

PROJECT REPORT

Introduction:

Our Weather app, your go-to companion for all things weather-related! Whether you're planning a weekend getaway, preparing for your daily commute, or simply curious about the current conditions, our app has got you covered.

Key Features:-

- (i) Real-time weather updates:- Stay up-to-date with the latest weather conditions for your location. Our app provides real-time data, so you can trust that information you receive is accurate and reliable.
- (ii) Hourly and Daily Forecasts:- Plan your day effectively with our detailed hourly and daily forecasts. Know when to expect rain, sunshine & any other weather changes, and be prepared for any outdoor activities.
- (iii) Weather Alerts:- Receive timely weather alerts and warnings, ensuring you're aware of any potential hazards or adverse conditions. Safety is our priority, and our app will notify you of significant weather changes in your area.

(iv) Customized locations:- Add multiple locations and access weather information for different cities & places that matter to you. whether it's your hometown, vacation destination between locations.

Purpose:-

The purpose of a weather app is to provide users with accurate and real-time weather information for any location they are interested in. Weather apps serve several essential functions, including:-

- (i) Weather forecasting:- The primary purpose of a weather app is to deliver weather forecasts, which help users plan their activities and make informed decisions based on expected weather conditions for the day or week ahead.
- (ii) Real-time updates:- Weather apps offer real-time updates on current weather conditions, such as temperature, humidity, wind speed, and precipitation, allowing users to stay informed about the weather at their current location or any other location they are interested in.
- (iii) Severe weather Alerts:- Weather apps can send alerts and warnings about severe

weather events, such as storms, hurricanes, tornadoes, & extreme temperatures, to help users stay safe and take necessary precautions.

(iv) Travel planning:- For travellers, a weather app is a valuable tool for checking weather conditions at their destination & along their travel route, enabling them to pack appropriately and anticipate any potential weather-related disruptions.

Literature Survey:-

(i) Usability and user Experience of weather apps:-

→ Many studies focused on evaluating the usability and user experience of various weather apps on different platforms. These assessments considered factors like app design, information presentation, and user interaction.

(ii) Accuracy and Reliability of weather Data:-

→ Several research papers examined the accuracy and reliability of weather data provided by various weather apps. These studies compared forecast accuracy between different apps and analyzed the sources of different data.

(iii) Data visualization Techniques:-

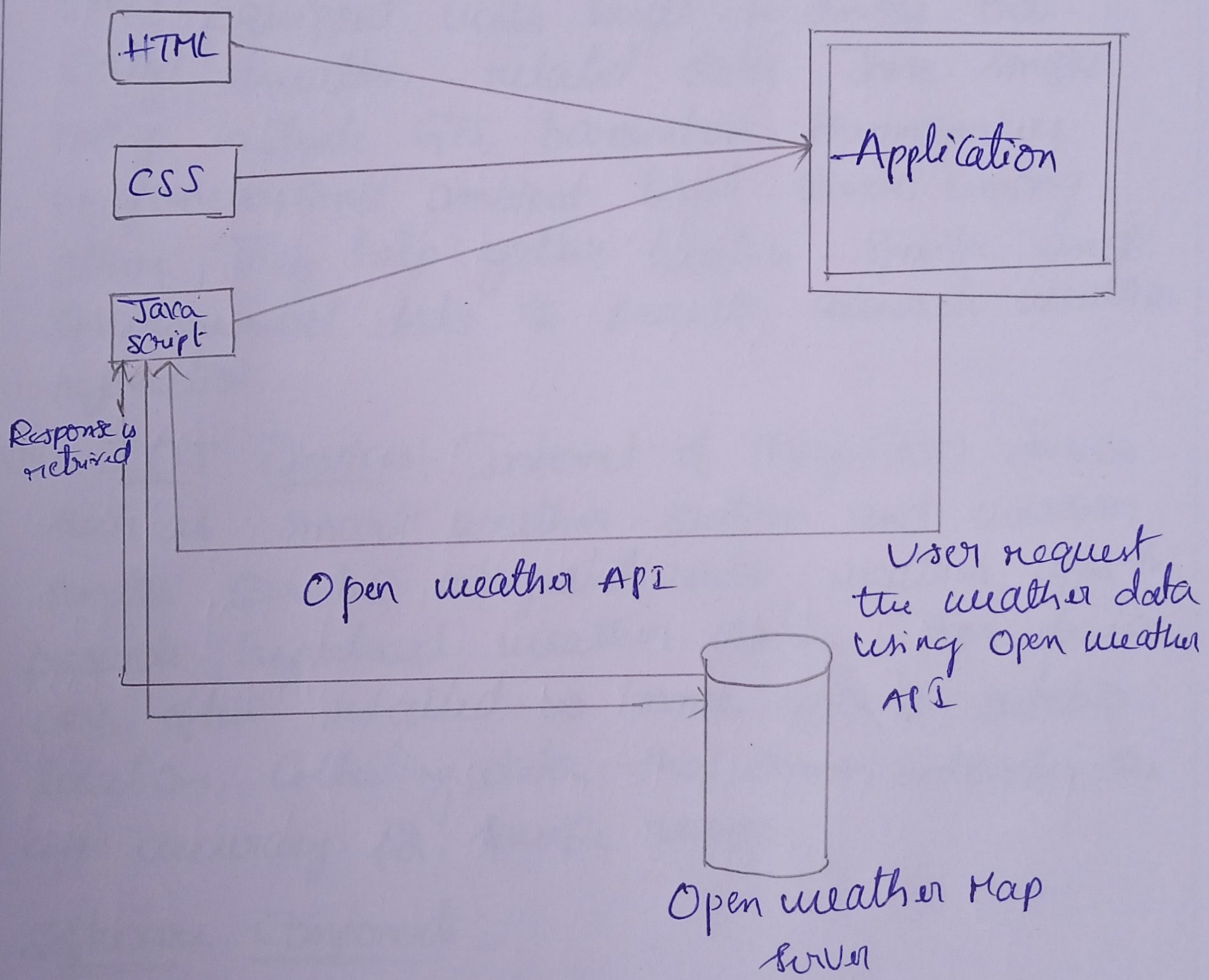
→ Researchers explored different data visualization methods and techniques to present weather

