

PROJECT REPORT
ON
"WEATHER FORECASTING APPLICATION"



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TABLE OF CONTENT

S.no	Topic	Page.no.
1.	Abstract	3
2.	Introduction	4
3.	Aim	6
4.	Literature Review	7
5.	Features of Weather Forecast Project	14
6.	Technology used	15
7.	Component/Modules used	21
8.	Understanding the project	21

9.	Minimum system requirement	22
10.	Working	23
11.	Design diagram	30
12.	Code	31
13.	Testing/Output	42
14.	Protocols	45
15.	Non-functional Requirement	46
16.	Security Requirement	46
17.	Software quality attributes	47
18.	Advantages and Disadvantages	48

19.	Conclusion and Future Scope	49
20.	Bibliography	50

ABSTRACT

Weather forecasting is the attempt by meteorologists to predict the weather conditions at some future time and the weather conditions that may be expected. The climatic condition parameters are based on the temperature, wind, humidity, rainfall and size of the data set. Here, the parameters temperature and Humidity only are considered for experimental analysis.

The state of the atmosphere at a given location and time in terms of heat, cloudiness, dryness, sunshine, wind, and rain is referred to as weather. Weather is the most important geophysical phenomenon that influences us. Weather varies greatly and is heavily influenced by climate, seasons, and a variety of other factors. The primary goal of this work is to use an application to obtain the weather forecast for any city in the world. The goal of this paper is to create a web application using the Html, CSS , and Javascript .

Introduction :

Weather forecasting is the use of science and technology to predict atmospheric conditions for a given location and time.

Weather describes the state of the atmosphere, such as how hot or cold it is, how wet or dry it is, how calm or stormy it is, and how clear or cloudy it is. Most weather phenomena occur on Earth in the troposphere, the lowest layer of the planet's atmosphere just below the stratosphere.

The prediction of atmospheric conditions such as temperature, humidity, dew point, rainfall, and wind speed on a specific location is known as weather forecasting. Current weather conditions, weather patterns, tracking the motion of air and clouds, and previous weather patterns are all collected using instruments such as barometers, thermometers, and radars.

Weather forecasting systems are an example of advanced equation systems that computers must solve. The prediction of weather forecasting systems assists airports or navies if there is a sudden change in climate, farmers in increasing crop yield production, and even mining people require climatic conditions to continuously monitor the Earth's crust. Floods and droughts can be avoided with accurate weather forecasting. Data collected by a weather station and used for analysis.

Data analysis plays an important role in discovering useful information, making predictions and decision making. The data analysis is used in

many rapidly emerging fields like Healthcare, Weather Conditions, Media, Agriculture, Education, and E-commerce etc. for business development and to reach ever increasing customer satisfaction. Analyzing the data involves cleaning, transforming and building data models for the available dataset. So time-series data i.e. the continuous weather data of a particular region to predict the future weather conditions for the data analysis to predict the further weather conditions.

A weather forecast application that uses HTML, CSS, and Java Script that enables visitors to quickly find local weather information by typing in their location.

AIM:

This web app's major goal was to make a weather prediction that users could interact with by simply searching for their selected city. Applications for weather forecasting provide predictions for temperature, wind speed, cloud cover, rain or snow, and more. To forecast the weather, look at current conditions, air and cloud motions, vintage fashions, trunk modifications, and laptop models.

Literature Review :

Here is the conclusion of some of the reference papers that we looked at in order to improve our project and learn about new technologies that we may integrate in our project.

- In this research of (*P. C. Reddy and A. S. Babu, "Survey on weather prediction using big data analytics", Second International Conference on Electrical Computer and Communication Technologies (ICECCT), 2017.*) Weather forecasting has been one of the foremost challenging problems around the world due to its sensibility towards data related to the scope for scientific analysis and prediction. Weather forecasting may be a continuous, dynamic, multi-dimensional chaotic method additionally data-intensive further these characteristics create foretelling an interesting challenge. It's one of the foremost domineering and hard operational responsibilities that has got to be administered by various earth science services everywhere in the world. In the current scenario, there are many statistical and predictive systems for weather forecasting that are accessible.
- In this research of (*M. Wiston and M. KM, "Weather Forecasting: From the Early Weather Wizards to Modern-day Weather Predictions", Journal of Climatology & Weather Forecasting, vol. 6, pp. 1-9,*

2018.)Various organizations in the Asian nation and abroad have demonstrated mistreatment and supported statistical knowledge manipulation. the assorted methodologies viz. datum decomposition models, Exponential smoothing models, ARIMA models which are based on autoregression further apply previous time series values of weather. ARIMA models have various kinds such as seasonal ARIMA models, vector ARIMA models with versatile statistical values, ARMAX models one of the types of ARIMA having variables unlike ARIMA, that has been used for prognostication functions. Numerous training models have applied for analysis and pattern identification by gathering the data of rain in different locations of the world. It is an entirely changed statistical way to investigate weather forecasting values by applying different functions. To provide outcomes accurately within a limited time may be a major challenge for the research project

- In this research of (*B Janani and Priyanka Sebastian, "ANALYSIS ON THE WEATHER FORECASTING AND TECHNIQUES", International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 2014.*)Regression may be an applied math experimental technique and it should be widely employed in various businesses, the behavioral sciences, social and climate rephrasing, and plenty of alternative areas .The weather has destroyed cities, injury has value trillions of greenbacks, and tragic events have killed thousands of individuals, globally. Thankfully, these terrible aspects of weather don't

affect most people, however, the weather still plays a job within the lives of each person on Earth. attempting to know the weather is not new. Many alternative cultures had, and still have, gods and shrines dedicated to the terrible topic. Today, as humanity turns to the longer term and pushes boundaries in science and technology, weather prediction can be far better . Typically, skilled weather prediction is formed by mistreatment mathematical simulations. Numerical models are accustomed to simulating what is presumably visiting and supporting the known state of the atmosphere. Forecasters use an associate array of models then, supporting the outputs of those simulations, manufacture their predictions.

- In this research of (*Y. Quan and L. Yuchang, Research on weather forecast based on neural networks, IEEE, 2000.*)The persistence methodology of prediction assumes that weather nowadays is going to be the same as weather tomorrow. The tactic uses generalized data regarding however the weather for a region is meant to be, then supports what the weather was that day, it predicts the following day to be similar. (*M. Wiston and M. KM, "Weather Forecasting: From the Early Weather Wizards to Modern-day Weather Predictions", Journal of Climatology & Weather Forecasting, 2018.*)The meteorology methodology is extremely almost like the persistence method. However, this methodology takes a lot of comprehensive observation of the past once predicting the longer term. Markov chains are one methodology of prediction. These chains use a recent pattern of

behavior and continuous knowledge to form predictions. the pc would produce a matrix, which might be used for analysis and predictions once there is a stable event. ANNs perform by finding out a particular data set and therefore the outcomes from such a knowledge set, and then, from the finding out, produce an associate algorithmic program to use for extrapolation (*M. Wiston and M. KM, "Weather Forecasting: From the Early Weather Wizards to Modern-day Weather Predictions", Journal of Climatology & Weather Forecasting, 2018.*). These networks perform by finding out rather than learning from the number of errors they need. The error is employed to tweak the various elements of the associate algorithmic program. Once the algorithmic program goes through many alternative coaching iterations, it develops some way to predict knowledge from a given data set Weather prediction is not a simple task (*B. N. Goswami, The Challenge of Weather Prediction, pp. 1-15, 1997.*). There is an associate array of various factors, methods, and knowledge that must be understood before correct weather prediction may be achieved.

- Supervised learning plays a crucial role in designing a weather prediction model. The Bayesian classifier is one of the methodologies of supervised learning that can be applied for weather predictions. Attributes such as humidity, temperature, and wind are used as main constraints in predicting weather(*M. Biswas, T. Dhoom and S. Barna, "Weather Forecast Prediction: An Integrated Approach for Analyzing*

and Measuring Weather", Data International Journal of Computer Applications, vol. 182, no. 4, pp. 20-24, 2018.).

