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Real Time Weather Detection and Sending Notifications

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Abstract: Weather forecasting is the application of current technology and science to predict the state of atmosphere for future time and at a given location. This is made by collecting data as much as possible about the present state of atmosphere, including temperature, humidity, wind, precipitation. Weather forecasts are made by collecting information about the current state of the atmosphere in a particular area and then using the weather to predict how to atmosphere will change individual input is still required to select the best predictive model to establish the predictions 1t will make the system easy for farmer to use. Weather is the state of atmosphere at the particular place and time. Crop's photosynthesis, transpirations, respiration, photoperiodism and all other activities are influenced by weather. Farmers can plough their field only when it has enough moisture.

Keywords: Machine learning, Weather detection

I. INTRODUCTION

Weather forecasting has numerous impacts in our daily life from cultivation to event planning. Previous weather forecasting models used the complicated blend of mathematical instruments which was insufficient in order to get higher classification rate. in contrast, simple analytical models are well suited for weather forecasting tasks. Weather forecasting has gained attention many researchers from various research communities due to its effect to the global human life. The emerging deep learning techniques in the last decade coupled with the wide availability of massive. Weather observation data and the advent of information and computer technology have motivated many researches to explore hidden hierarchical pattern in the large volume of weather dataset for weather forecasting. The activities of many primary sectors depend on the weather for production, e.g. farming. The climate is changing at a drastic rate nowadays, which makes the old weather prediction methods less effective and more hectic. To overcome these difficulties, the improved and reliable weather prediction methods are required. These predictions affect a nation's economy and the lives of people. To develop a weather forecasting system that can be used in remote areas is the main motivation of this work. The data analytics and machine learning algorithms, such as random forest classification, are used to predict weather conditions. In this paper, a low-cost and portable solution for weather prediction is devised. The situation of weather plays a crucial role in almost every aspect of human life. Note that intelligent weather analysis techniques can help us to make efficient decisions that can lead us to save valuable lives, properties, and time. As a consequence, researchers focus on the automated analysis of weather and climate data such as forecasting rainfall, predicting air temperature to understand and to extract useful information.

MOTIVATION OF THE PROJECT

The weather Detection plays very important role in the field of agriculture. It is also helpful at places like volcano and rain forests. It is quite difficult for a human being to stay for longer time at such places. It is necessary to get a weather information in our day-to-day life for one's personal or business needs. Forecasting involves making predictions about the future. Traders and analysts use forecasts in valuation models, to time trades, and to identify trends. Forecasts are often predicated on historical data. Because the future is uncertain, forecasts must often be revised, and actual results can vary greatly.

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II. LITERATURE SURVEY

1.Paper name: Smart weather monitoring and real time alert system using IoT Author: Yashaswi Rahut, Rimsha Afreen, Divya Kamini or Description: To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment, it will record real time data. It can cooperate with other objects through the network. Then the collected data and analysis results will be available to the end user through the Wi-Fi. The smart way to monitor environment and an efficient, low-cost entrenched system is presented with different models in this paper. In the proposed architecture purposes of different modules were discussed. The noise and air pollution monitoring system with Internet of Things (IoT) concept experimentally tested for monitoring two parameters. It also sent the sensor parameters to the cloud (Google Spread Sheets). This data will be cooperative for future analysis and it can be easily shared to other end users. This model can be further expanded to monitor the developing cities and manufacturing zones for pollution monitoring. To protect the public health from pollution, this model provides an efficient and low. The components in this project don't consume much power and can even be powered by solar panels. Compared to other devices that are available in the market the Smart weather monitoring system is cheaper and cost effective. This project can be of great use to meteorological departments, weather stations, aviation and marine industries and even the agricultural industry. s. Most of this technology is focused on efficient monitoring and controlling of different. An efficient environmental monitoring system is required to monitor and assess the weather conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels) and for gathering data for research purposes. Sensor devices are positioned at different locations to collect the data to forecast the behaviour of a particular area of interest. The main aim of this paper is to design and implement a resourceful monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the devices are stored in the cloud and to project the predictable trend on the web browser.

