WEATHER WEB APPLICATION

PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report "**WEATHER WEB APPLICATION** " is bonafide work of **UJJWAL RAJ 511991821014, SANJIV KUMAR 511991821012, ANUDEEP KUMAR 511991821002** who carried out the project work under my supervision.

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Submitted for the **PROJECT REPORT & VIVA-VOICE** held at **GEMS POLYTECHNIC COLLEGE**, Aurangabad on …….

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We undersigned **UJJWAL RAJ 511991821014, SANJIV KUMAR 511991821012, ANUDEEP KUMAR 511991821002** the student of **GEMS Polytechnic College** hereby declared that this project is of our own work and has been carried out under the supervision of our guide **Mr. Ragland Royal .**

DATE **SIGNATURE**

1.

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3.

ACKNOWLEDGEMENT

The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely privileged to have got this all along the completion of my project. All that I have done is only due to such supervision and assistance and I would not forget to thank them.

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Abstract

The Weather Web Application project aims to create a user-friendly and visually appealing web application that provides real-time weather information based on the user's location or a specified city. The application utilizes open weather APIs to fetch current weather data and forecast information, presenting it in a clear and concise manner

1. Introduction:

The increasing need for up-to-date weather information has led to the development of this Weather Web Application. The application offers a seamless user experience with an intuitive interface, allowing users to quickly access weather details for any location globally.

2. Objectives:

- Develop a responsive and visually appealing web interface for displaying weather information.

- Integrate open weather APIs to retrieve real-time weather data.

- Provide a user-friendly experience for both desktop and mobile users.

- Display current weather conditions, temperature, humidity, wind speed, and other relevant information.

- Include a forecast feature to show upcoming weather conditions.

3. Technologies Used:

- HTML5: For structuring the web page.

- CSS3: For styling and layout design.

- JavaScript: For implementing dynamic features and handling API requests.

- Open Weather API: To fetch weather data.

4. System Architecture:

The application follows a client-server architecture, where the client (web browser) interacts with the server (open weather API) to retrieve weather data. The client-side is built using HTML, CSS, and JavaScript, providing an interactive interface for users.

5. Features:

Location-based Weather: The application detects the user's location or allows manual city input to provide accurate weather information.

Real-time Updates: Utilizing open weather APIs, the application fetches and displays real-time weather data.

Responsive Design:Ensures a seamless user experience across various devices and screen sizes.

6. Implementation:

***HTML** is used for creating the structure of the web page, including input forms and information display areas.*

***CSS** is employed to style the page, ensuring a visually appealing and user-friendly layout.*

***JavaScript** is used for dynamic content updates, user interaction, and handling API requests.*

7. Challenges Faced:

- Handling asynchronous API requests and ensuring timely updates.

- Cross-browser compatibility to ensure the application works well across different browsers.

8. Future Enhancements:

- Integration with additional weather APIs for more comprehensive data.

- Implementing user preferences and customization options.

- Adding geolocation features for automatic user location detection.

9. Conclusion:

The Weather Web Application project successfully delivers a responsive and feature-rich platform for users to access real-time weather information effortlessly. The combination of HTML, CSS, and JavaScript, along with the use of open weather APIs, ensures a reliable and accurate representation of weather conditions.

11. References:

- Open Weather API Documentation

- MDN Web Docs for HTML, CSS, and JavaScript

This Weather Web Application serves as a valuable tool for individuals seeking reliable and timely weather updates in a visually pleasing manner.

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LIST OF ABBREVATIONS

ABBREVATION	EXPANSION
HTML	Hyper Text Mark Up Language
CSS	Cascading Style Sheet
API	Application Program Interface
ECMA	European Computer Manufacturers Association

CHAPTER 1

INTRODUCTION

Hypertext Markup Language (**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 browsers receive 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 originally included cues for the appearance of the document.

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 headings, paragraphs, lists,links, quotes and other items. HTML elements are delimited by *tags*, written using angle brackets. Tags such as <**img** /> and <**input** /> directly introduce content into the page. Other tags such as <**p**> surround and provide information about document text and may include other tags as sub-elements. Browsers do not display the HTML tags, but use them to interpret the content of the page.

HTML can embed programs written in a scripting language such as JavaScript, which affects the behavior and content of web pages. Inclusion of CSS defines the look and layout of content. The World Wide Web Consortium (W3C), former maintainer of the HTML and current maintainer of the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997.

API

In computer programming, an **application programming interface** (**API**) is a set of subroutine definitions, communication protocols, and tools for building software. In general terms, it is a set of clearly defined methods of communication

among various components. A good API makes it easier to develop a computer program by providing all the building blocks, which are then put together by the programmer.

An API may be for a web-based system, operating system, database system, computer hardware, or software library.

An API specification can take many forms, but often includes specifications for routines, data structures, object classes,variables , or remote calls . POSIX, Windows API and ASPI are examples of different forms of APIs. Documentation for the API usually is provided to facilitate usage and implementation.

OUTLINE OF THE PROJECT

Throughout the human history, people were keen to know about the weather, its parameters and its impacts on their daily lives. By the virtue the technological advancement, in this era, the information about the weather lies in our hands (through mobile phones or websites). We can now make ourselves aware of not only our location's temperature, humidity etc. but also any part of the world. In this project, we will learn how to make a weather application using pure JavaScript. We will also be familiarizing ourselves with the JSON extraction during this process using open weather API.

As a web developer, grabbing data from API's is something you are going to do often. Fetching weather data is a perfect way to get your feet wet. In this project we are going to use the browsers built in fetch with JavaScript to grab data from Open Weather Map's API.

LITERATURE REVIEW

JavaScript (/ˈdʒɑːvəˌskrɪpt/),often abbreviated as **JS**, is a high-level, interpreted scripting language that conforms to the ECMA Script specification. JavaScript has curly-bracket syntax, dynamic typing, prototype-based object- orientation, and first-class functions.

