cheap and simple access to meteorological information [5] [6].

With the latest technological advancements and the emergence of the Internet of Things, it is now feasible to develop a long-range, low-maintenance, economical, and constantly operational autonomous wireless weather station that can be recharged using solar energy or a wireless power transfer system.