- Decision tree as the name suggests is a tree-like structure distributing the data into different classes and groups. A newly entered data in the model can be verified and judged regarding its adjustment in any class. It is composed of nodes, branches, and leaves. Nodes on the top are considered as root nodes, other nodes in the tree structure are known as internal nodes and classes are denoted in leaf nodes. The tree is the outcome of calculation of information gain and entropy of the attributes in the dataset which is used for processing. The methods from top node that is root node to class node that is leaf node depicts classification rules (*G. Krishna, "An Integrated Approach for Weather Forecasting based on Data Mining and Forecasting Analysis", International Journal of Computer Applications.*).
- A combination of the number of decision trees for better prediction results. In explicit, trees that are fully becoming horrendously profound will in general be told incredibly sporadic examples: they overfit their instructing sets, for example, have a low inclination, or have horribly high fluctuation. Irregular backwoods are some methods for averaging various profound call trees, prepared on totally various parts of the indistinguishable training set, to diminish the change.

- This comes to the detriment of a minor low increment inside the inclination and a couple of loss of interpretability, anyway, normally enormously supports the presentation inside the last model.
- Artificial Neural Network is also emerging as a significant technique for weather prediction models (*K. Abhishek, M.P. Singh, S. Ghosh and A. Anand, "Weather forecasting model using Artificial Neural Network", Procedia Technology, vol. 4, pp. 311-318, 2012.*) (*Y. Quan and L. Yuchang, "Research on weather forecast based on neural networks", Proceedings of the 3rd World Congress on Intelligent Control and Automation (Cat. No.00EX393), 2000.*). The neural network technique offers more precise and accurate results in computation of weather forecasting. It is an effective technique for developing reliable models for prediction of weather. The outcome of one layer may be the input to the connected layer. Due to this mechanism, the neural network technique is raised as a robust model for weather forecasting (*A. J. Litta, S. M. Idicula and U. C. Mohanty, "Artificial Neural Network Model in Prediction of Meteorological", International Journal of Atmospheric Sciences, pp. 1-15, 2013.*).

FEATURES OF WEATHER FORECAST PROJECT

- The weather is periodically updated.
- Updated temperature information and a forecast for the next 5 days.
- Depending on the weather, the weather changes every hour.
- It offers reliable weather data information.
- Anyone, anyone can look up the weather.
- Information that is dependent on the weather can be received from any location.
- Enables users to travel.
- Aids consumers in making future travel plans.

In order to predict how ecosystems will act in the future, weather forecasters gather as many records as they can about the state of ecosystems now (particularly regarding temperature, humidity, and wind). By observing its growth, it is done.

TECHNOLOGY USED :

1. HTML :

HTML stands for Hyper Text Markup Language. HTML is the standard markup language for creating Web pages. HTML is the standard markup language for creating Web pages

HTML describes the structure of a Web page. It consists of a series of elements,

HTML elements tell the browser how to display the content.

It contains various tags like :

- <html> - It represents the root of the html document.
- <title> - It defines the title component of the document.
- <head> - It defines the head portion of the document which contains information related to the document.
- <body> - It defines the document's body.
- <script> - It is used to embed a client side script.
- <div> - It defines the division or a section in the html document.
- <p> - It defines paragraphs.
- <h1> - It defines headings.
- <link> - It defines the relationship between the current document and external resources.

- - It is used to embed images in html pages.

- <input> - It is used within the <form> element to declare input controls that allows users to input data.
- - It is an inline container used to mark up a part of a text, or a part of the document.
- <section class=""> - It defines the section of the document such as chapters, header, footer or any other sections.
- <main> - It defines the main component of the document.

2. CSS :

- ❖ The language we employ to style a Web page is CSS.
- ❖ Cascading Style Sheets that's what CSS stands for.
- ❖ CSS explains how HTML elements should appear on screens, in print, or in other media.
- ❖ Work is greatly reduced using CSS. It can manage the design of several web pages simultaneously.
- ❖ In CSS files, external stylesheets are stored. By observing its growth, it is done.

Various Elements that are used in css are -

- Margin - It is used to create space around the element , outside any defined borders.
- Padding - It is used to create space around elements content ,inside of any defined border.
- Height - It specified the height of the element.
- Weight - It specified the weight of the element
- Background-image - It allows placing any image behind the html element.
- Box sizing - It allows us to include the padding and border of an element's total weight and height.
- Transition - It provides a way to control animation speed when changing css properties.

- Box overflow - It controls what happens to the content that is too big to fit into an area.
- Align item - It sets align-self values on all direct children as a group.
- Justify content - It defines how browsers distribute space between and around content items along the main axis of a flex container and the inline axis of the grid container.
- Display - It sets whether the element is treated as block, inline and the layout used for its children such as flow layout,grid layout or flex.
- Position - It sets how an element is set in the document.

3. Java Script :

An object-based, portable, and lightweight scripting language is JavaScript.

JavaScript is a translated language rather than a compiled language. The JavaScript code must be translated for the web browser by the JavaScript Translator, which is built into the browser.

For the creation of interactive web pages, JavaScript is employed. The following applications are its principal uses: Client-side validation, dynamic drop-down menus,

displaying the current date and time, displaying clocks, and displaying pop-up windows and dialogue boxes (such as an alert dialogue box, a confirm dialogue box, and a prompt dialogue box).

Various elements that are used in java script are:

- api_key - The authentication system takes in a given username and creates user data, containing the username.

- menuBar.addEventListener - The addEventListener method is the most preferred way to add an event listener to window, document or any other element in the DOM.
- Const - The const declaration creates a read-only reference to a value.
- MenuBar - The JavaScript Menu Bar is a graphical user interface control that serves as a navigation header for your web application or site. It supports data binding, templates, icons, multi level nesting, and horizontal and vertical menus.
- Console.log - It is a function in JavaScript that is used to print any kind of variables defined before in it or to just print any message that needs to be displayed to the user.
- Innerhtml - The Element property innerHTML gets or sets the HTML or XML markup contained within the element. To insert the HTML into the document rather than replace the contents of an element, use the method insertAdjacentHTML().
- Div - The <div> tag defines a division or a section in an HTML document. The <div> tag is used as a container for HTML elements - which is then styled with CSS or manipulated with JavaScript.

Components/Modules Used :

1. WeatherForecasting(Google's API for Weather forecast)
2. Visual Studio Code(IDE)

Understanding the Project :

The idea behind this web app's creation is to provide a weather prediction that engages the user just by Googling the desired city. The Weathercast tool contains the ability to foresee conditions like cloud cover, rain or snow, wind speed, and temperature. We make weather predictions by taking into account current conditions, air and cloud movement, historical patterns, strain changes, and computer models.

Minimum System Requirements :

Hardware Interface :

- 64 bits processor architecture supported by any Operating System.
- Minimum RAM requirement for proper functioning is 512 MB.

Software Interface :

- Operating System: Windows, Linux
- (Integrated development Environment)
- Openweather API.

Working :

We will do our coding in Visual Studio , so for that

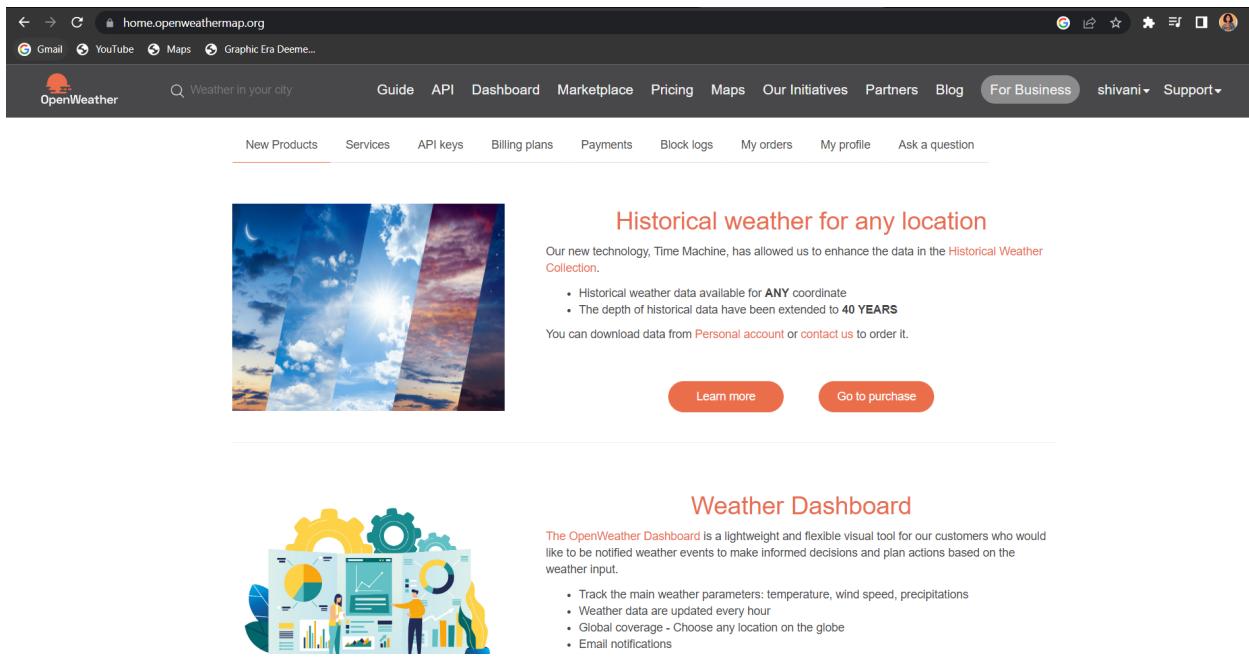
Open VS Code and make a folder in it (i.e Project) , then make 3 files in it, naming Index.html , Style.css, Script.js .

