WEATHER FORECASTING APPLICATION

A PROJECT REPORT

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BONAFIDE CERTIFICATE

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Weather forecasting is one of the most scientifically and technologically challenging problems around the world in the last century. To make an accurate prediction is indeed, one of the major challenges that meteorologists are facing all over the world. To predict the conditions of the atmosphere for a given location, Weather Forecasting is used. Weather forecasting is made by collecting numerous data predicted by very proper understanding of the collected data. Weather simply refers to the condition of air on the earth at given place and time. It is a continuous, data-intensive, multidimensional, dynamic and chaotic process. These processes make weather forecasting a formidable challenge.

Forecasting is the process of estimation in unknown situations from the historical data. It is the application of science and technology. Weather forecast is more helpful for people as it predicts how the future weather is going to be and people may plan accordingly. Farmers will be most beneficial one's as they may know the rainfall prediction accordingly. The weather forecast can be done in many ways like using the previous data or analyzing the current clouds.

This proposed application concentrates on weather forecasting with an improved prediction and reliable accuracy. Traditional observations made at the surface of atmospheric pressure, temperature, wind speed, wind direction, humidity, precipitation is collected routinely from trained observers, automatic weather stations or buoys. During the data assimilation process, information gained from the observations is used in conjunction with a numerical model's most recent forecast for the time that observations were made to produce the meteorological analysis.

Numerical weather prediction models are computer simulations of the atmosphere. They take the analysis as the starting point and evolve the state of the atmosphere forward in time using understanding of physics and fluid dynamics. The complicated equations which govern how the state of a fluid changes with time require supercomputers to solve them. The output from the model provides the basis of the weather forecast.

Table of contents

Chapter-1

Introduction

Weather prediction is the application of technology to predict the action of the atmosphere for a given location. It is becoming increasingly vital for business, agriculturists, farmers, disaster management and related organizations to understand the natural phenomena. The art of weather prediction began with using the reoccurring astronomical and meteorological events to help them to monitor the seasonal changes in the weather. Throughout these centuries, this attempt is made to produce forecasts based on weather changes and personal observations. Weather prediction has been one of the most interesting domains.

1.1 Identification of relevant Contemporary issue

The surge in extreme weather events accentuates the urgent need for a robust weather forecast system. The consultancy problem emerges from the inadequacies in accurately predicting these events. The traditional weather forecasting models often struggle to capture the rapid shifts and complex dynamics of the changing climate, leading to less reliable predictions. This deficiency poses a critical challenge for communities, governments, and industries in preparing for and mitigating the impacts of such events.

Conducting a survey among various stakeholders—ranging from local communities to industries reliant on weather forecasts—would likely reveal the pressing need for a more precise and timely weather prediction system. Reports from these surveys would indicate the challenges faced due to unreliable forecasts, showcasing the real-world impacts of inadequate predictions on businesses, agriculture, disaster management, and public safety.

Several contemporary reports from agencies and organizations corroborate this pressing issue. For instance, the World Meteorological Organization (WMO) regularly releases reports highlighting the increasing risks posed by extreme weather events due to climate change. These reports emphasize the importance of enhancing weather forecasting capabilities to address the challenges posed by these events effectively.

1.2. Identification of Problem

Rapid changes in weather dynamics make it difficult for existing models to accurately predict future weather conditions.

Growing Socio-Economic Impact: The impact of inaccurate weather forecasts is severe, affecting a variety of sectors such as agriculture, transportation, disaster management, and public safety.

Limitations of current models: Existing predictive models have difficulty accounting for the complex interactions of climate factors.

Factors such as feedback loops, regional variations, and nonlinear interactions between different variables pose major challenges to accurate predictions Technology and resource limitations: Due to technological advances and limited resources, prediction accuracy improvement becomes even more difficult.

1.3 Identification of Tasks

Identifying the Solution:

Research and Analysis: This involves conducting comprehensive research to understand the problem deeply. It includes reviewing existing data, reports, and literature, as well as gathering insights from stakeholders.

Needs Assessment: Understanding the requirements and expectations of stakeholders and end-users. This involves conducting interviews, surveys, and consultations to gather perspectives and identify key needs.

Brainstorming and Idea Generation: Generating potential solutions or approaches based on the identified problem and stakeholder needs. This stage involves creativity and open discussion to explore diverse ideas.

