International Journal of Engineering and Techniques - Volume 12 Issue 2, March-April - 2026

RESEARCH ARTICLE

Weather Forecasting Using API

Abubakar Mukhtar Mukhtar[1], Mr. R.Sankaranarayanan[2]
1(*NIMS Institute of Engineering and Technology, NIMS University, Jaipur,*
Email: mukhtarsadalori861230@gmail.com)
2 (*NIMS Institute of Engineering and Technology, NIMS University, Jaipur,*
Email: sankarnba22@gmail.com)

Abstract:

Weather forecasting has become an indispensable part of our lives, playing a vital role in agriculture, aviation, disaster management, transportation, and human activities. The project system will fetch real-time data regarding temperature, humidity, atmospheric pressure, wind speed, and weather conditions through HTTP requests. The data will be fetched in JSON format, which will be further processed using the Python programming language. The system will not only be efficient but will also serve as a useful tool for both users and developers.

Keywords *— **Weather Forecasting, Real time data, HTTP Requests, JSON format***

I. INTRODUCTION

Weather forecasting is the scientific prediction of atmospheric conditions over a specific time and place, using principles of physics along with statistical and empirical methods [10]. Humans have attempted to predict weather for centuries, with formal approaches developing since the 1800s [5]. Traditionally, forecasting relied on instruments such as barometers, thermometers, and satellite imaging [11]. With technological advancements, Application Programming Interfaces now enable real-time data retrieval from multiple sources [2]. This project utilizes API technology and Python to develop an efficient, scalable, real-time weather forecasting system.

II. REVIEW OF LITERATURE

Kumar et al., (2023) did research on cloud-based real-time weather observation systems highlighting the successful combination of IoT devices and cloud computing for ongoing environmental data gathering. The results emphasize benefits like scalability, accessibility, and enhanced decision-making, achieving an accuracy rate of approximately 80%.

Gomathy et al., (2022) did a study of weather forecasting using python, in which the system will forecast weather, determined by factors like temperature, humidity, and wind.). The weather prediction system utilizes factors like temperature, humidity, and wind, and will predict weather based on historical data thus this forecast will demonstrate accuracy.

Hemanth et al., (2024) developed an API integrated weather forecasting website, which was created employing HTML, CSS, and JavaScript to build an interactive interface and usability. The usage precisely presents up-to-date weather details, it comprises the temperature, humidity, and wind velocity, by obtaining real-time information from the Weather Map API.

Sanjay (2025) developed with Python, utilizing the OpenWeatherMap API as the main source for obtaining real-time weather data such as temperature, humidity, wind speed, and sky conditions. The system design highlights modularity and simplicity, facilitating smooth data transfer between the client application and the cloud-hosted weather API.

Pathrol et al., (2025) developed an efficient weather prediction application utilizing JavaScript, aimed at delivering up-to-date weather data via a web interface. Experimental assessment shows that the application reaches quick response times and dependable accuracy in presenting weather conditions, thereby providing an effective and affordable tool for real-time weather tracking.

Wavhale et al., (2020) conducted a research which integrated climate information cloud computing-based platform for analytics and visualization atmosphere in the dominant technologies of measurement data, analysis of numerical data and animation employing different weather APIs. The system offers Mapping and Visualization Service alongside analytics functions to engage with the connections of different weather specifications.

III. METHODOLOGY

A. Proposed Framework

1) System Components: User Interface, API Request Module, Weather API, Data Processing Module, Output Module

2) ***Framework Flow:*** User Input → API Request → Weather API → JSON Response → Data Processing → Output Display

.

B. Hardware and Software Requirements

1) ***Hardware Requirements:*** Personal Computer or Laptop, Minimum 4GB RAM, Intel i3 Processor or higher, Stable Internet Connection.

2) ***Software Requirements:*** Programming Language-Python, JSON, OperatingSystem-Windows/ Linux/macOS, API Service-OpenWeather AI.

C. System Design

Client: User interface

Server: Weather API

Middleware: Python backend

D. Algorithm

1. Start
2. Input city name
3. Validate input
4. Send API request
5. Receive JSON response
6. Parse data
7. Extract parameters
8. Display results
9. End

E. Simulation Steps and Simulation Result

1. Start the application
2. Enter a city name
3. Validate input
4. Send request to API
5. Receive data
6. Process JSON response
7. Display results
8. Handle errors

TABLE I

SIMULATION RESULT

Input Type	**Result**
Valid City	Correct weather data displayed
Invalid City	Error message shown
No Internet	Connection error
Empty Input	Prompt displayed

F. Applications

Daily Life: Helps users plan activities

Agriculture: Assists farmers in crop planning

Travel: Helps tourists plan trips

Disaster Management: Early warnings

Education: Learning tool for students

G. Advantages and Disadvantages

1) ***Advantages:*** Real time weather updates, Easy to use interface, High accuracy, Scalable system, Efficient data handling.