Now as we are making a weather forecast website we need a live weather report of every country and state so for that we need a weather api key which we will get from “openweathermap” .

In any web browser open “openweathermap” i.e.

The screenshot shows the OpenWeatherMap API landing page. At the top, there's a navigation bar with links for Guide, API, Dashboard, Marketplace, Pricing, Maps, Our Initiatives, Partners, Blog, For Business, and user-specific options like shivani and Support. Below the navigation, the main title is "Weather API". A sub-section titled "One Call API 3.0 NEW" is highlighted in red. It includes a "Subscribe" button and a "Pay as you call" link. To the right, there's a promotional offer for "1,000 API calls per day for free" at "0.0012 GBP" per API call over the daily limit. Below this, there's a "Subscribe to One Call by Call" button. At the bottom of the page, there's a cookie consent banner with options to "Allow all" or "Manage cookies".

Now sign-in to get an api-key



The screenshot shows the OpenWeather website homepage. At the top, there's a navigation bar with links for Guide, API, Dashboard, Marketplace, Pricing, Maps, Our Initiatives, Partners, Blog, For Business, shivani, and Support. Below the navigation is a secondary menu with links for New Products, Services, API keys (which is underlined), Billing plans, Payments, Block logs, My orders, My profile, and Ask a question.

Historical weather for any location

Our new technology, Time Machine, has allowed us to enhance the data in the [Historical Weather Collection](#).

- Historical weather data available for **ANY** coordinate
- The depth of historical data have been extended to **40 YEARS**

You can download data from [Personal account](#) or [contact us](#) to order it.

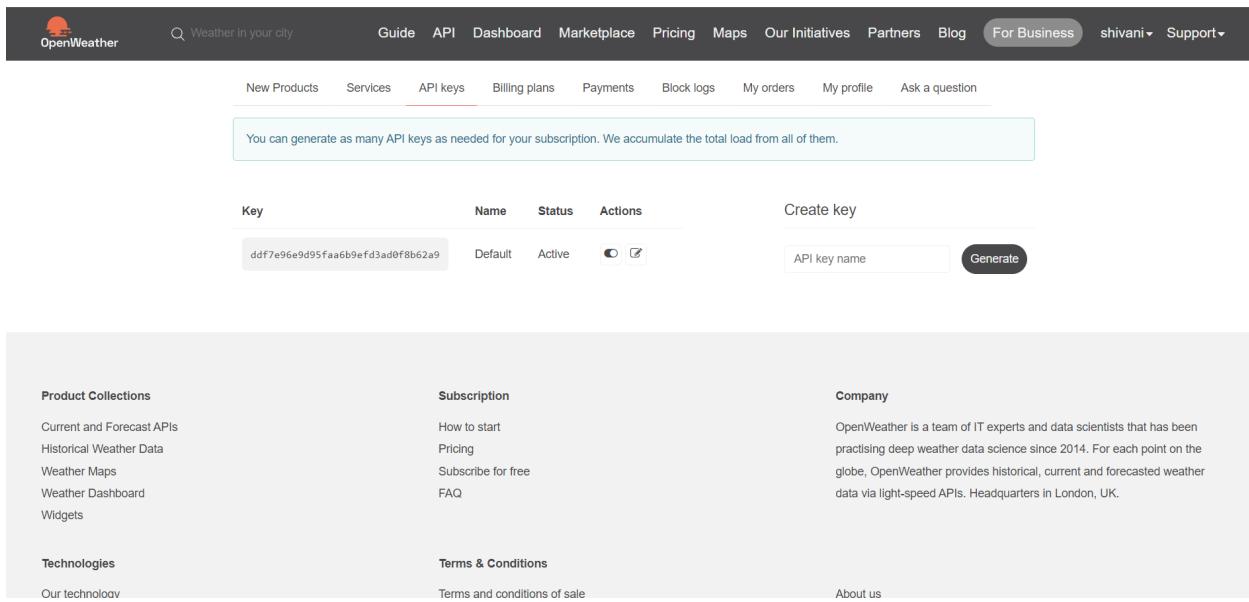
[Learn more](#) [Go to purchase](#)

Weather Dashboard

The [OpenWeather Dashboard](#) is a lightweight and flexible visual tool for our customers who would like to be notified weather events to make informed decisions and plan actions based on the weather input.

- Track the main weather parameters: temperature, wind speed, precipitations
- Weather data are updated every hour
- Global coverage - Choose any location on the globe
- Email notifications

Click on Api keys and it will generate you a api-key



The screenshot shows the OpenWeather website with the 'API keys' section highlighted in the secondary menu. The page title is 'API keys'. A message in a box says: 'You can generate as many API keys as needed for your subscription. We accumulate the total load from all of them.' Below this is a table with columns: Key, Name, Status, Actions, and Create key. There is one row shown with the key 'ddf7e96e9d95faa6b9ef3ad0f8b62a9', name 'Default', status 'Active', and a pair of binoculars icon in the Actions column. In the 'Create key' row, there is a text input 'API key name' and a 'Generate' button.

Key	Name	Status	Actions	Create key
ddf7e96e9d95faa6b9ef3ad0f8b62a9	Default	Active		<input type="text" value="API key name"/> Generate

Product Collections

- Current and Forecast APIs
- Historical Weather Data
- Weather Maps
- Weather Dashboard
- Widgets

Subscription

- How to start
- Pricing
- Subscribe for free
- FAQ

Company

OpenWeather is a team of IT experts and data scientists that has been practising deep weather data science since 2014. For each point on the globe, OpenWeather provides historical, current and forecasted weather data via light-speed APIs. Headquarters in London, UK.

Technologies

Our technologies

Terms & Conditions

Terms and conditions of sale

About us

Now copy paste that api-key in your java script code and click on Api on the page, a new page will appear then scroll down and we will get Current and forecast weather data collection. As we want current weather data so click on the api doc present in it.

The screenshot shows the OpenWeather API documentation page. At the top, there's a navigation bar with links for Guide, API, Dashboard, Marketplace, Pricing, Maps, Our Initiatives, Partners, Blog, For Business, shivani, and Support. Below the navigation bar, a banner reads "You can read the [How to Start](#) guide and enjoy using our powerful Weather API right now." The main content area has several sections:

- Current Weather Data**: Includes "API doc" and "Subscribe" buttons. Description: "Access current weather data for any location including over 200,000 cities. We collect and process weather data from different sources such as global and local weather models, satellites, radars and a vast network of weather stations. JSON, XML, and HTML formats. Included in both free and paid subscriptions."
- Hourly Forecast 4 days**: Includes "API doc" and "Subscribe" buttons. Description: "Hourly forecast is available for 4 days. Forecast weather data for 96 timestamps. JSON and XML formats. Included in the Developer, Professional and Enterprise subscription plans."
- Daily Forecast 16 days**: Includes "API doc" and "Subscribe" buttons. Description: "16 days forecast is available for any location on the globe. 1-day step for 16 days. JSON and XML formats. Included in all paid subscription plans."
- Climatic Forecast 30 days**: Includes "API doc" and "Subscribe" buttons. Description: "Forecast weather data for 30 days. JSON format. Included in the Developer, Professional and Enterprise subscription plans."
- Bulk Download**: Includes "API doc" and "Subscribe" buttons. Description: "You may request current weather and forecasts in bulk with a variable data granulation. Current weather bulk is available for 209,000+ cities."
- Global Weather Alerts Push notifications**: Includes "Doc" and "Get access" buttons. Description: "Get all the **warnings from national weather agencies**. Weather alerts are pushed to your endpoint as soon as they occur."