Building the Solution:

Design and Planning: Creating a detailed plan or blueprint for the solution. This involves defining goals, outlining functionalities, creating design mock-ups, and determining the necessary resources.

Development or Implementation: Building the solution based on the design plan. This stage includes coding, engineering, constructing, or creating the solution according to the specified requirements.

Quality Assurance: Ensuring the solution meets quality standards. This involves testing for functionality, usability, reliability, and scalability. It may also involve iterations to refine the solution based on feedback.

Testing the Solution:

Testing Strategy Development: Creating a test plan outlining how the solution will be tested. This includes defining test cases, scenarios, and methodologies to ensure comprehensive coverage.

Execution of Tests: Performing various tests to validate the solution. This includes functional testing, user acceptance testing (UAT), performance testing, security testing, and regression testing to identify and address any issues.

Feedback and Iteration: Gathering feedback from stakeholders and users based on the tested solution. This feedback helps in refining and improving the solution through iterative processes.

Chapter-2
LITERATURE REVIEW

2.1. Timeline of the reported problem

Timeline outlining the evolution of the reported problem regarding the need for a robust weather forecast system:

18th-19th Century:

Initiation of rudimentary meteorological observations and recording of weather data.

20th Century:

Significant advancements in meteorology, aided by technological innovations like radar, satellites, and computers.

Growing recognition of the importance of accurate weather forecasts following major weather-related disasters.

Late 20th Century:

Increasing awareness of climate change and its influence on weather patterns.

Emergence of scientific consensus on human-induced climate impacts and the risk of extreme weather events.

Present Day:

Continued technological advancements improving forecasting capabilities.

Reports from organizations like the IPCC highlighting the escalating risks of extreme weather events due to climate change.

Instances of severe weather events causing significant socio-economic impacts, emphasizing the critical need for accurate forecasts.

Ongoing Efforts and Future Challenges:

Research and initiatives focusing on enhancing forecasting models using advanced technologies.

Persistent challenges in predicting long-term weather trends and capturing the complexities of changing climate patterns.

2.2. Proposed solutions

overview of earlier proposed solutions for weather forecasting:

Statistical Methods:

Early approaches relied on statistical methods, analyzing historical weather data to predict future patterns based on past occurrences.

Numerical Weather Prediction (NWP):

Development of Numerical Weather Prediction models in the mid-20th century, utilizing mathematical equations to simulate atmospheric conditions.

Satellite and Radar Technology:

Utilization of satellite imagery and radar technology to gather real-time data on weather patterns, enhancing forecasting accuracy.

Supercomputing Power:

Advancements in computing power allowed for more complex simulations and quicker analysis of large datasets, improving forecast models' precision.

Ensemble Forecasting:

Introduction of ensemble forecasting, which uses multiple variations of a forecast model to account for uncertainties, providing a range of potential outcomes.

Data Assimilation Techniques:

Integration of data assimilation methods, incorporating observational data into models in real-time to enhance accuracy.

Global and Regional Models:

Development of both global and regional models to predict weather patterns on broader and more localized scales, respectively.

Advancements in Technology (AI/ML):

Recent integration of Artificial Intelligence (AI) and Machine Learning (ML) algorithms to improve forecasting accuracy by identifying patterns in vast datasets.

2.3. Bibliometric analysis

A bibliometric analysis of weather forecasting applications involves examining the key features, effectiveness, and drawbacks of these applications as highlighted in academic literature, research papers, and publications. Here's an analysis based on these aspects:

Key Features:

Data Integration: Effective weather forecasting applications integrate various data sources such as satellite imagery, radar data, atmospheric models, and ground-based observations to create comprehensive forecasts.

Numerical Models: These applications often rely on complex numerical models, such as Numerical Weather Prediction (NWP), to simulate atmospheric conditions and predict future weather patterns.

Visualization Tools: User-friendly visualization tools are crucial, offering graphical representations of forecasts to facilitate easy interpretation for meteorologists, researchers, and the general public.

Real-time Updates: Applications providing real-time updates and timely forecasts are highly valued, allowing for quick adaptation to changing weather conditions.

Ensemble Forecasting: Utilization of ensemble forecasting techniques helps in generating multiple forecasts, considering different model variations and uncertainties, enhancing the reliability of predictions.

Effectiveness:

Improved Accuracy: Advancements in modelling techniques and data assimilation have led to increased accuracy in short to medium-range weather forecasts.

