



## A Survey on a Weather Forecasting Application

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**Abstract:** *Weather forecasting is the process of using science and technology to predict the atmospheric conditions for a specific location. Historically, ancient weather prediction relied on observing recurring patterns, also known as pattern recognition. For instance, people might notice that a particularly red sunset often signaled clear weather the following day. However, not all such predictions were accurate.*

*In this system, weather predictions are based on parameters such as temperature, humidity, and wind. Users will input the current temperature, humidity, and wind values. The system will use these inputs along with historical weather data to forecast the weather, ensuring reliable predictions. This system can be applied in various fields, including air traffic, marine navigation, agriculture, forestry, military, and naval operations.*

**Keywords:** *Weather, Map, API, Forecasting*

### I. INTRODUCTION

Today's Weather app is a web application which will tell the users about the weather details of any particular city. The easy and Interactive User Interface will help our users to easily know about the temperature, wind speed, humidity and description about the weather. Weather forecasting entails predicting how the present state of the atmosphere will change. Present weather conditions are obtained by ground observations, observations from ships, observation from aircraft, radio sounds, doppler radar and satellites. This information is sent to meteorological centers where the data are collected, analyzed and made into a variety of charts, maps and graphs. Modern high-speed computers transfer the many thousands of observations onto surface and upper-air maps. Weather forecasts provide critical information about future weather. The intricate process of weather forecasting evaluates the application of science and technology to the prediction of weather conditions at a certain moment. As the name suggests, the weather app is a sophisticated yet extremely promising system that provides users with fast access to the best and most accurate data.

Weather forecasts are created by gathering quantitative information about the atmosphere's current condition at a specific location and use meteorology to predict future changes in the atmosphere. In the subject of weather forecasting, technology has played a tremendous role. The general public may also benefit from weather data, therefore it's not just important for scientists and researchers. The goal of weather forecasting is to predict the atmospheric environment, which might change periodically and from place to place. In summary, it is a multifaceted process that evaluates the use of science and creativity to predict the climate conditions at a specific moment in time. Weather forecasts assist us in coordinating our daily activities. The predicting of weather is influenced by several factors, including air humidity, wind speed, atmospheric pressure, and temperature. Weather forecasting applications are helpful for tourism, transportation safety (particularly for road and civil/military aircraft), defence services, agricultural, and sailors since they are used to identify inclement weather. The weather app is easy to use. For users, the program is more user-friendly and efficient.

### II. LITERATURE SURVEY

We provide a novel method in this work: using a weather generator as a weather API. A few real-world examples demonstrate the advantages of this method. In summary, a weather API minimizes maintenance requirements, facilitates model integration into frameworks, and prevents interoperability problems stemming from disparate programming languages. The OpenWeatherMap API is used to display the data in the Capstone Weather App. The online meteorological service OpenWeatherMap API allows academics and programmers of mobile applications and web-based services to access weather data, including current analysis and prediction data[1]. The main focus of this suggested application is weather forecasting with enhanced prediction and consistent accuracy. Conventional surface measurements of air pressure, temperature, wind direction, speed, humidity, and precipitation are frequently gathered via automated weather stations, buoys, or skilled observers. The most current forecast from a numerical model for the period when observations were made is combined with the information gleaned from the observations during the data assimilation process to create the meteorological analysis. Computer simulations of the atmosphere are called numerical weather prediction models. They use their knowledge of physics and fluid dynamics to advance the condition of the atmosphere throughout time, starting with the analysis. Supercomputers are needed to solve the complex equations that describe how a fluid's condition changes over time. The model's output serves as the foundation for the weather prediction [2]. In a study titled "Analysis on The Weather Forecasting and Techniques," the authors determined that fuzzy logic and artificial neural networks offer the best prediction

and solution in comparison. They made the decision to analyse a number of factors, including wind, pressure, temperature, humidity, and wind [5].

The main concerns with weather prediction were covered in a different study report titled "Issues with weather prediction." Not even the most basic weather forecast is accurate. Usually, the one-day prediction is two degrees off from the actual temperature. Considering that forecasts are produced for longer into the future, this accuracy isn't too awful. For instance, temperature predictions are less accurate in a region like the tropics than in a place like New England, where temperatures vary greatly [6].

Another study, "Current weather prediction," stimulated what is most likely to occur based on the known condition of the atmosphere using numerical approaches. For instance, if a forecaster is examining three distinct numerical models and two of them indicate that a storm would make landfall in a certain location, the forecaster is likely to make this prediction. Although these numerical models are always being improved and perform effectively, there are still mistakes in them due to imprecise equations that they utilize. The weather in any one location is highly dependent on the weather in other locations due to the long-range nature of weather systems [7]

### III. PROPOSED APPROACH

The objective of the Today's weather project is to design and implement an efficient and user-friendly system that helps user to know about weather details of any city using its name only. In Weather System we are using various methodologies to solve our problems. Below are the detailed description about the technology used and methods we are applying in our project.