2) ***Disadvantages:*** Requires steady internet connectivity, Dependant on API availability, Limited offline Support.

H. Future Implications and Scope

Integration of Artificial Intelligence for predictive forecasting

Development of mobile applications

Multi-language support

Weather alerts and notifications

Offline data caching

Integration with IoT devices

IV. CONCLUSION

The project successfully demonstrates a real-time weather forecasting system using API integration. It provides accurate and instant weather information and handles various scenarios effectively. The study highlights the importance of APIs in modern software development and shows how real-time data can enhance user experience. The system is efficient, scalable, and suitable for real-world applications.

ACKNOWLEDGMENT

Sincere gratitude is extended to the project guide, Mr. R. Sankaranarayanan, for his valuable guidance, support, and encouragement throughout the completion of this project. Appreciation is also expressed to NIMS Institute of Engineering and Technology, NIMS University, Jaipur, for providing the necessary resources and academic environment. Grateful acknowledgment is made to family and friends for their constant support and motivation during the course of this work.

REFERENCES

1. Chadha, S., Gupta, N., & Chauhan, R. (2024). Development of Weather Forecast Application using API. *2024 1st International Conference on Advances in Computing, Communication and Networking*. 10.1109/ICAC2N63387.2024.10895829
2. Eldridge, T. (2023). *What Is a Weather API?* meteomatics. https://www.meteomatics.com/en/weather-api/what-is-a-weather-api/
3. Gomathy, C. K., Chowdary, U. S. R., Reddy, V. M., & Geetha, V. (2022). WEATHER FORECASTING APPLICATION USING PYTHON. *JOURNAL OF ENGINEERING, COMPUTING & ARCHITECTURE*, *12*(3). https://www.researchgate.net/profile/C-K-Gomathy/publication/360620450_WEATHER_FORECASTING_APPLICATION_USING_PYTHON/links/63ef2eb619130a1a4a87139b/WEATHER-FORECASTING-APPLICATION-USING-PYTHON.pdf
4. Hemanth, S. V., Krishna, K. S. V. S., Kumar, P. A., Karthik, N., & Mahendra, T. (2024). Development of an API-Integrated Weather Forecasting Website. *IJIRT*, *11*(7). https://d1wqtxts1xzle7.cloudfront.net/124575970/IJIRT171265_formatted-libre.pdf?1757658058=&response-content-disposition=inline%3B+filename%3DDevelopment_of_an_API_Integrated_Weather.pdf&Expires=1774250113&Signature=Tzd9bst0eGhVIKsbUMt9HqOM5wrD9h43P-RilbiB
5. Iseh, A. J., & Woma, T. Y. (2013). Weather Forecasting Models, Methods and Applications. *IJERT*, *2*(12). https://www.ijert.org/weather-forecasting-models-methods-and-applications-2#:~:text=Weather%20forecasting%20can%20be%20defined,understanding%20of%20atmospheric%20processes%20to
6. Kumar, S., Dabral, S., Negi, A., Rawat, V., Maurya, S., & Alaskar, K. (2023). Real Time Cloud-Based Weather Monitoring System using NodeMCU. *International Conference on signal processing and communication*. https://ieeexplore.ieee.org/document/10441319/citations?tabFilter=papers
7. Pathrol, S., Singh, J., Kumar, M., & Kumar, S. (2025). Development of a Lightweight Weather Forecasting

Application Using Javascript. *International Journal of Latest Technology in Engineering Management & Applied Science*, *14*(10). 10.51583/IJLTEMAS.2025.1410000061

8. Sanjay, B. S. (2025). Weather Forecast Detection Using API. *INTERNATIONAL JOURNAL OF ENGINEERING DEVELOPMENT AND RESEARCH*, *13*(4). https://rjwave.org/IJEDR/papers/IJEDR2504489.pdf
9. Wavhale, V. D., Kumar, V., Choudhari, V. R., & Bira, S. (2020). Weather data forecast and analytics. *INTERNATIONAL RESEARCH JOURNAL OF ENGINEERING AND TECHNOLOGY*, *7*(8). https://d1wqtxts1xzle7.cloudfront.net/64716499/IRJET_V7I8110-libre.pdf?1603116297=&response-content-disposition=inline%3B+filename%3DIRJET_Weather_Data_Forecast_and_Analytic.pdf&Expires=1774255863&Signature=M0eqn1nqitL67raXQNqK6qWfseboMXySkKxthwE0EGGVXuA2L
10. *Weather Forecasting.* (2021). Drishtiias. https://www.drishtiias.com/daily-news-analysis/weather-forecasting-1#:~:text=Need:,tourists%20to%20visit%20certain%20areas.
11. *Which Instruments Are Used To Measure And Forecast Weather?* (2025). RIKA. https://www.rikasensor.com/a-which-instruments-are-used-to-measure-and-forecast-weather.html