Early Warning Systems: Effective weather forecasting applications contribute to the development of early warning systems for extreme weather events, aiding in disaster preparedness and risk mitigation.

Sector-specific Applications: Tailored applications for specific sectors like agriculture, aviation, and maritime industries provide customized forecasts catering to their unique needs, enhancing operational efficiency.

Research Advancements: These applications have facilitated advancements in meteorological research, enabling better understanding and prediction of weather phenomena.

Drawbacks:

Long-term Predictions: Challenges persist in accurately predicting long-term weather trends due to the inherent complexity of climate systems and uncertainties in global climate models.

Data Quality and Assimilation: Ensuring the quality and assimilation of diverse datasets into forecasting models remains a challenge, impacting the accuracy of predictions.

Limited Regional Precision: Some applications struggle with providing precise forecasts at a local or regional level, especially in areas with complex terrain or microclimates.

Resource Intensiveness: High computational resources required for running complex models might limit accessibility, especially in developing regions with limited technological infrastructure.

This bibliometric analysis underscores the evolution and effectiveness of weather forecasting applications, highlighting their key features, advancements, effectiveness in accuracy, while acknowledging persistent challenges and limitations in regional precision, long-term predictions, and data assimilation.

2.4. Review Summary

Let's connect the findings from the literature review on weather forecasting applications with the specifics of our project:

Utilization of Advanced Models:

The literature highlights the effectiveness of sophisticated numerical models and ensemble forecasting techniques in improving forecast accuracy. Our project aims to integrate these advanced models to enhance the precision of weather predictions, aligning with the proven methodologies outlined in the literature.

Emphasis on Data Quality and Assimilation:

The review underscores the significance of high-quality data and effective assimilation methods for accurate forecasting. Our project prioritizes data quality checks and robust assimilation techniques to ensure reliable inputs for the forecasting models, aligning with the literature's emphasis on this critical aspect.

Real-time Updates and Accessibility:

The importance of providing real-time updates for timely decision-making aligns with our project's goal of delivering forecasts accessible to both meteorologists and the general public. Incorporating this aspect ensures that our system meets the need for quick adaptation to changing weather conditions.

Addressing Regional Precision Challenges:

Acknowledging the limitations in regional precision highlighted in the literature, our project focuses on strategies to improve local-level predictions, considering the diverse geographic features that influence weather patterns. This aligns with the literature's recognition of challenges in forecasting accuracy in varied terrains.

Optimizing Resources and Scalability:

The literature emphasizes the computational intensity of advanced forecasting models. Our project is mindful of resource optimization, aiming to design scalable solutions that balance computational efficiency while ensuring wider accessibility of the forecasting system, echoing the concerns outlined in the literature.

Tailored Forecasts for Specific Sectors:

The literature emphasizes sector-specific applications as valuable. Our project plans to offer tailored forecasts for diverse sectors like agriculture, transportation, and disaster management, aligning with the need to cater to their unique requirements, as highlighted in the literature.

By aligning our project objectives and methodologies with the insights gleaned from the literature review, we aim to leverage proven strategies and address acknowledged challenges in weather forecasting. Incorporating these findings enhances the credibility, effectiveness, and usability of our forecasting system, aligning it with best practices and advancements identified in the literature.

2.5. Problem Definition

The problem at hand revolves around improving the accuracy and usability of a weather forecasting system to better predict and communicate weather patterns. Here's a breakdown of what is to be done, how it is to be done, and what not to be done:

What is to be done:

1. **Enhance Forecasting Accuracy:**
    - Implement advanced numerical models and ensemble forecasting techniques to improve the precision of weather predictions.
    - Incorporate data quality checks and effective assimilation methods to ensure reliable inputs for the forecasting models.
2. **Real-time Updates and Accessibility:**
    - Develop a user-friendly interface for the system, providing real-time updates accessible to meteorologists and the general public.
    - Prioritize timely dissemination of forecasts to facilitate quick adaptation to changing weather conditions.
3. **Address Regional Precision Challenges:**
    - Focus on strategies to improve local-level predictions, considering diverse geographic features influencing weather patterns.
    - Explore methods to mitigate limitations in forecasting accuracy in varied terrains or microclimates.
4. **Optimize Resources and Scalability:**
    - Design scalable solutions that balance computational efficiency while ensuring wider accessibility of the forecasting system.
    - Focus on resource optimization without compromising the accuracy and reliability of forecasts.
5. **Tailored Forecasts for Specific Sectors:**
    - Develop tailored forecasts catering to the unique requirements of various sectors such as agriculture, transportation, and disaster management.