Alongside HTML and CSS, JavaScript is one of the core technologies of the World Wide Web.JavaScript enables interactive web pages and is an essential part of web applications. The vast majority of websites use it, and major web browsers have a dedicated JavaScript engine to execute it.

As a multi-paradigm language, JavaScript supports event-driven, functional, and imperative (including object-oriented and prototype- based) programming styles. It has APIs for working with text, arrays, dates, regular expressions, and the DOM, but the language itself does not include any I/O, such as networking, storage, or graphics facilities. It relies upon the host environment in which it is embedded to provide these features.

Initially only implemented client-side in web browsers, JavaScript engines are now embedded in many other types of host software, including server-side in web servers and databases, and in non-web programs such as word processors and PDF software, and in runtime environments that make JavaScript available for writing mobile and desktop applications, including desktop widgets.

PROBLEM STATEMENT:

To make a web page using HTML, CSS& JAVA SCRIPT and connect the web page application to a API from open weather API and display the data.

OBJECTIVES

We need to first make the outline of the project using HTML and CSS to create the front end of the web page .

CHAPTER 2

AIM & SCOPE OF WEB DEVELOPMENT

REQUIREMENTS:

HARDWARE REQUIREMENTS:

1. Any processor with minimum GPU memory

SOFTWARE REQUIREMENTS:

1. BRAKETTS EDITOR
2. OPEN WEATHER API

1. ROLE OF BRAKETTS

Brackets is a source code editor with a primary focus on web development. Created by Adobe Systems, it is free and open-source software licensed under the MIT License, and is currently maintained on GitHub by Adobe and other open- source developers. It is written in JavaScript, HTML and CSS. Brackets is cross- platform, available for macOS, Windows, and most Linux distributions. The main purpose of brackets is its live HTML, CSS and JavaScript editing functionality.

On November 4, 2014, Adobe announced the first (1.0) release of Brackets. The update introduced new features such as custom shortcut key combinations and more accurate JavaScript hinting. Brackets has a major focus on development in JavaScript, CSS and HTML. With release of version 1.0, Adobe announced a feature that extracts design information from a PSD file for convenience of coding in CSS. As of June 28, 2016, the feature is officially discontinued, due to low usage. However, Extract is still available via Photoshop and Dreamweaver, both of which are part of their paid service, Adobe Creative Cloud. The latest version release of Brackets is 1.14.

LANGUAGES USED

- **HTML**
- **CSS**
- **JAVA SCRIPT**

HTML

Hypertext Markup Language (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 browsers receive 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 originally included cues for the appearance of the document.

CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate .CSS file, and reduce complexity and repetition in the structural content.

JAVA SCRIPT

JavaScript often abbreviated as **JS**, is a high-level, interpreted scripting language that conforms to the ECMA Script specification. JavaScript has curly-bracket syntax, dynamic typing, prototype-based object- orientation, and first-class functions. Alongside HTML and CSS, JavaScript is one of the core technologies of the World Wide Web. JavaScript enables interactive web pages and is an essential part of web

applications. The vast majority of websites use it, and major web browsers have a dedicated JavaScript engine to execute it.

2. OPEN WEATHER API

Open Weather Map is an online service that provides weather data, including current weather data, forecasts, and historical data to the developers of web services and mobile applications. For data sources, it utilizes meteorological broadcast services, raw data from airport weather stations, raw data from radar stations, and raw data from other official weather stations. All data is processed by Open Weather Map in a way that it attempts to provide accurate online weather forecast data and weather maps, such as those for clouds or precipitation. Beyond that, the service is focused on the social aspect by involving weather station owners in connecting to the service and thereby increasing weather data accuracy. The ideology is inspired by Open Street Map and Wikipedia that make information free and available for everybody. It uses Open Street Map for display of weather maps.

Open Weather Map provides an API with JSON, XML and HTML endpoints and a limited free usage tier. Making more than 60 calls per minute requires a paid subscription starting at USD 40 per month.
Access to historical data requires a subscription starting at US$150 per month.

Users can request current weather information, extended forecasts and graphical maps (showing cloud cover, wind speed, pressure and precipitation).

Current weather data

Current data is refreshed every ten minutes; it can be searched by city or by geographic coordinates on Earth.

Forecasts

Weather forecasts can be searched by city or by coordinates. Three- hourly forecasts are available for up to 5 days, while daily forecasts are available for up to 16 days.

Searching

The Open Weather Map geocoding system allows users to select cities by name, country, zip-code or geographic coordinates. It is possible to search by part of city name. To make searching result more accurate city name and country should be divided by comma.

Maps

Open Weather Map service provides lots of weather maps including Precipitation, Clouds, Pressure, Temperature, Wind and many others. Maps can be connected to mobile applications and web sites. Weather maps can be connected as layers to the wide range of maps including Direct tiles, WMS, Open Layers, Leaflet, Google maps, and Yandex maps.

CHAPTER 3

METHODS& MATERIAL USED

MATERIAL USED:

- Bracketts editor
- API key
- Google Chrome

DESIGNING OF TEXT EDITOR:

The project will stick to the basic functionalities expected of a simple text editor – which includes the ability to – write something on the notepad, save it and open and modify it whenever required. For the purpose of this tutorial we will design the braketts editor with html and css code to create the front end part of the web page.