2. Paper Name: IoT Based Real-Time Weather Monitoring and Reporting System. Author: Kharat Pranav, Patare Akshay, Pujari Anant Description-: The system proposed in this paper is an advanced solution for monitoring the weather conditions at a particular place and making the information visible anywhere in the world. The technology behind this is the Internet of Things (IoT), which is an advanced and efficient solution for connecting things to the internet and connecting the entire world of things in a network. Here things might be whatever like electronic gadgets, sensors, and automotive electronic equipment. The system deals with monitoring and controlling the environmental conditions like temperature, relative humidity, and CO level with sensors and sends the information to the web page, and then plots the sensor data as graphical statistics. The data updated from the implemented system can be accessible in the internet from anywhere in the world. Weather Monitoring is an essential practical implementation of the concept of Internet of Things, it involves sensing and recording various weather parameters and using them for alerts, sending notifications, adjusting appliances accordingly and also for long term analysis. Also, we will try to identify and display trends in parameters using graphical representation. The devices used for this purpose are used to collect, organize and display information. It is expected that the internet of things is going to transform the world by monitoring and controlling the phenomenon of environment by using sensors/devices which are able to capture, process and transmit weather parameters. Cloud is availability of computer system resources like data storage, computing power without direct active management of user

3. Paper Name: Real-Time Weather Monitoring and Prediction Using City Buses and Machine Learning Author: -Pradchaya Anantamek Description: - This paper presents a real-time weather monitoring and prediction system based on bus information management, combined with information processing and machine learning to complete the communication and analysis of information between buses, stations, and sensors. The proposed system contains four core components: (1) information management, (2) interactive bus stop, (3) machine learning prediction model, and (4) weather information platform. The website shows weather information via a dynamic chart. In addition to the current temperature, humidity, air pressure, rainfall, UV, and PM 2.5, the system provides a forecast of temperature, humidity, and air pressure for the next 24 h. Although the proposed system achieves effective weather monitoring and information management, misalignment may be present due to the significant weather changes, which is the major challenge to overcome. In the future work, in addition to optimizing the system operation, we are planning to refine the prediction system, considering the deployment of nodes based on bus routes, the learning models, including more physical

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parameters, exploring the effects of forecast and measurement errors on the forecasting models, reanalysing the dataset (e.g., performing data revisions), applying multiple data sources [26] and information processing technologies, which may achieve better prediction accuracy. Curate weather data are important for planning our day-to-day activities. In order to monitor and predict weather information, a two-phase weather management system is proposed, which combines information processing, bus mobility, sensors, and deep learning technologies to provide real-time weather monitoring in buses and stations and achieve weather forecasts through predictive models. Based on the sensing measurements from buses, this work incorporates the strengths of local information processing and moving buses for increasing the measurement sensing data.

4. coverage and supplying new Paper Name: Real Time Weather Monitoring System using IoT Author: - Ram Kumar, Sreeram Murthy Description: An IoT-based weather monitoring system is a network of sensors, devices, and other technologies that are used to collect and analyses data about the weather. This system can be used to monitor a variety of weather-related parameters, such as temperature, humidity, atmospheric pressure, and wind speed. The collected data is then sent to a central hub, where it can be processed and analysed to provide real time information about the weather. This information can be used for a variety of purposes, including forecasting future weather patterns, alerting people to potential weather hazards, and optimizing energy usage. Overall, an IoT-based weather monitoring system can provide valuable insights and information that can help people better understand and prepare for the weather.

III. PROBLEM DEFINITION AND OBJECTIVE

To develop a real-time weather detection and notification system that applies modern technology, including machine learning, to analyse current atmospheric conditions and predict future weather states at a specific location. The application will utilize data sources such as APIs or sensor inputs to monitor temperature, humidity, wind speed, and other parameters. Based on this analysis, it will provide timely and accurate alerts or notifications to users, enabling better preparedness and decision-making for weather-related events.