Now an API URL will generate and copy-paste in the browser and do changes according to you for any particular city or you want every country weather report so do changes accordingly and after doing changes just copy-paste that URL in your Java script code to get the weather details for every country and every city.

The screenshot shows the OpenWeatherMap API documentation. At the top, there's a navigation bar with links for Guide, API, Dashboard, Marketplace, Pricing, Maps, Our Initiatives, Partners, Blog, For Business, shivani, and Support. Below the navigation bar, the main content area has a title "Current weather data". On the right side of the main content, there's a sidebar with various links related to the API, such as "Call current weather data", "How to make an API call", "Bulk downloading", "Weather fields in API response", "JSON", "XML", "List of condition codes", "Min/max temperature in current weather", "API and forecast API", "Other features", "Geocoding API", "Built-in geocoding", "Format", "Units of measurement", "Multilingual support", and "Call back function for JavaScript code". In the center, there's a section titled "Call current weather data" with a sub-section "How to make an API call". It includes a code snippet for an API call:

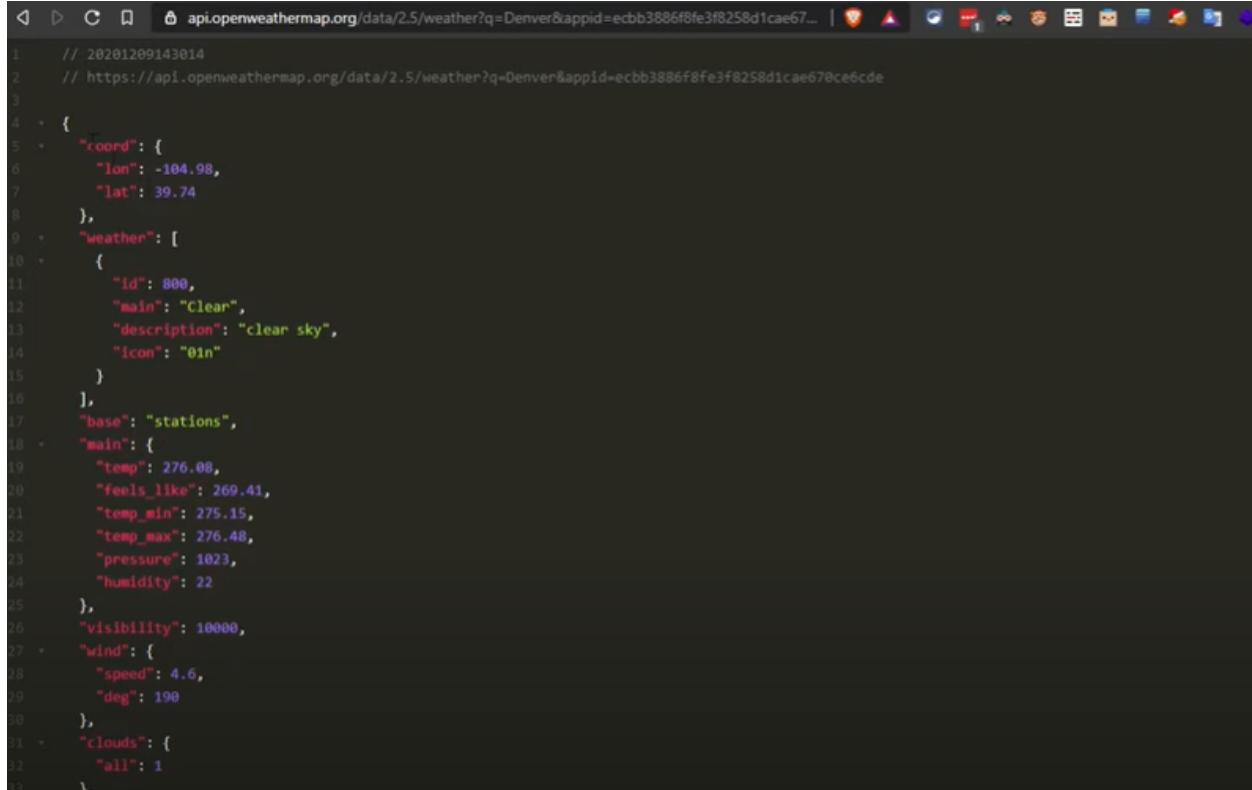
```
https://api.openweathermap.org/data/2.5/weather?lat={lat}&lon={lon}&appid={API key}
```

Below this, there's a "Parameters" section with a table:

<code>lat, lon</code>	required Geographical coordinates (latitude, longitude). If you need the geocoder to automatically convert city names and zip-codes to geo coordinates and the other way around, please use our Geocoding API .
-----------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

On the far right, there's a small black rectangular box with white text that says "INCORPORATE KEY NEWS EVENTS INTO YOUR MARKET RESEARCH" with a small gear icon above the text.

Now to check your api key is working just copy-paste that api url in any browser because it takes some time to process your api key and once it shows api is valid then you can proceed to do changes accordingly.

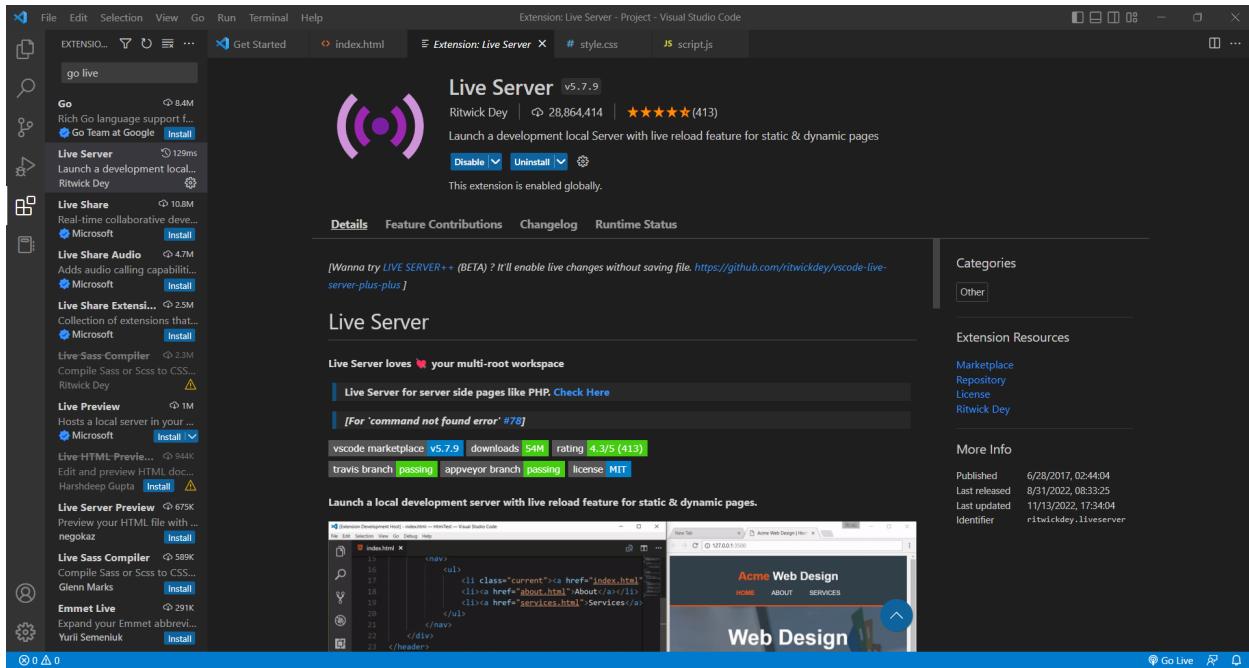


The screenshot shows a browser window with the URL api.openweathermap.org/data/2.5/weather?q=Denver&appid=ecbb3886f8fe3f8258d1cae67.... The page displays a JSON object representing weather data for Denver. The JSON structure includes coordinates, weather conditions (id: 800, main: "Clear", description: "clear sky", icon: "01n"), base information (main: temp: 276.08, feels_like: 269.41, temp_min: 275.15, temp_max: 276.48, pressure: 1023, humidity: 22), visibility: 10000, wind (speed: 4.6, deg: 190), and clouds (all: 1). The code block below shows the raw JSON content with line numbers.