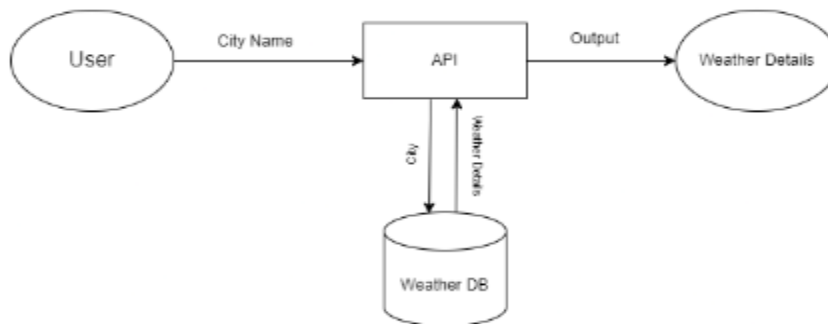


Fig-1: Weather Forecasting Architecture

A weather forecasting application is a software tool designed to provide users with up-to-date and accurate information about current and future weather conditions. These applications leverage data from meteorological sources, satellites, and weather stations to deliver forecasts, real-time weather updates, and other related information.

An Entity-Relationship Diagram (ERD) for a Weather Application is the entities and their relationships within the system

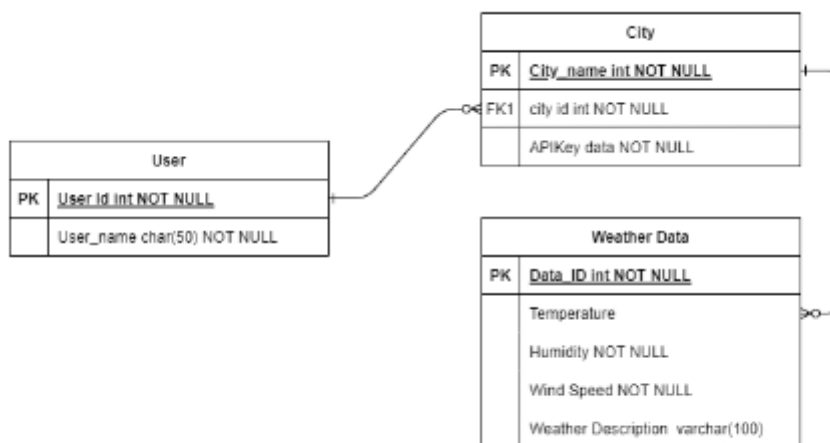


Fig-2: ER- Model of Weather Forecasting

Here's a simplified use case diagram for a weather forecasting application:

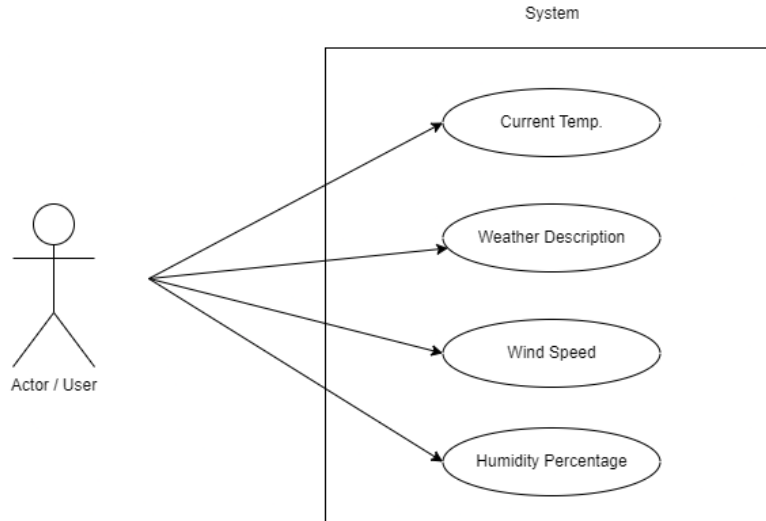


Fig-3: Use Case of Weather Forecasting

### CONCLUSION

This research proposes an accurate and efficient weather prediction model based on the concept of linear regression, which is a part of machine learning. The model effectively predicts weather conditions using parameters such as temperature, humidity, and pressure, enabling reliable forecasts. It also supports decision-making in daily life. The accuracy of predictions can be further improved when applied to cleaner and larger datasets. Effective pre-processing of datasets plays a crucial role, as unprocessed data can negatively impact the model's efficiency.

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