How it is to be done:

1. **Utilization of Advanced Models:**
    - Engage in integrating sophisticated numerical models and ensemble forecasting techniques, guided by established best practices and advancements in the field.

2. **Data Quality Assurance:**
    - Implement robust data quality checks and assimilation methods, ensuring the reliability of inputs and adhering to established standards.
3. **User-Centric Design:**
    - Employ a user-centered design approach to create an intuitive and accessible interface for meteorologists and end-users.
4. **Collaborative Research and Development:**
    - Engage in collaboration with experts in meteorology, leveraging ongoing research and developments in weather forecasting.

What not to be done:

1. **Compromising Data Integrity:**
    - Avoid sacrificing data quality for speed or computational efficiency, ensuring the integrity of inputs into the forecasting models.
2. **Overlooking User Needs:**
    - Refrain from neglecting user requirements and preferences, prioritizing usability and accessibility in the system design.
3. **Relying Solely on Single Model:**
    - Avoid over-reliance on a single forecasting model, instead opting for ensemble forecasting to account for uncertainties.
4. **Disregarding Regional Variances:**
    - Avoid generalizing forecasts without considering regional variations or complexities in terrain that impact weather patterns.

By adhering to these strategies and avoiding potential pitfalls, the project aims to enhance the accuracy, accessibility, and sector-specific utility of the weather forecasting system, contributing to improved decision-making and preparedness in diverse sectors affected by weather conditions.

2.6. Goals/Objectives

People can get accurate weather information is the main aim of this application. The important issue faced in our country is climatic changes and that can be resolved by our application "WEATHER FORECASTING SYSTEM". The goal of weather prediction is to provide information. People and organizations can use to reduce weather related loses and enhanced societal benefits, including protection of life and property, public health and support of economic prosperity and quality of life.

Weather forecasts are made by collecting as much data as possible about the current state of the atmosphere (particularly the temperature, humidity and wind) and using understanding of atmospheric processes (through meteorology) to determine how the atmosphere evolves in the future. However, the chaotic nature of the atmosphere and incomplete understanding of the processes mean that forecasts become less accurate as the range of the forecast increases. To develop software for forecasting the weather involving wind speed, cloud cover, rain or snow in order to nurture the needs of people all around the globe. To develop a weather forecasting application on which people can completely rely for their weather updates. The scope for weather forecasting system will keep on increasing as the technology progresses.

Chapter-3

DESIGN FLOW/PROCESS

3.1. Evaluation & Selection of Specifications/Features

Let's critically evaluate the features identified in the literature and compile an ideal list of features required in the weather forecasting solution:

Features Identified in Literature:

1. **Integration of Advanced Models:** The literature emphasizes using sophisticated numerical models and ensemble forecasting for accuracy.
2. **Data Quality and Assimilation:** Highlighted as crucial, ensuring high-quality data and effective assimilation methods.
3. **Real-time Updates and Accessibility:** Emphasized for timely decision-making and user accessibility.
4. **Addressing Regional Precision Challenges:** Acknowledges challenges in local-level predictions due to diverse terrain.
5. **Resource Optimization:** Balancing computational efficiency without compromising accuracy.
6. **Tailored Forecasts for Sectors:** Recognizes the value of customized forecasts for specific industries.

Ideal List of Required Features:

1. **Integration of Cutting-edge Models:** Implementation of state-of-the-art numerical models and ensemble techniques for accurate predictions.
2. **Robust Data Quality Assurance:** Rigorous checks ensuring high-quality inputs and effective data assimilation methods.
3. **Real-time Updates and User Accessibility:** Timely dissemination of forecasts through an intuitive, user-friendly interface accessible to both experts and the public.
4. **Improved Regional Precision:** Strategies to enhance local-level predictions, accounting for diverse geographic features influencing weather patterns.
5. **Optimized Resource Utilization:** Designing a scalable system that balances computational efficiency with forecasting accuracy for wider accessibility.

6. **Sector-specific Customization:** Tailoring forecasts to meet the unique needs of various sectors like agriculture, aviation, disaster management, etc.

3.2. Design Constraints

considering various aspects in the design of a weather forecasting system involves addressing several critical domains:

Regulations:

- **Data Privacy Laws:** Compliance with regulations ensuring the protection of personal and sensitive data used in the forecasting system.
- **Industry Standards:** Adherence to meteorological industry standards and protocols for data collection, assimilation, and dissemination.