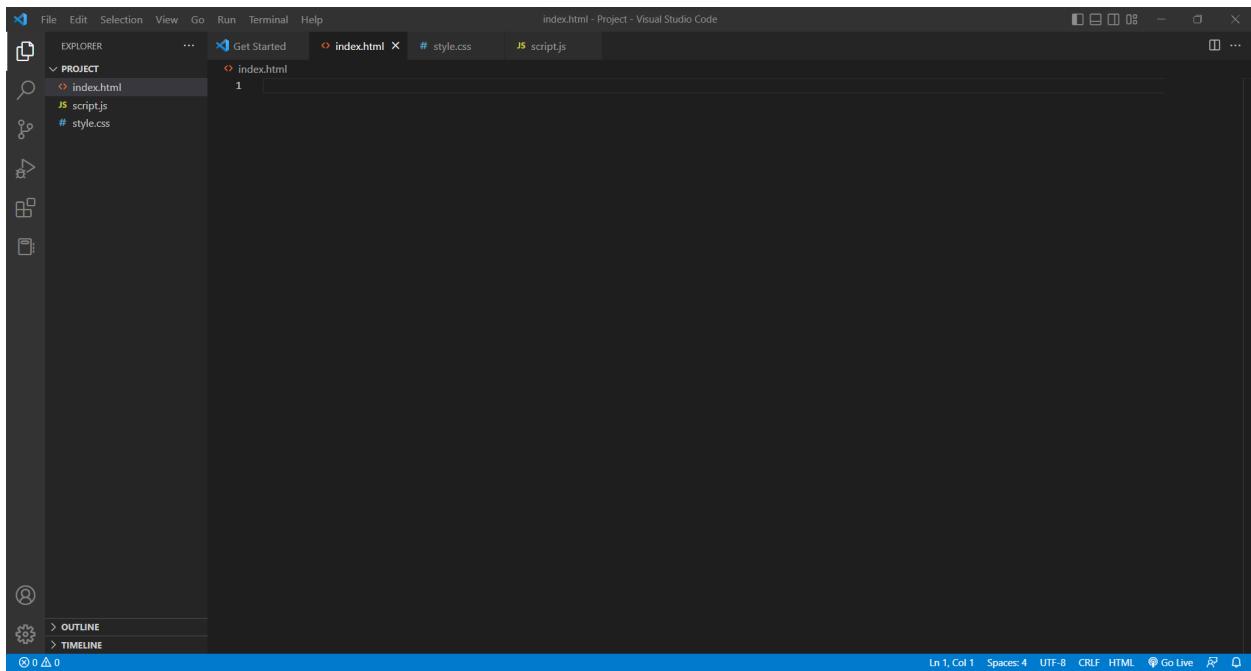
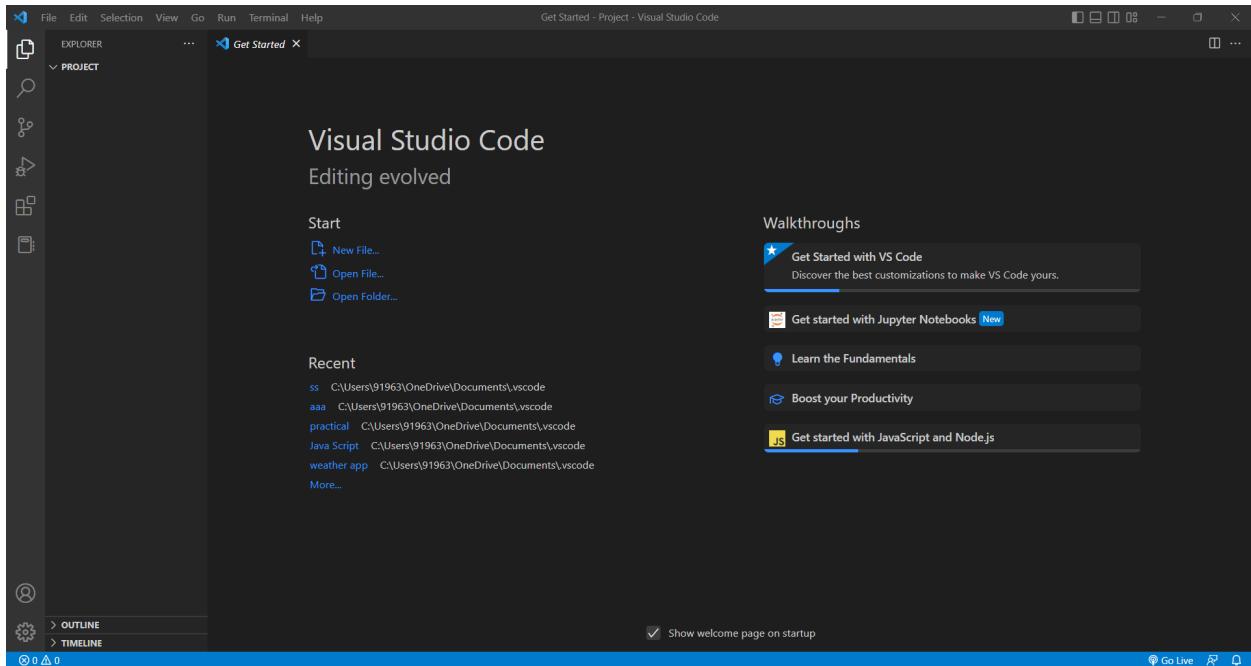
```
1 // 20201209143014
2 // https://api.openweathermap.org/data/2.5/weather?q=Denver&appid=ecbb3886f8fe3f8258d1cae67...
3
4 {
5   "coord": {
6     "lon": -104.98,
7     "lat": 39.74
8   },
9   "weather": [
10    {
11      "id": 800,
12      "main": "Clear",
13      "description": "clear sky",
14      "icon": "01n"
15    }
16  ],
17   "base": "stations",
18   "main": {
19     "temp": 276.08,
20     "feels_like": 269.41,
21     "temp_min": 275.15,
22     "temp_max": 276.48,
23     "pressure": 1023,
24     "humidity": 22
25   },
26   "visibility": 10000,
27   "wind": {
28     "speed": 4.6,
29     "deg": 190
30   },
31   "clouds": {
32     "all": 1
33   }
34 }
```

Now once we are done with api then whatever we want to show in our website like Feels Like, Humidity , Latitude , Latitude in your javascript code.

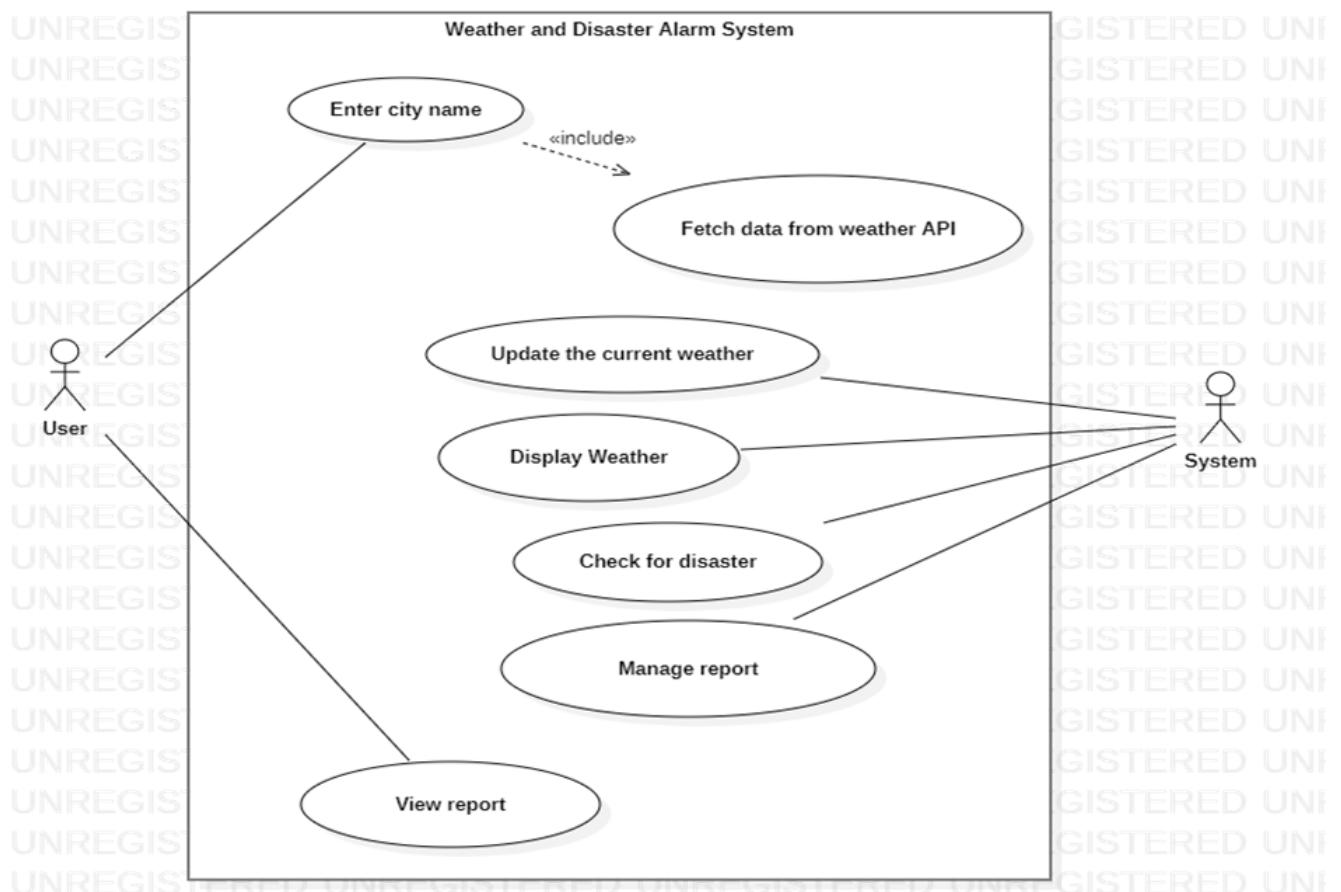
Download extension Live Server and it will run on our web browser.