Objective: -

- To detect the weather condition using machine learning.
- To learn and understand python programming language.
- To send real-time notifications to users about significant weather changes.
- To build an efficient application to predict the state of atmosphere.

IV. FUNCTIONAL REQUIREMENTS:

System Feature

The system will collect real-time weather data using external weather APIs (e.g., OpenWeatherMap) or sensors. Store and manage real-time and historical weather data for model training and analysis.

Analyse current and past data using machine learning models to classify or predict weather conditions.

Send real-time alerts to users when certain weather conditions or thresholds are met.

Provide a graphical interface for users to view real-time weather data, predictions, and alerts.

V. NON-FUNCTIONAL REQUIREMENTS:

Performance Requirements:

The performance of the system lies in the way it is handled. Every user must be given proper guidance regarding how to use the system. The other factor which affects the performance is the absence of any of the suggested requirements. **Safety Requirements:**

To ensure the safety of the system, perform regular monitoring of the system so as to trace the proper working of the system. An internal staff has to be trained to ensure the safety of the system. He has to be trained to handle extreme error cases.

Security Requirements:

User data must be stored securely and only accessible to authorized users.

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Communication (email/SMS) should be protected from misuse or spam.

The system should not expose API keys or sensitive data in the code.

Use secure channels (HTTPS) for all data transfers.

Regular checks should be done to find and fix security issues.

VI. SYSTEM ARCHITECTURE:



Fig.1: System Architecture

VII. IMPLEMENTATION STEPS DATA COLLECTION:

Identification of Data Source: Weather data is collected either through a public API (e.g., OpenWeatherMap) or through physical sensors such as DHT11/DHT22 for temperature and humidity. API-based collection is preferred due to ease of access and reliable data from meteorological services.

Data collection: Collect live weather data using OpenWeatherMap API. Get details like temperature, humidity, wind speed, and condition. Save data in a table or file for later use.

Data Cleaning: Remove incorrect or missing data Change data into a clean and simple format Make sure time and numbers are easy to use.

Training the ML Mode: Use past weather data (from Kaggle or similar sites). Train the model to learn patterns (e.g., sunny, rainy, cloudy). Check accuracy with testing.

Real-Time Prediction: Use current weather data with the trained model. Predict weather conditions like rain, sun, or storm. Confirm results with actual readings.

Sending Notifications: Set alert rules (e.g., high chance of rain). Send messages to users through SMS or email using Twilio or SMTP. Make sure alerts are quick, simple, and helpful.

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RESULTS:



Fig. home page

1. User Input Page

e Weather Notifier	
Edite city same	

2. Functional Results Of Pune:

	Weather for pune
	Weather: Clouds
	Temperature: 28.56°C
Ad	dvice: The weather looks nice today!
	🥐 Weather Notifier
	Enter city name
	Creck Weather
	Last shecked ofly: pune
	Last checked time: 10/5/2025, 5:28:56 pm

Fig. output

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VIII. CONCLUSION

As a result, we created a python-based prototype software application for predict the state of atmosphere for future time and at a given location. The suggested study work has established a model for weather prediction that can be used to improve performance without incurring significant additional costs, as well as reducing prediction variation. Weather plays an important role in our daily lives, and it would be difficult to arrange daily activities without the help of meteorologists and forecasters. Weather forecasters and meteorologists can predict the weather and its potential changes, yet the weather is still unpredictable. In this study, we used neural network architecture to improve forecasting by addressing regional numerical model flaws. Hopefully, this approach may be used to forecast other continuous meteorological data. We ran tests with a variety of error histories to determine the number of epochs. We demonstrated that the proposed architecture facilitates this. The project's goal is to use a mathematical model to anticipate weather forecasting. The early design was to see if a larger workforce was required numerically.

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