Economic:

- **Cost-effectiveness:** Developing a system that balances effectiveness with affordability to ensure wider accessibility.
- **Resource Allocation:** Efficient use of resources to minimize operational costs and maximize output.

Manufacturability:

- **Scalability and Production:** Designing the system in a way that facilitates ease of manufacturing and scalability without compromising quality.

Safety:

- **Data Security:** Implementing robust security measures to safeguard sensitive data from breaches and cyber threats.
- **Accuracy and Reliability:** Ensuring forecasts are reliable and accurate to prevent potential risks

3.3. Design selection

Strengths:

1. **Accessibility and User Interaction:**
    - Provides an intuitive, user-friendly interface accessible to a broad audience.
    - Allows for interactive visualization of forecasts, enhancing user experience.
2. **Real-time Updates and Accessibility:**
    - Capable of integrating real-time API calls to fetch and display the latest forecasts.
    - Enables users to access forecasts conveniently from various devices.

3. **Scalability and Adaptability:**
    - Offers flexibility for future updates, enhancements, and integration of new APIs or features.
    - Allows for quick iterations and updates without significant system overhauls.
4. **Ease of Deployment and Maintenance:**
    - Simple deployment process and easier maintenance compared to complex models or algorithms.
    - Reduces overhead costs associated with complex infrastructure and computational requirements.

Comparisons and Reasons for Selection:

- **Adaptability and User Accessibility:** A website utilizing HTML, CSS, JS, and API calling offers real-time accessibility and user interaction, crucial for disseminating weather forecasts efficiently.
- **Scalability and Maintenance:** It allows for scalability without compromising on maintenance efforts or costs, unlike the complexities associated with sophisticated model integrations.
- **Ease of User Engagement:** The simplicity and user-friendly nature of a website interface facilitate better user engagement, which is essential for a wide user base including meteorologists and the general public.

Given these factors, a website using HTML, CSS, JS, and API calling emerges as the best design approach for weather forecasting. Its emphasis on user accessibility, real-time updates, scalability, and ease of maintenance aligns well with the need for effective and user-centric forecasting systems.

3.4 Implementation plan/methodology

1. Project Objective:

Purpose: The weather forecast application aims to provide users with accurate and timely weather information based on their location or specified location search.

Target Audience: General users, travellers, event planners, or any individual requiring weather updates for planning purposes.

2. Technology Stack:

Frontend Technologies Used:

HTML: Structure and markup of the application's content.

CSS: Styling and layout design to enhance the user interface.

JavaScript: Interactivity and handling dynamic content.

API Integration:

Explain the choice of weather API (e.g., OpenWeatherMap.) for retrieving weather data.

3. Project Scope:

Key Features:

Display current weather conditions.

Allow users to search for weather in specific locations.

Limitations/Constraints:

Address any limitations in the API access, data accuracy, or feature scope due to time or resource constraints.

4. Development Process:

Requirements Gathering:

Discuss methods used to understand user needs (e.g., surveys, user interviews) and translate them into functional requirements.

Design Phase:

Showcase wireframes, mockups, or design diagrams illustrating the app's layout and user interface elements.

5. Challenges Faced:

Technical Hurdles: Discuss any technical challenges encountered, such as API limitations, data formatting issues, or cross-browser compatibility problems.

Resolution: Explain the strategies or solutions used to overcome these challenges, including any workarounds or alternative approaches.

6. Lessons Learned:

Development Experience: Reflect on the learning curve experienced during the project.

Improvement Areas: Discuss areas where the development process could have been more efficient or effective.

Best Practices: Share any coding practices or development strategies that proved particularly useful.

7. Future Enhancements:

Feature Additions:

Propose additional features (e.g., weather alerts, customization options) for the application.

Scalability Considerations:

Discuss strategies for scaling the application, especially if there is an increase in user base or additional functionalities.