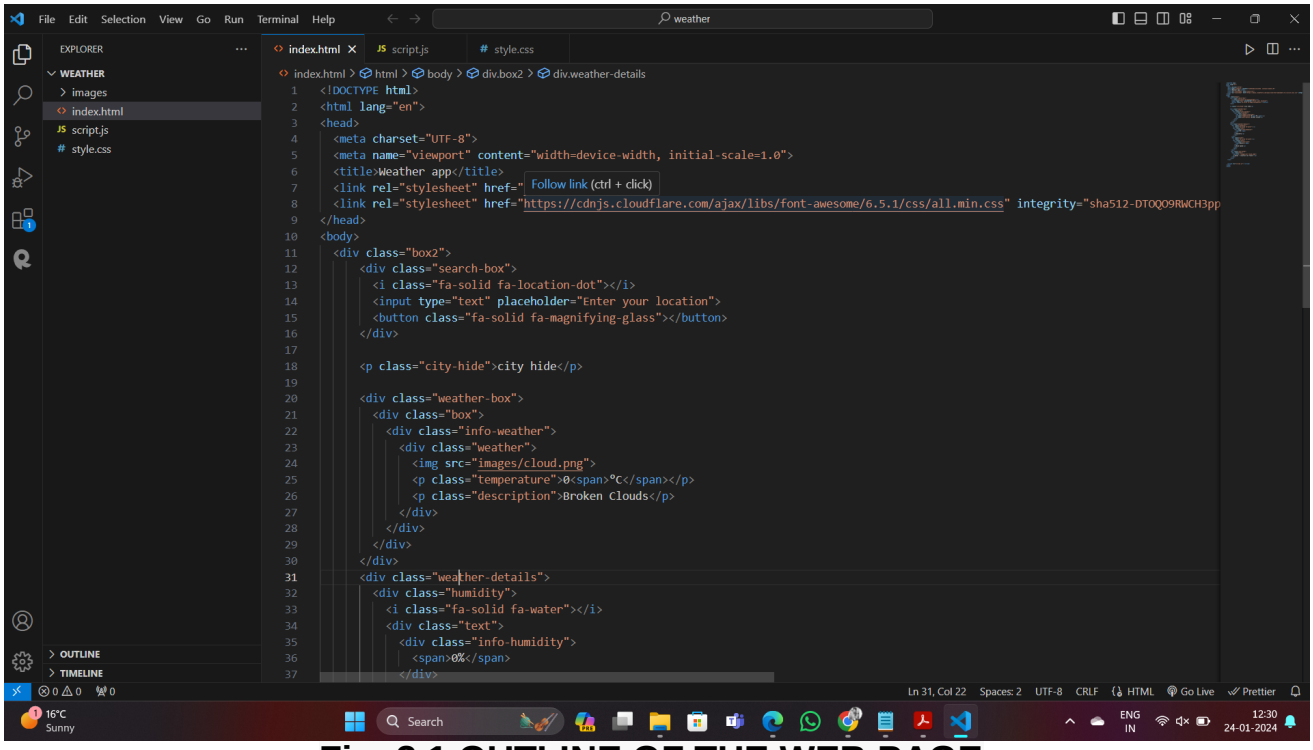

Fig. 3.1 OUTLINE OF THE WEB PAGE

At this point we've already looked at CSS fundamentals, how to style text, and how to style and manipulate the boxes that your content sits inside. Now it's time to look at how to place your boxes in the right place in relation to the viewport, and one another. We have covered the necessary prerequisites so you can now dive deep into CSS layout, looking at different display settings, traditional layout methods involving float and positioning, and new fangled layout tools like flexbox.

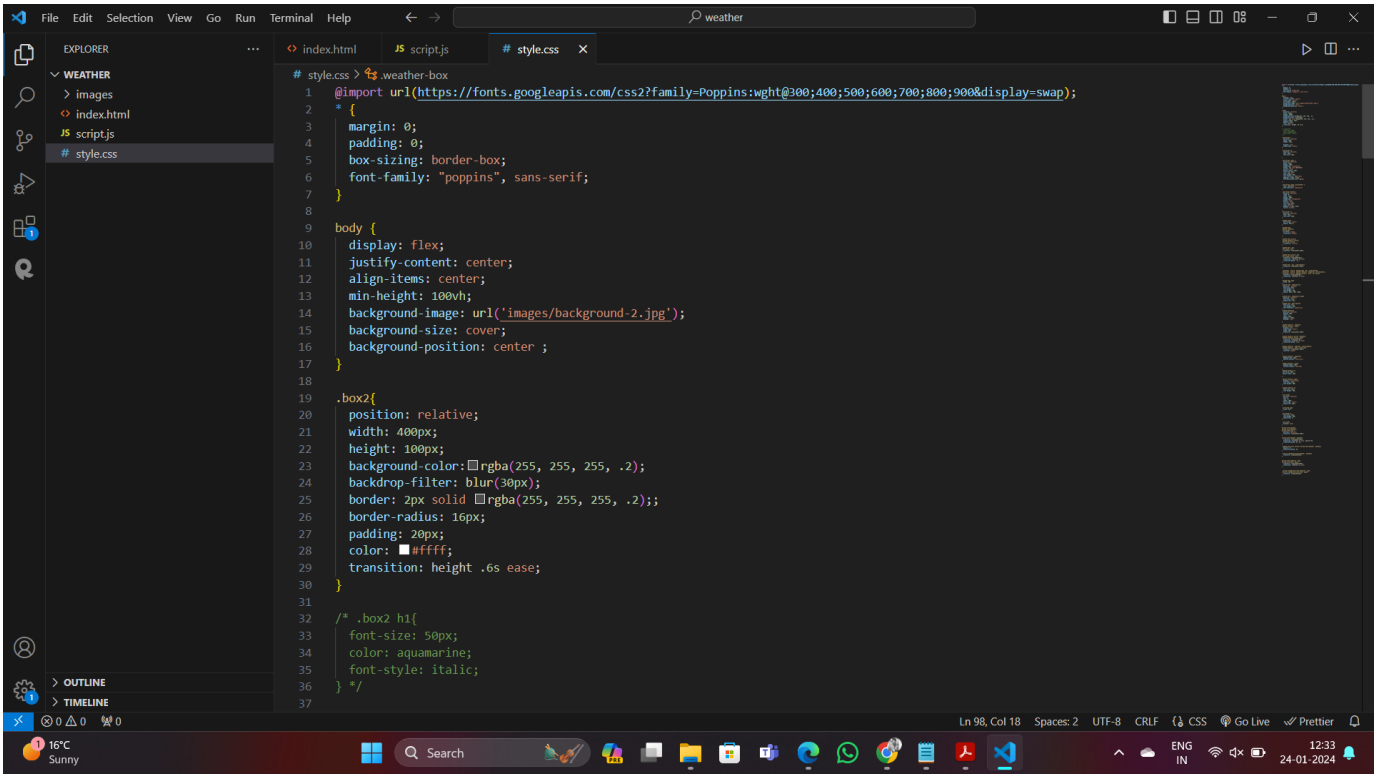

FIG.3.2 STYLING OF THE WEB PAGE

This module looks at styling boxes, one of the fundamental steps towards laying out a web page. In this module we recap the box model, then look at controlling box layouts by setting margins, borders, and padding, custom background colors, images and other features, and fancy features such as drop shadows and filters on boxes.