information effectively. These studies aimed to improve users' comprehension of complex weather data through innovative visualizations.

(iv) Hyperlocal weather forecasting:-

→ Hyperlocal weather forecasting, which provides highly localized weather predictions, was a subject of interest. Studies investigated the use of various technologies to gather real-time data for more precise predictions.

Block diagram :



Hardware Components:-

(i) Smartphones, Tablets and Computers:

Weather apps primarily run on user devices, such as, smartphones, tablets and computers.

These devices provide the platform on which the weather app software is run installed and executed.

(ii) Sensors:

Some modern smartphones and tablets come equipped with built-in sensors that collect weather-related data. These sensors may include GPS, barometers, thermometers, hygrometers and ambient light sensors, among others. They help gather location-specific and environmental data to provide accurate weather information.

(iii) IOT Devices:

Internet of Things (IoT) devices, such as smart weather stations and weather sensors can be integrated with weather apps to provide hyperlocal weather data. These devices are often installed in homes, offices & outdoor locations, collecting data that either enhances the app's accuracy for specific region.

Software Components:-

(i) Application Code-

The core of a weather app is its application code. The code is written in programming languages like Java script, HTML,

css depending on the platform and framework used for app development.

(ii) APIs (Application programming Interfaces)-

weather Apps rely on API's provided by weather data providers and weather services. These API's allow the app to access up-to-date weather information, including current conditions and weather forecasts, for specific locations.

(iii) User Interface (UI)- The User interface is the visual representation of the weather app, including screens, icons, buttons, and graphics. A well-designed UI ensures that users can easily navigate the app and access the weather data they need.

(iv) Geolocation Services- weather apps often use geolocation services to determine the user's current location. This information is then used to provide location-based weather forecasts and current weather conditions.