Now for Vs code make folder and file and start coding :



DESIGN DIAGRAM :



- Requesting an API gateway.
- Retrieve data from the data server.
- Show the weather information.

Code :

Html Code:

Index.html :

```
<!DOCTYPE html>

<html lang="en">

<head>

    <TITLE>WEATHER FORECAST WEBSITE</TITLE>

    <meta charset="UTF-8">

    <title>Weather website</title>

    <link rel="stylesheet" href="style.css">

</head>

<body>

    <div id="container">

        <div id="location">

            <input type="text" id="country" placeholder="Country">

            <input type="text" id="city" placeholder="City">

            <input type="submit" id="check" value="Go">

        </div>

        <div class="flex">

            <h2 id="weatherCountry">Cityname</h2>

            <h2 id="temperature">0°<strong>C</strong></h2>

        </div>

    </div>

</body>
```

```
<h2 id="weatherDescription">Description</h2>

<ul>

  <div class="features">

    <li id="feelsLike">Feels Like 0°C</li>
    <li id="humidity">Humidity 0</li>
    <li id="longitude">Longitude 0</li>
    <li id="latitude">Latitude 0</li>
  </div>

</ul>

<div class="h4"><u>Project made by Shivani Singh</u></div><br>
</div>

</div>

<script src="script.js"></script>

</body>

</html>
```

CSS Code :

Style.css :

```
* {
    padding: 0;
    margin: 0;
    font-family: sans-serif;
    box-sizing: border-box;
    color: #fff;
    background-color: transparent;
}

#container {
    height: 100vh;
    width: 100%;
    position: relative;
    background-image: url('https://source.unsplash.com/1600x900/?landscape');
    display: flex;
}

#container #location {
    height: 60px;
    width: 100%;
```

```
position: absolute;  
left: 0%;  
top: 11%;  
display: flex;  
justify-content: center;  
flex-direction: row;  
}  
  
  
#container input {  
height: 50px;  
width: 300px;  
margin: 0px 20px;  
padding: 0 20px;  
left: 0%;  
border: none;  
outline: none;  
background: white;  
font-size: 20px;  
color: black;  
}  
  
  
#container input::placeholder {  
color: #000000d0;  
}  
  
  
#container input[type="submit"] {
```

```
cursor: pointer;  
width: 150px;  
background: #000000d0;  
color: white;  
font-weight: 700;  
font-size: 22px;  
}
```

```
#tempIcon {  
height: 150px;  
width: 150px;  
position: absolute;  
top: 35%;  
left: 60%;  
}
```

```
#weatherCountry {  
font-size: 40px;  
position: absolute;  
top: 37%;  
margin-left: auto;  
margin-right: 20%;  
}
```

```
#temperature {
```

```
    font-size: 45px;  
    position: absolute;  
    top: 45%;  
    left: 37%;  
}
```

```
#temperature b {  
    color: red;  
}
```

```
#weatherDescription {  
    font-size: 20px;  
    text-transform: capitalize;  
    position: absolute;  
    bottom: 38%;  
    left: 60%;  
}
```

```
#container ul {  
    position: absolute;  
    bottom: 17%;  
    left: auto;  
    right: auto;  
    margin-right: 20%;  
}
```

```
#container ul li {  
    font-size: 20px;  
    margin: 20px 0;  
    list-style-type: none;  
    margin-right: 5rem;  
}  
  
.features  
{  
    justify-content: center;  
}  
  
.flex  
{  
    background: #000000d0;  
    color: white;  
    padding: 2em;  
    border-radius: 30px;  
    width: 100%;  
    max-width: 700px;  
    height: 30rem;  
    margin: 1em;  
    margin-top: 14rem;  
    margin-left: auto;  
    margin-right: auto;  
    display: flex;
```

```
justify-content: center;
}

.h1
{
    margin-left: 28rem;
    margin-top: 25rem;
    font-size: 1.5rem;
    font-family: "myFirstFont";
}

@font-face {
    font-family: "myFirstFont";
    src: url("fonts/ticking-timebomb-bb.regular.ttf");
}
```

Java Script code :

Index.js :

```

let country = document.querySelector("#country");

let city = document.querySelector("#city");

let check = document.querySelector("#check");

let tempIcon = document.querySelector("#tempIcon");

let weatherCountry = document.querySelector("#weatherCountry");

let temperature = document.querySelector("#temperature");

let weatherDescription = document.querySelector("#weatherDescription");

let feelsLike = document.querySelector("#feelsLike");

let humidity = document.querySelector("#humidity");

let longitude = document.querySelector("#longitude");

let latitude = document.querySelector("#latitude");



check.addEventListener("click", () => {

    let key = `bd4ea33ecf905116d12af172e008dbae`;

    let url =
`https://api.openweathermap.org/data/2.5/weather?q=${city.value},${country.value}
&lang=en&units=metricappid=${key}`;




    fetch(url).then(response => {

        return response.json();

    }).then(data => {

        console.log(data);

        weatherCountry.innerText = `${data.name} / ${data.sys.country}`;
    });
});
```

```

temperature.innerHTML = `${data.main.temp}°C</b>`;

document.body.style.backgroundImage
="url('https://source.unsplash.com/1600x900/?' + '')";

data.weather.forEach(items => {

    weatherDescription.innerText = items.description;

    if (items.id < 250) {

        tempIcon.src = `storm.svg`;

    } else if (items.id < 350) {

        tempIcon.src = `drizzle.svg`;

    } else if (items.id < 550) {

        tempIcon.src = `snow.svg`;

    } else if (items.id < 650) {

        tempIcon.src = `rain.svg`;

    } else if (items.id < 800) {

        tempIcon.src = `atmosphere.svg`;

    } else if (items.id === 800) {

        tempIcon.src = `sun.svg`;

    } else if (items.id > 800) {

        tempIcon.src = `clouds.svg`;

    }

})

feelsLike.innerText = `Feels Like ${data.main.feels_like}°C`;

humidity.innerText = `Humidity ${data.main.humidity}`;
latitude.innerText = `Latitude ${data.coord.lat}`;