Chapter-4
RESULTS ANALYSIS AND VALIDATION

4.1. Implementation of solution

System Requirements:

Hardware Requirements

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware. The minimum hardware requirements are as follows,

- Hard disk: 40 GB and Above
- RAM: 512 MB and Above
- Processor: Intel I3 and Above

4.2 Software requirements

Software requirements deals with defining resource requirements and prerequisites that needs to be installed on a computer to provide functioning of an application. The minimal software requirements are as follows

1. Visual Studio Code

2. Windows / Mac

Language Used:

1.HTML

2.CSS

3.JAVASCRIPT

4.BOOTSTRAP

5.API

Visual Studio Code

Visual studio code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++. It is based on the Electron

framework, which is used to develop Node.js Web application that run on the Blink layout engine. Visual studio code employs the same editor component used in Azure DevOps. Instead of a project system, it allows users to open one or more directories, which can be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language. It supports a number of programming language and a set off features that differs per language. Unwanted files and folders can be excluded from the project tree via the settings. Many visual studio code features are not exposed through menus or the user interface but can be accessed via the command palette.

HTML

The Hyper Text Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

Web browser receives HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and original included cues for the appearance of the documents. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as heading, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags written using angle brackets. Tags such as specified., and directly introduce content into the page.

CSS

Cascading style sheets (CSS) is a fundamental technology in web development used to control the presentation and layout of web pages. It allows web designers and developers to define how elements within a web page should look, including aspects like fonts, colors, spacing, and positioning. This capability is essential for creating visually appealing and consistent web interfaces. One of the key principles of CSS is the separation of concerns, which means isolating the content (html) from the presentation (CSS). This separation simplifies the process of maintaining and updating a website because changes to the design can be made in the CSS file without altering the underlying html structure, promoting cleaner and more organized code.

Java Script

JavaScript is a light-weight object-oriented programming language which is used for several website for scripting the webpages. It is an interpreted full-fledged programming language that enables dynamic interactivity on website when applied to an HTML document. It was introduced in the year 1995 for adding programs to the webpage in the Netscape Navigator browser. Since then, it has been adopted by all other graphical web browsers. With JavaScript, users can build modern web applications to interact directly without reloading the page every time. The traditional website uses js to provide serval forms of interactivity and simplicity. Although, JavaScript has no connectivity with Java programming language. the name was suggested and provided in the times when Java was gaining popularity in the market. In addition to web browsers, databases such as CouchDB and MongoDB uses JavaScript as their scripting and query language.

API

Application programming interfaces (Apis) are essential components of modern software development that enable interaction and data exchange between different applications or software systems. Apis act as intermediaries, allowing one piece of software to request and receive information or services from another piece of software, thereby improving functionality and integration. Apis define a set of rules, protocols, and tools that determine how software components will interact. They specify the methods, data formats, and endpoints that developers can use to make requests and retrieve responses. This standardized approach simplifies the process of connecting disparate systems, which is vital in our increasingly connected digital world.

Chapter-5
CONCLUSION AND FUTURE WORK

5.1. Conclusion

In the era of the global warming, research in weather measurement, monitoring and forecasting are become more and more relevant. This research demonstrates the design and implementation of an affordable mini weather monitoring system that ensures flexibility, portability, stability and user-friendly operations which can provide data of some weather variables including temperature, humidity and pressure. With the advancement of technology weather forecasting has developed to its level best, but there is yet to develop, as far as a nature is so unpredictable. Weather forecasts are increasingly accurate and useful, and their benefits extend widely across the economy. While much has been accomplished in improving weather forecasts, there remains much room for improvement. Simultaneously, they are developing new technologies and observational networks that can enhance forecaster skill and the value of their services to their users.

5.2 Future work

The website we created in this project can be further developed into a mobile application so that it can give timely weather updates. These updates will be received in the form of notification in the user's mobile based on the location they are present in. So, the users don't even have to get into that particular application to know the weather and it saves their valuable time.

Chapter-6

REFERENCES

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2 https://www.thecodehelp.in/

3. FOR API: after creating account Log-In here to get the API

   https://home.openweathermap.org/users/sign_in

4. For images

   https://unsplash.com/s/photos/weather

5.For API calling:

   https://openweathermap.org/api

6.For JavaScript

https://developer.mozilla.org/en-US/docs/Web/javascript

7.https://fontawesome.com/start

APPENDIX

Github link:

https://github.com/Ramjidixit/Mini_Project

1.HTML Source code

https://github.com/Ramjidixit/Mini_Project/blob/main/index.html

2. CSS Source code

https://github.com/Ramjidixit/Mini_Project/blob/main/style.css

3. JAVASCRIPT Source code

https://github.com/Ramjidixit/Mini_Project/blob/main/app.js

4.Deployment Link

https://nimble-kitten-264259.netlify.app/