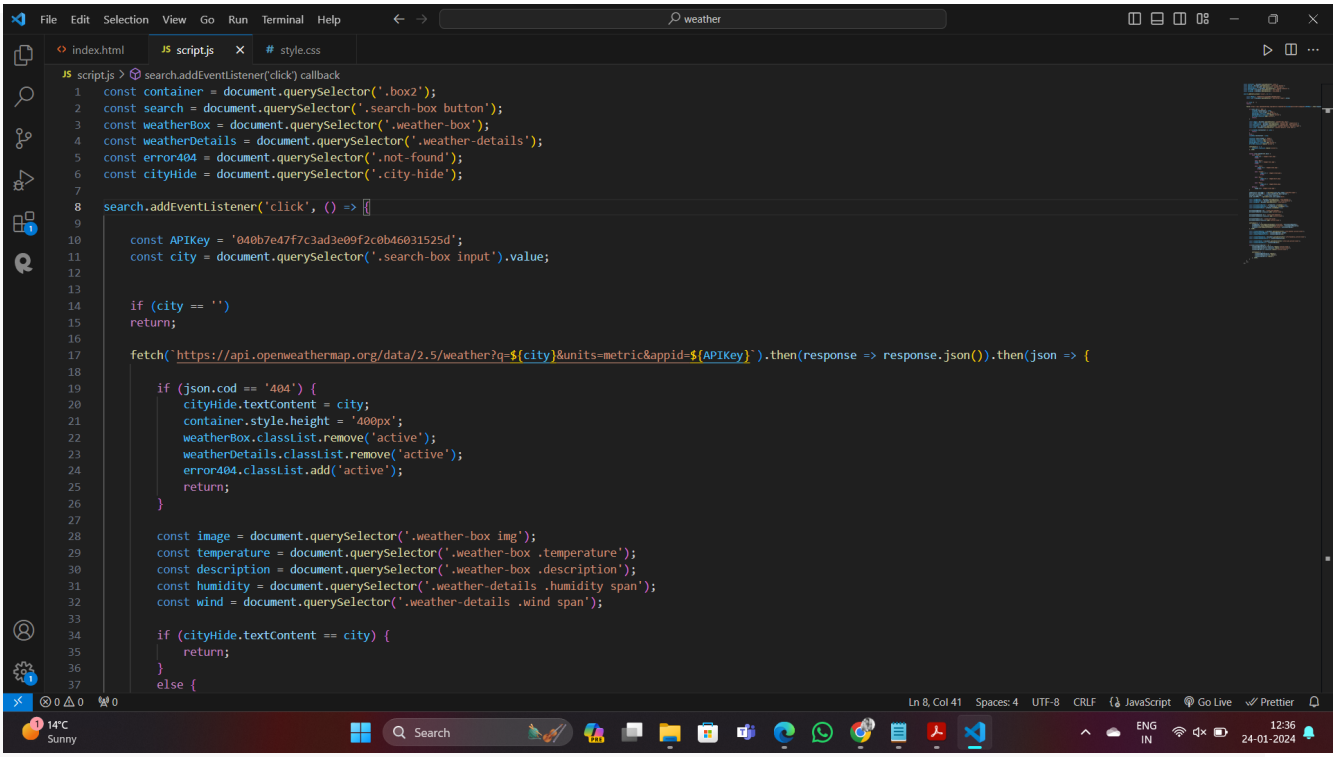

FIG.3.3 API CONNECTION THROUGH JAVA SCRIPT

API keys aren't as secure as authentication tokens but they identify the application or project that's calling an API. They are generated on the project making the call, and you can restrict their use to an environment such as an IP address range, or an Android or iOS app.

By identifying the calling project, you can use API keys to associate usage information with that project. API keys allow the Extensible Service Proxy (ESP) to reject calls from projects that haven't been granted access or enabled in the API.

1. **Weather data is open:** current weather, forecasts, maps with precipitations, wind, clouds, data from weather stations are available through APIs, maps and other products.
2. **Coverage is global:** weather data is available for any geographic location.
3. **Weather model:** own model of weather forecast calculation, WRF model for regions + global models.
4. **Advanced technologies for a competitive price:** due to Big Data technology costs of production and support are cheap, a price for a user is affordable.

CONNECTION OF API:

Since we use open weather API ,we need to sign up on open weather map website ie, www.openweathermap.org/api