```

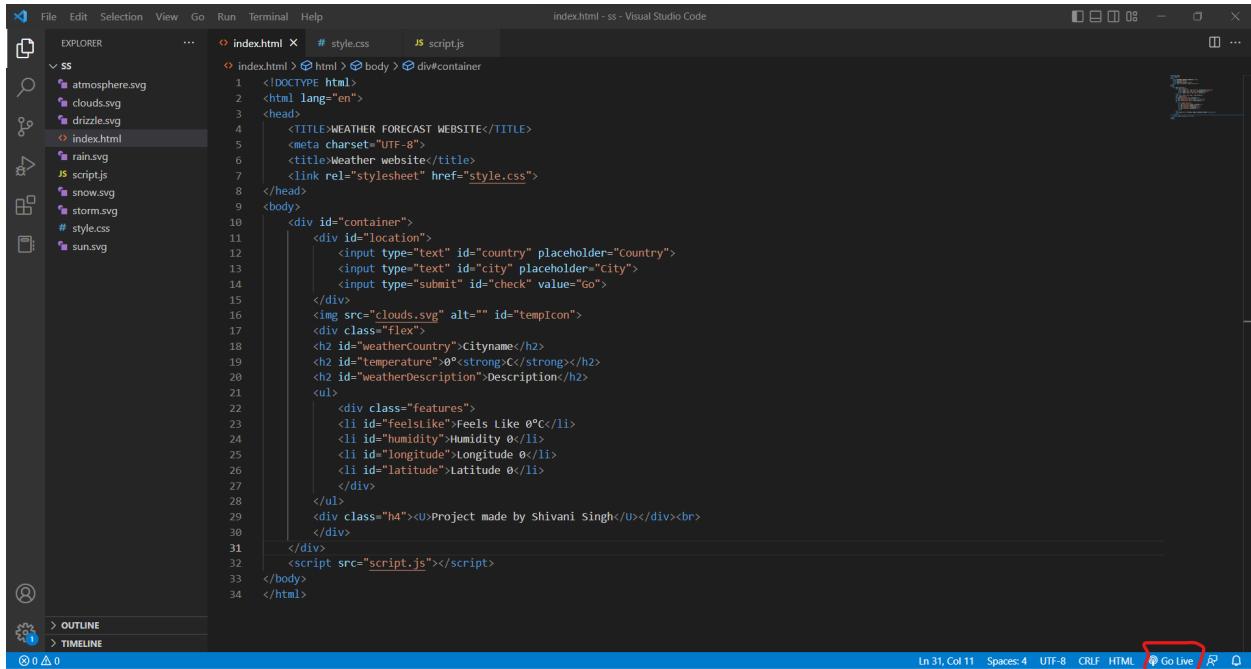
```
longitude.innerText = `Latitude ${data.coord.lon}`;

})

country.value = "";
city.value = "";
})
```

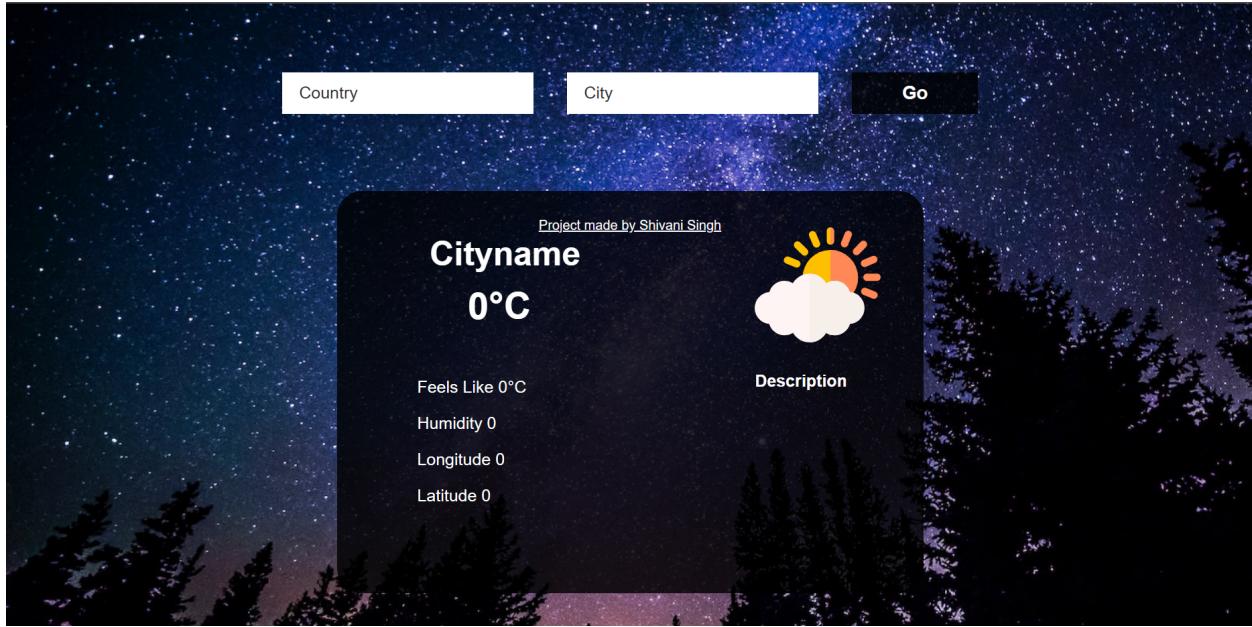
Output :

Click on Go live and it will open our website

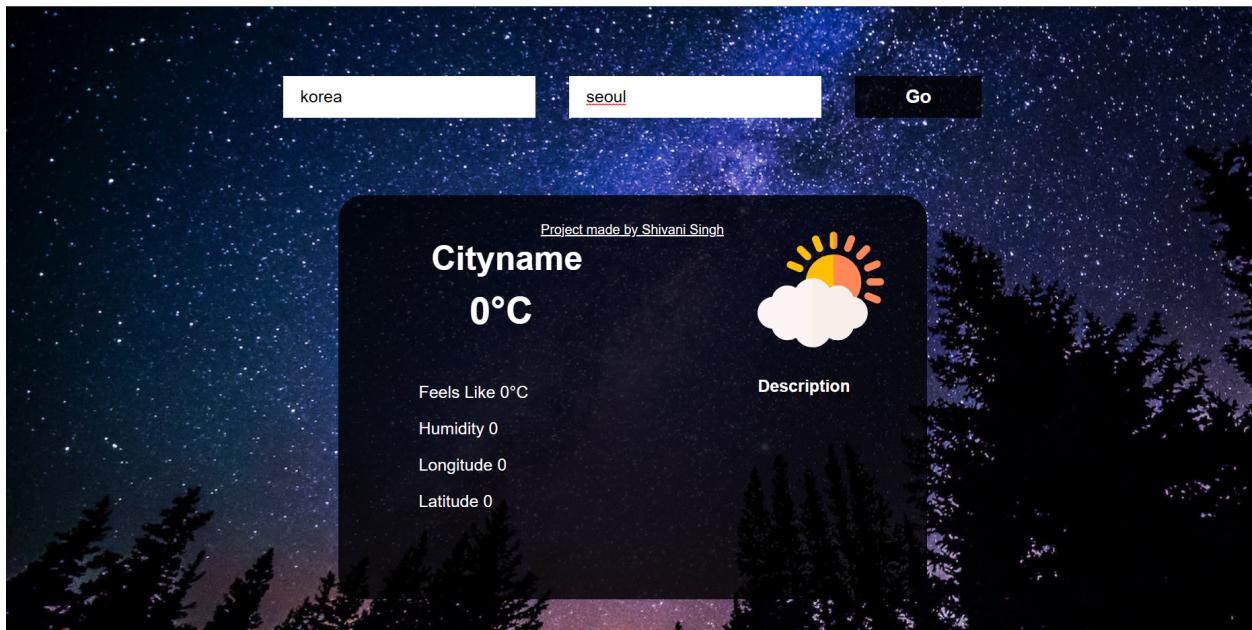


The screenshot shows the Visual Studio Code interface with the following details:

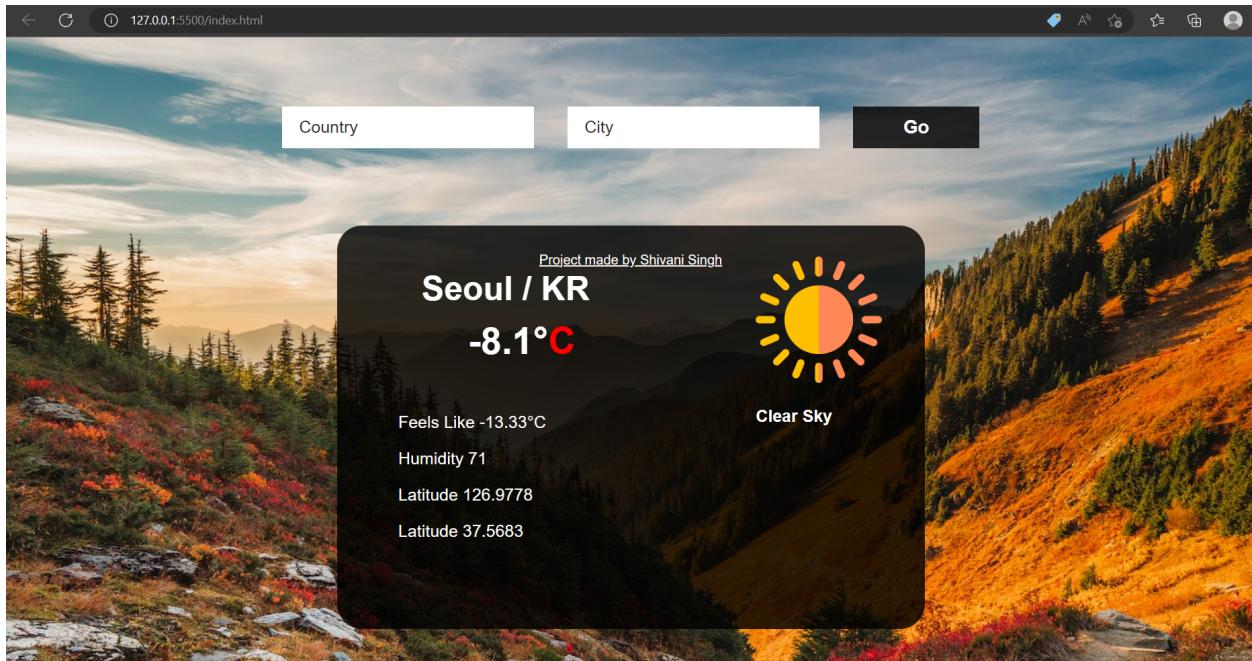
- File Explorer (Left):** Shows files in the current workspace, including `index.html`, `style.css`, `script.js`, and several SVG files (`atmosphere.svg`, `clouds.svg`, `drizzle.svg`, `rain.svg`, `snow.svg`, `storm.svg`, `sun.svg`).
- Code Editor (Center):** Displays the `index.html` file content. The code includes HTML structure for a weather forecast website, CSS imports, and JavaScript links.
- Bottom Status Bar:** Shows "Ln 31, Col 11" and other file status indicators.
- Bottom Right:** A red box highlights the "Go Live" button in the status bar.



When you correctly enter the country and city (for example, Country-Korea and City- seoul), the programme merely asks for the city you want to see the weather prediction for. Click on go , It then informs you of the forecast for the current day.



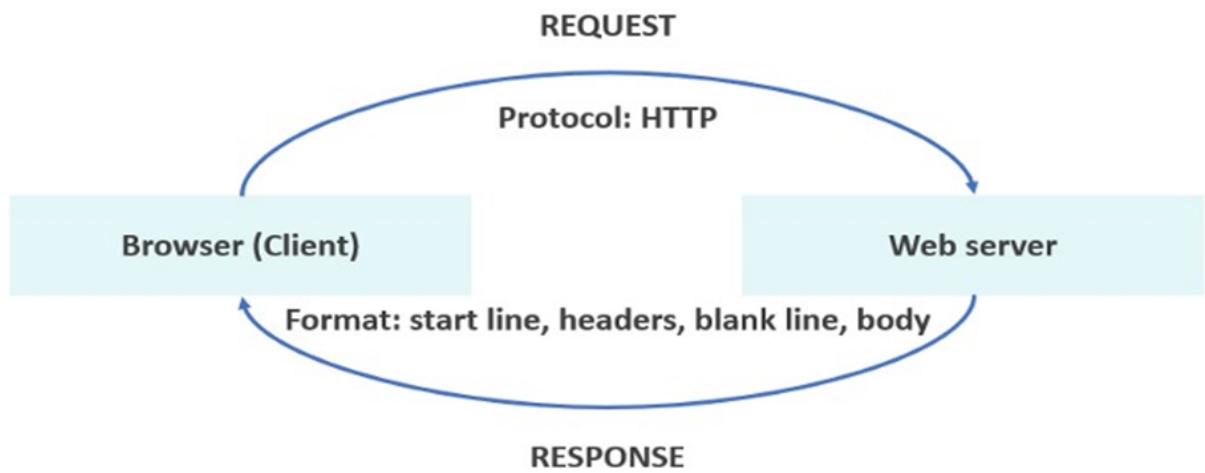
After entering the country and city it will tell you the weather forecast.



Protocols :

When we are creating the connection between the client and the server using HTTP (Hypertext transfer Protocol) which is the protocol used by web browsers referred to as client for communicating with web servers. The data between the two parties is not in plain files like in FTP (File transfer Protocol), but hypertext written in HTML format which are transferred over the internet here 's how this process looks:

- The request in this case is sent by the browser and includes the request method, the URL and the protocol version followed by other information.
- Server receives the request, and runs a program to process it.
- The server returns the HTTP response to the browser.



Client-Server Diagram of API.

Non-Functional Requirements :

Performance requirements :

- ❖ In this project, the user initiates communications by entering data.
- ❖ User issues a request to a server.
- ❖ Server receives the request and runs the program to process it.
- ❖ If the number of users are more, increase the capacity of the server to respond to the requests.

Security requirements :

Broken, exposed or hacked APIs are behind major data breaches. They exposed sensitive medical, financial, and personal data for public consumption. In our case a hacker can hack and misuse our API key to access the data and mislead the user about the weather which can further lead to misleading .

Software Quality Attributes :

1. Availability

The project can consistently be accessible 24/7. If the number of users are more, the capacity of the server is increased to respond to the requests.

2. Maintainability

Maintainability is very easy as we are not using any physical location and database.

3. Flexibility

This project is highly flexible depending on the user requests. If the user requests may increase, increase the capacity of the server to respond to the requests.

4. Usability

This specific project is easy to use.

Advantages :

- Farmers can known when to plant or harvest their crops
- People can choose where and when to take their holidays to take advantage of good weather.
- Surfers know when large waves are expected.
- Regions can be evacuated if hurricanes or floods are expected.
- Aircraft and shipping rely heavily on accurate weather forecasting.
- The user can see different satellite images of clouds, temperature, precipitation, and wind patterns to understand the forecast in a better way.

Disadvantages :

- Weather is extremely difficult to forecast correctly
- It is expensive to monitor-so many variables from so many sources
- The computers needed to perform the millions of calculations necessary are expensive
- The weather forecasters get blamed if the weather is different from the forecast

Conclusion and Future Scope:

Weather forecasting is a complex and challenging science that depends on the efficient interplay of weather observation, data analysis by meteorologists and computers, and rapid communication systems.

Meteorologists have achieved a very respectable level of skill for short range weather forecasting.

Further improvement is expected with denser surface and upper air observational networks, more precise numerical models of the atmosphere, larger and faster computers and more are to be realized.

However, continued international cooperation is essential, for the atmosphere is a continuous fluid that knows no political boundaries.

Weather forecasting dates back to early civilizations and continues to this day. People have always been curious about climate and have wished and attempted to discover various methods to predict weather in the past. Early predictions were mostly based on personal experience and assumptions, rather than on experiments, testing, and analysis.

There are numerous issues with weather prediction. Even the weather forecast is bleak. The one-day forecast is sometimes less than 2 degrees below the actual temperature. Though this inaccuracy is not harmful because predictions are made for a longer period of time. Furthermore, accuracy may be even lower when predicting

precipitation. Furthermore, weather forecasting is inaccurate in areas where the climate is inconsistent. For example, in a geographical area where temperatures vary a lot, temperature predictions are much more inaccurate than in a place like the tropics.

Predictions based on weather data necessitate extensive knowledge of statistical weather models and scientific information required for climatology, which must be coordinated with observations from the atmosphere. This study examines how meteorology evolved from early human civilizations to modern weather prediction.

Though it previously referred to somewhat out-of-date strategies, the scope is now to apply new tools and technologies for weather prediction. Weather prediction is an emerging topic for researchers today because it is associated with multiple domains and requires both science and technology for processing, computations, and designing the forecasting model.

BIBLIOGRAPHY :

1. <https://openweathermap.org/appid>
2. www.wikipedia.com
3. www.github.com
4. <https://getrevising.co.uk/grids/weather-forecasting>
5. <https://ieeexplore.ieee.org/document/9596117>