

## **Title: IoT-Based Mobile Application for Real-Time Localized Weather Monitoring and Forecasting with Incremental Learning**

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**Abstract:** Precise weather forecasting at the right time remains essential because it supports every aspect of daily activities and safety, impacting decisions in all sectors. Weather forecasting systems that already exist struggle to give precise local outcomes while depending on information from distant monitoring stations and limited environmental record points. The paper presents a mobile application for real-time weather forecasting that employs machine learning and IoT technology to combat weather forecasting problems efficiently. The system combines a mobile application that offers immediate weather information, which users can access via a straightforward, easy-to-use system. A set of Internet of Things (IoT) sensors gathers complete environmental information consisting of temperature, humidity, wind speed, barometric pressure, and rainfall measurements. The distributed sensors work as operational elements to gather both specific and precise weather measurements from each location in real time. The forecasting model employs an incremental learning method, which enables better performance from the model as new data collections occur, leading to increased prediction accuracy. The forecasting models use APIs to provide quick and smooth data exchange between weather sensors and the prediction systems, which enables efficient information retrieval and submission. The innovative system generates forecast predictions while offering flexible capabilities for extending its use across larger land areas. Users benefit from this project because it delivers precise local weather data and creates an easy-to-use interface through which they can access it. The system shows its operational success by being implemented first in Gazipur, Bangladesh, which proves its scalability to expand throughout the country.

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