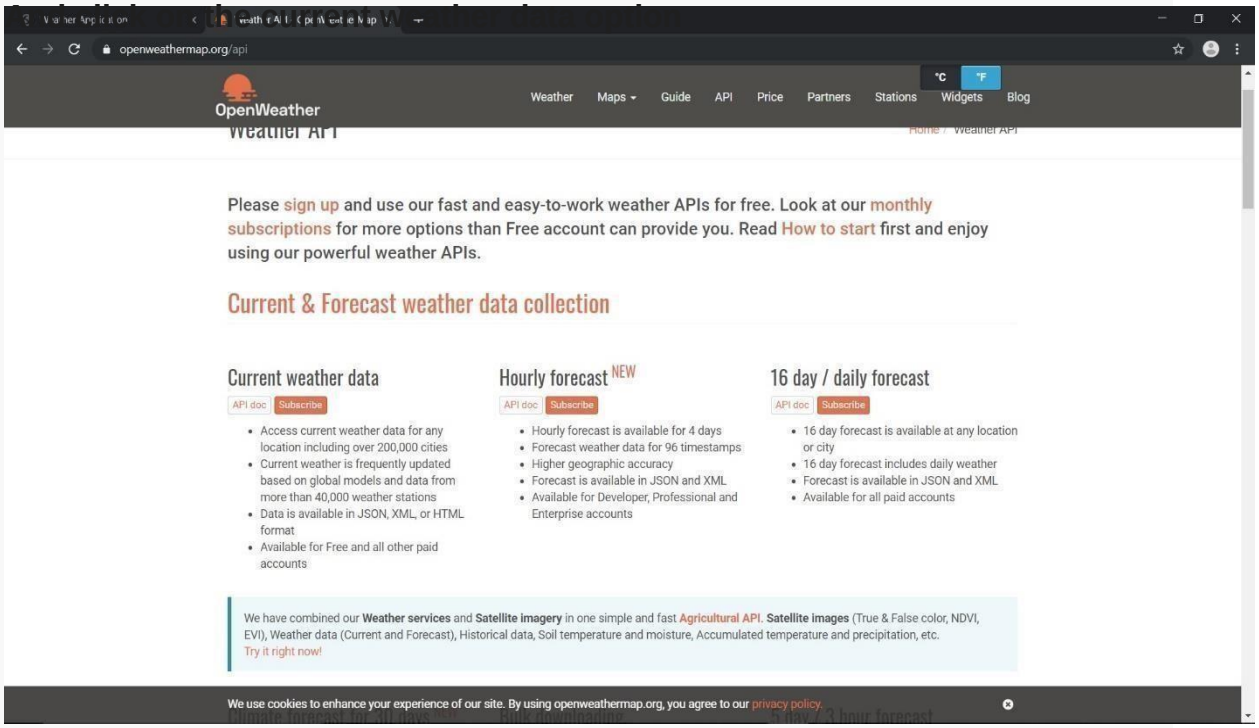

Fig3.4 OPEN WEATHER API WEBSITE

After opening the website enter your sign up details to log in**.**

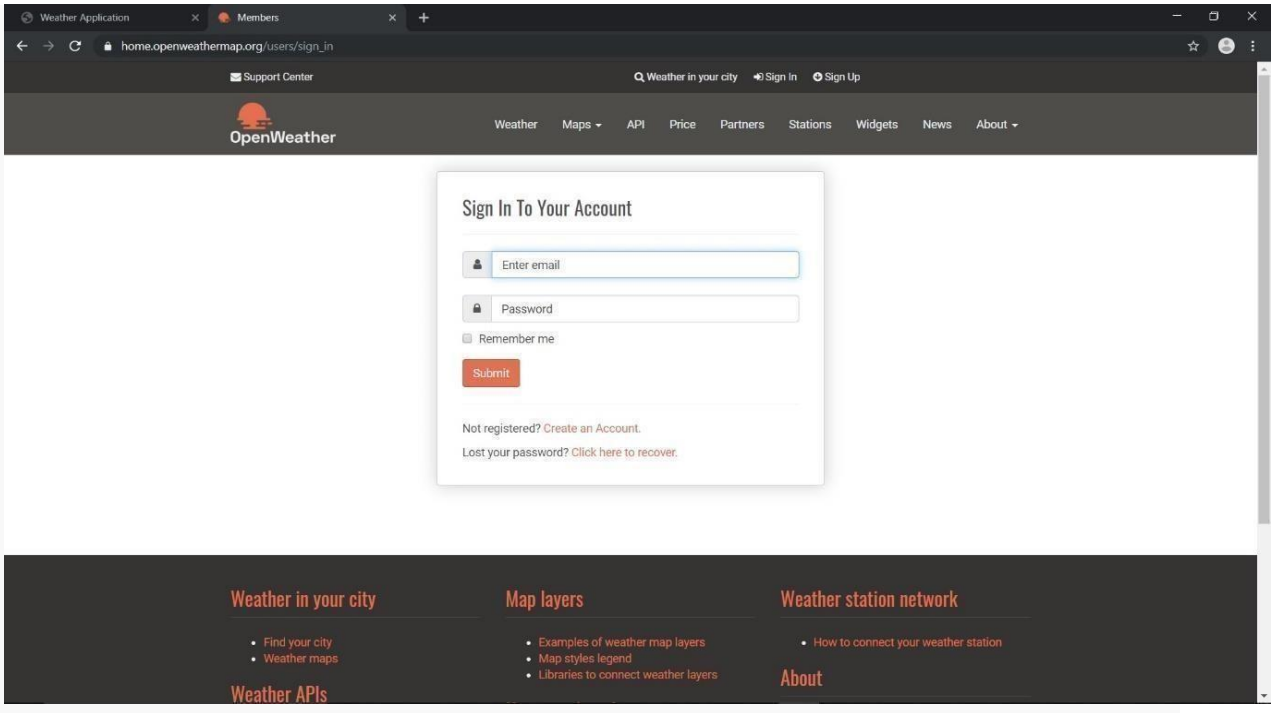

Fig 3.5 SIGN UP PAGE

Api recommend making calls to the API no more than one time every 10 minutes for one location (city / coordinates / zip-code). This is due to the fact that weather data in our system is updated no more than one time every 10 minutes.

The server name is **api.openweathermap.org**. Please, never use the IP address of the server.

Better call API by city ID instead of a city name, city coordinates or zip code to get a precise result.

Please, mind that Free and Startup accounts have limited service availability. If you do not receive a response from the API, please, wait at least for 10 min and then repeat your request. We also recommend you to store your previous request.

After you log in go to API keys on the tabular column and then you will find your respective API key.

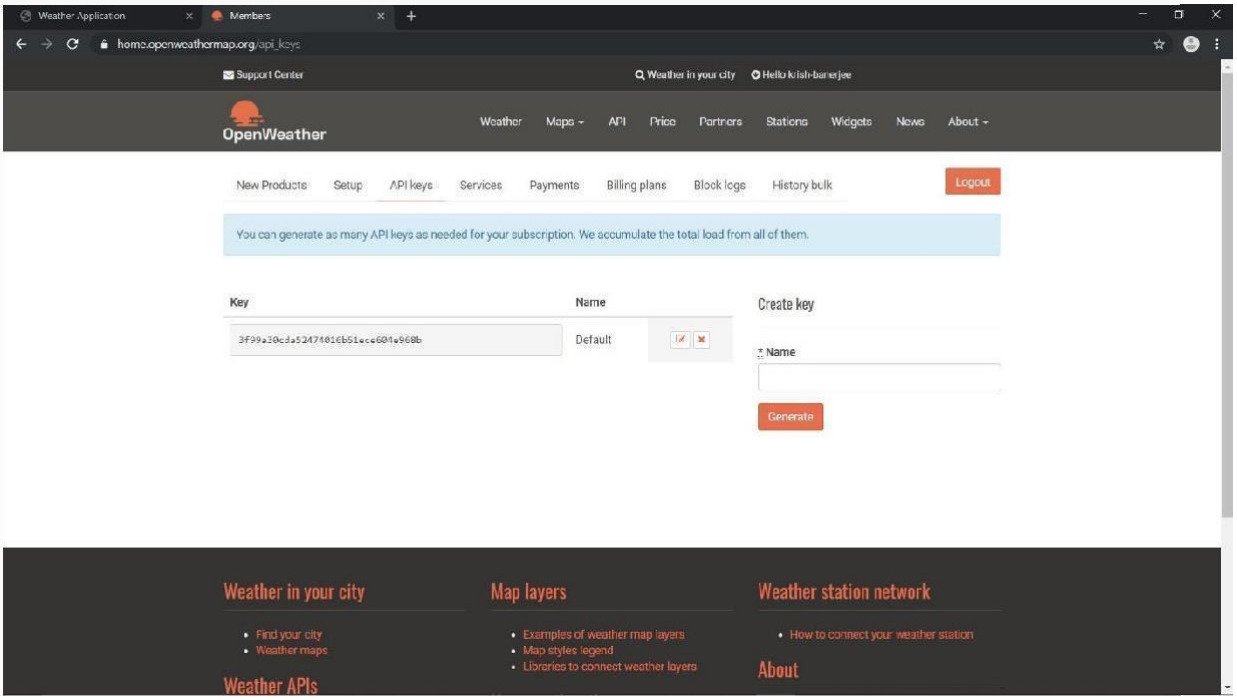

Fig 3.6 API KEY

A confirmation email with your API key and technical instructions will be sent to your email address.

Please note that it takes up to 2 hour to activate your API key.Please use your unique API key {appid=} in each API call to authorize a request from your application and process it appropriately.

Demand for certain products and services varies greatly depending on the weather. For example, users are much more likely to search for information on amusement parks on a hot, sunny day than if it's cold and raining. An amusement park company may want to increase their bids when the weather is nice, but doing so every day would require a lot of manual work. With AdWords scripts, however, it's possible to programmatically fetch weather information and adjust bids in a matter of minutes. This script uses Google Spreadsheets to store the list of campaigns and their associated locations.

A call to the OpenWeatherMap API is made for each location and weather conditions are calculated using some basic rules. If a rule evaluates to true, then a corresponding location bid multiplier is applied to the location targeting for the campaign.

CHAPTER 4

RESULTS & DISCUSSION

Before running the code enter your API key in the java script file in the const key area ,this will use your unique key to access all the weather data you want to use in your website and after running the code you get the front end part of the website.

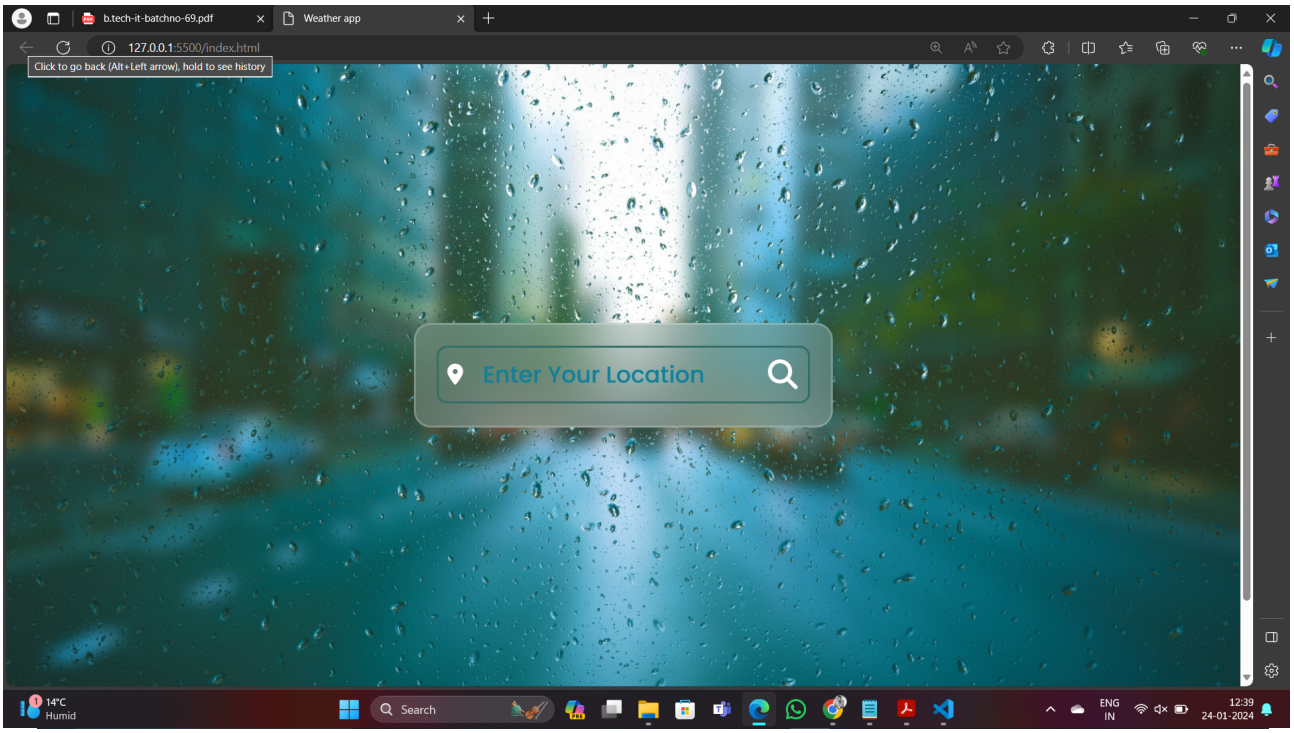

Fig.4.1 WEATHER APPLICATION

Now enter any location you want to see the weather of, For example I want to see the weather of Chennai so, I will enter Chennai on the search tab which will in turn access the weather data from the open weather API and show us the connected data

Fig 4.2 CHENNAI

Similarly, lets see the weather of Delhi.

Fig 4.3 DELHI

DISCUSSION

The process of updating Weather API to new .NET Core 2.0 and Entity Framework Core 2.0 has already started. In addition, as soon as EF Core supports spatial data

types, they should be implemented to Weather API. As EnerKey service are sold to other countries weather information should be collected from those countries. Most likely, the first new country to be added is Sweden followed by other Nordic countries after that. There is also need for weather forecasts, so that the customers and Enegia's internal services can react to rapid weather changes. Cold weather will increase electricity consumption and creates spikes to energy consumption. Implementing Weather API to other services can be done quickly using OpenAPI specification (OAS). With generated JSON file programs such as NSwagStudio can generate clients instantly.

Developer should pursue clean and maintainable code. Over engineering six-layer logic when two is more than enough is counter intuitive. Planning good test cases will save developers time in the long run. It is important to priorities testing cases and at least cover every basic case. Writing tests that will not test anything worth testing and are hard to maintain, will take time from the development process. 24 Code reviews are good and inexpensive way to improve quality. Every developer has their unique way of looking challenges and can catch issues that others have missed. Asking for guidance and opinions will often lead to better result than working solo.

The process of predicting weather patterns is a very complicated science. It requires the need to analyze and decode massive data sets gathered from thousands of sensors and weather satellites every day.

Identifying patterns in collected data to predict the future is a very strenuous task. For best results, it also needs to be done in real-time.

But like any kind of forecast, weather forecasting is something of an educated guess. Since we cannot control the weather, the best meteorologists can do, is to use past and present data and patterns to attempt to predict the future.

CHAPTER 5

CONCLUSION & FUTURE WORK

SUMMARY:

The intention of the project is to just make a model of a weather forecast using web development and code it in a simple way so that one can know the weather of a location on his/her website just by accessing a API key. This application would be a part of the development platform of the technology.

FUTURE WORK:

In future projects I'll improve the design of my program by giving stylish themes and fonts.

Also , would compare the API data with a weather predictor which predicts weather with the data of weather in that location in the past 5 years.

CONCLUSION:

Run the program , the google chrome window opens with your designed web page. Then enter the location of the place for which you want to see its weather. Now your web page shows the respective temperature and humidity of that particular area.

Hence, we have successfully created a website which displays the weather of any location entered at that particular time.

APPENDIX

A.SOURCE CODE:

HTML&CSS CODE

B.SCREENSHOTS

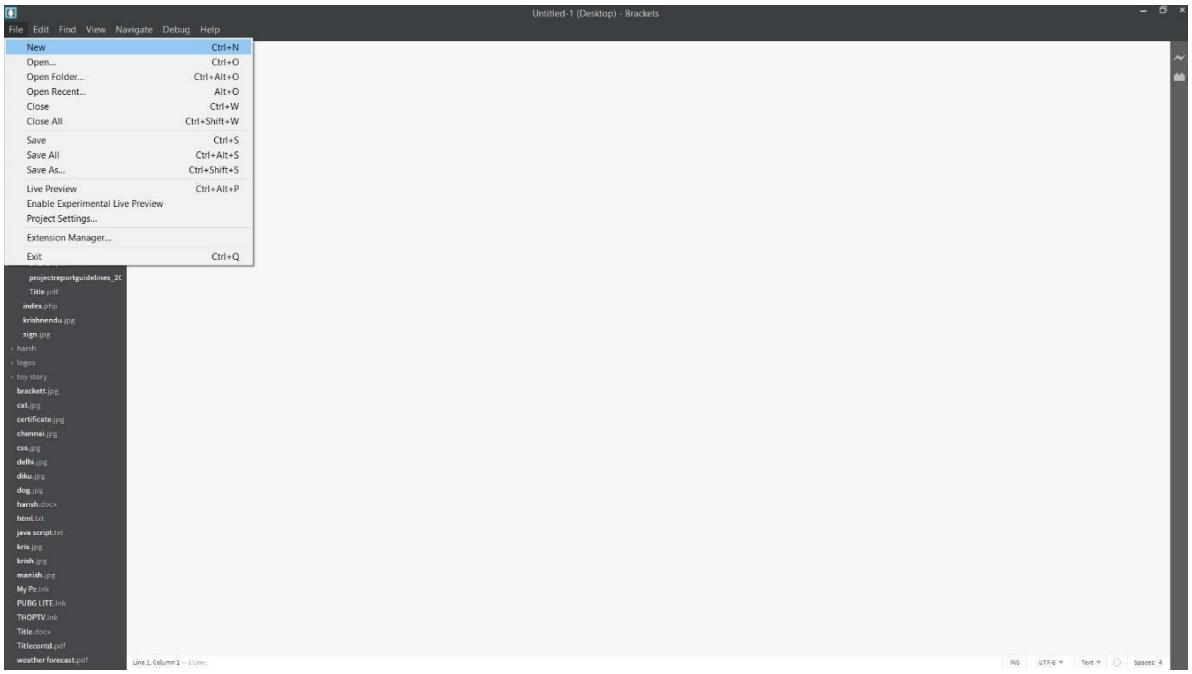

FIG.5.1 OPENING A NEW FILE

FIG.5.2 EDITING OPTION

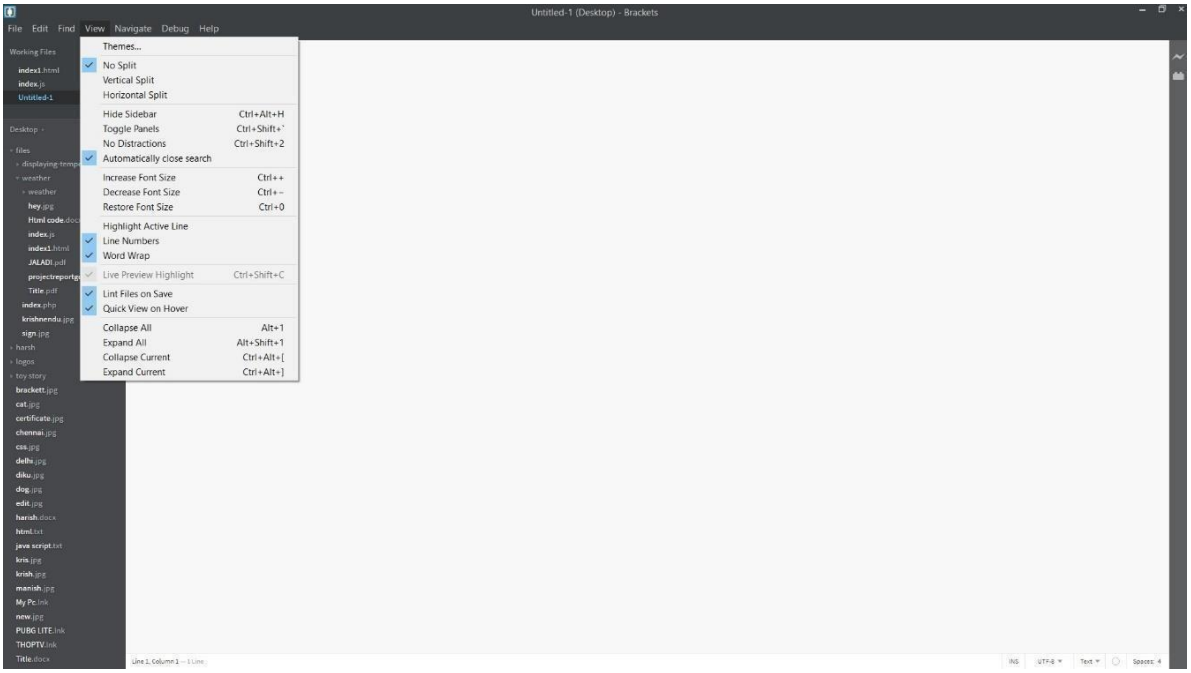

FIG.5.3 VIEW OPTION

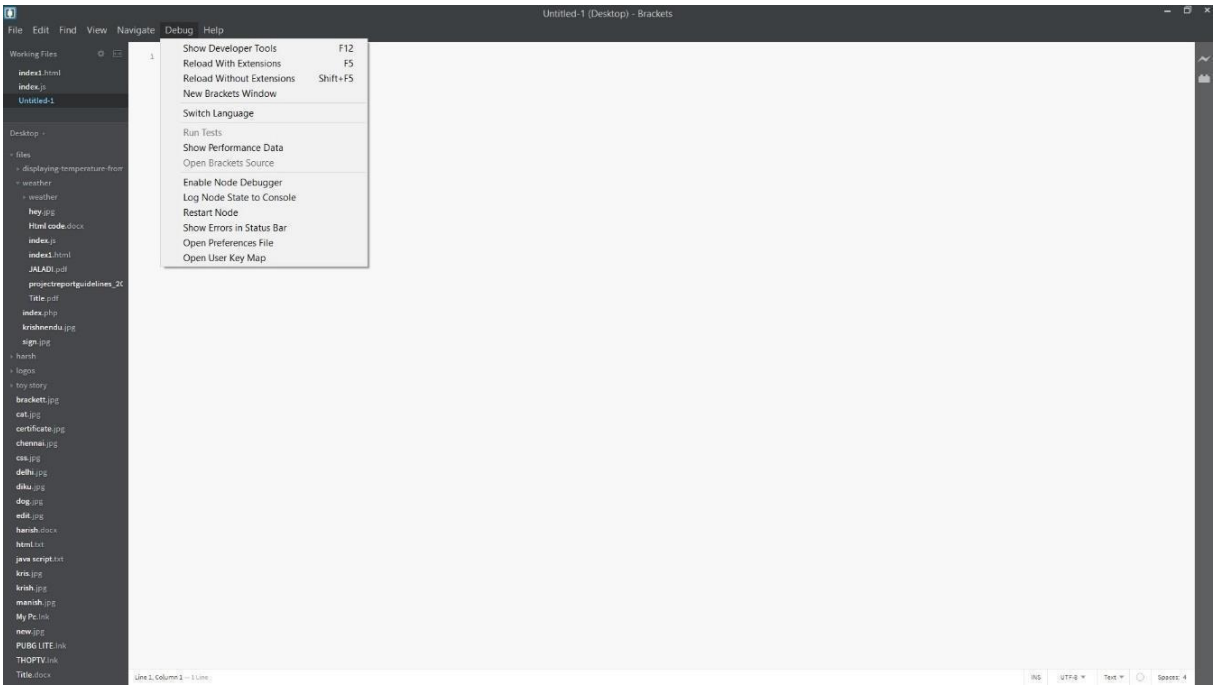

FIG.5.4 DEBUG