index.html X
C: > Users > anilk > OneDrive > Desktop > New folder > index.html > ...

```
1  <!DOCTYPE html>
2  <html lang="en">
3
4  <head>
5      <meta charset="UTF-8">
6      <meta http-equiv="X-UA-Compatible" content="IE=edge">
7      <meta name="viewport" content="width=device-width, initial-scale=1.0">
8      <link
9          href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700;800;900&family=Roboto:wght@300;400;500;700;900&displ
10         rel="stylesheet">
11     <link rel="stylesheet" href="style.css">
12     <title> Weather App</title>
13 </head>
14 <body background="images/fat.png">
15
16     </div>
17
18
19     <div class="container">
20
21
22         <div class="search-box">
23             <br>
24             <br>
25             <br>
26             <i class="fa-solid fa-cloud-sun-rain"></i>
27
28
29
```

```
29
30     <input type="text"placeholder="Enter your city">
31
32         <button class="fa-solid fa-magnifying-glass"></button>
33
34     </div>
35     <br>
36
37
38     <div class="not-found">
39         
40         <p>Oops! Invalid location :/</p>
41     </div>
42
43
44     <div class="weather-box">
45         <img src="">
46         <p class="temperature"></p>
47         <p class="description"></p>
48     </div>
49
50     <div class="weather-details">
51         <div class="humidity">
52             <i class="fa-solid fa-water"></i>
53             <div class="text">
54                 <span></span>
55                 <p>Humidity</p>
56             </div>
57         </div>
```

```
C: > Users > anilk > OneDrive > Desktop > New folder > index.html > ...
58     <div class="wind">
59         <i class="fa-solid fa-wind"></i>
60         <div class="text">
61             <span></span>
62             <p>Wind Speed</p>
63         </div>
64     </div>
65 </div>
66
67 </div>
68
69
70 <script src="https://kit.fontawesome.com/7c8801c017.js" crossorigin="anonymous"></script>
71 <script src="index.js"></script>
72
73
74 </body>
75
76 </html>
```

```
index.html  JS index.js  X
C: > Users > anilk > OneDrive > Desktop > New folder > JS index.js
1 const container = document.querySelector('.container');
2 const search = document.querySelector('.search-box button');
3 const weatherBox = document.querySelector('.weather-box');
4 const weatherDetails = document.querySelector('.weather-details');
5 const error404 = document.querySelector('.not-found');
6
7 search.addEventListener('click', () => {
8
9     const APIKey = '147f71604944a550268f69fa76aa7dd6';
10    const city = document.querySelector('.search-box input').value;
11
12    if (city === '')
13        return;
14
15    fetch(`https://api.openweathermap.org/data/2.5/weather?q=${city}&units=metric&appid=${APIKey}`)
16        .then(response => response.json())
17        .then(json => {
18
19            if (json.cod === '404') {
20                container.style.height = '400px';
21                weatherBox.style.display = 'none';
22                weatherDetails.style.display = 'none';
23                error404.style.display = 'block';
24                error404.classList.add('fadeIn');
25                return;
26            }
27
28            error404.style.display = 'none';
29            error404.classList.remove('fadeIn');
```

```
30
31 const image = document.querySelector('.weather-box img');
32 const temperature = document.querySelector('.weather-box .temperature');
33 const description = document.querySelector('.weather-box .description');
34 const humidity = document.querySelector('.weather-details .humidity span');
35 const wind = document.querySelector('.weather-details .wind span');
36
37 switch (json.weather[0].main) {
38     case 'Clear':
39         image.src = 'images/clear.png';
40         break;
41
42     case 'Rain':
43         image.src = 'images/rain.png';
44         break;
45
46     case 'Snow':
47         image.src = 'images/snow.png';
48         break;
49
50     case 'Clouds':
51         image.src = 'images/clouds.png';
52         break;
53
54     case 'Haze':
55         image.src = 'images/mist.png';
56         break;
57
58     default:
```

```
59         image.src = '';
60     }
61
62     temperature.innerHTML = `${parseInt(json.main.temp)}<span>°C</span>`;
63     description.innerHTML = `${json.weather[0].description}`;
64     humidity.innerHTML = `${json.main.humidity}%`;
65     wind.innerHTML = `${parseInt(json.wind.speed)}Km/h`;
66
67     weatherBox.style.display = '';
68     weatherDetails.style.display = '';
69     weatherBox.classList.add('fadeIn');
70     weatherDetails.classList.add('fadeIn');
71     container.style.height = '590px';
72
73
74 });
75
76
77});
```

```
index.html   JS index.js   # style.css  X
C: > Users > anilk > OneDrive > Desktop > New folder > # style.css > 83 *
1 *{
2     margin: 0;
3     padding: 0;
4     border: 0;
5     outline: none;
6     box-sizing: border-box;
7 }
8
9
10 .container {
11     max-width: 400px;
12     margin: 0 auto;
13     padding: 20px;
14     border: 1px solid #ccc;
15     border-radius: 5px;
16 }
17
18 h1 {
19     margin-bottom: 20px;
20 }
21 body{
22
23     height: 100vh;
24     display: flex;
25     align-items: center;
26     justify-content: center;
27     background-size: cover;
28
29
30
```

```
30
31
32 }
33
34 .container{
35   position: relative;
36   width: 400px;
37   height: 105px;
38   background: #ffffff;
39   padding: 28px 32px;
40   overflow: hidden;
41   border-radius: 18px;
42   font-family: 'Roboto', sans-serif;
43   transition: 0.6s ease-out;
44 }
45
46 .search-box{
47   width: 100%;
48   height: min-content;
49   display: flex;
50   align-items: center;
51   justify-content: space-between;
52 }
53
54 .search-box input{
55   color: #06283D;
56   width: 80%;
57   font-size: 24px;
58   font-weight: 500;
```

```
59     text-transform: uppercase;
60     padding-left: 32px;
61 }
62
63 .search-box input::placeholder{
64   font-size: 20px;
65   font-weight: 500;
66   color: □#06283D;
67   text-transform: capitalize;
68 }
69
70 .search-box button{
71   cursor: pointer;
72   width: 50px;
73   height: 50px;
74   color: □#06283D;
75   background: ■#dff6ff;
76   border-radius: 50%;
77   font-size: 22px;
78   transition: 0.4s ease;
79 }
80
81 .search-box button:hover{
82   color: ■#fff;
83   background: □#06283D;
84 }
85
86 .search-box i{
```

```
88     color: □#06283D;
89     font-size: 28px;
90 }
91
92 .weather-box{
93     text-align: center;
94 }
95
96 .weather-box img{
97     width: 60%;
98     margin-top: 30px;
99 }
100
101 .weather-box .temperature{
102     position: relative;
103     color: □#06283D;
104     font-size: 4rem;
105     font-weight: 800;
106     margin-top: 30px;
107     margin-left: -16px;
108 }
109
110 .weather-box .temperature span{
111     position: absolute;
112     margin-left: 4px;
113     font-size: 1.5rem;
114 }
115
116 .weather-box .description{
```

```
117     color: #06283D;
118     font-size: 22px;
119     font-weight: 500;
120     text-transform: capitalize;
121 }
122
123 .weather-details{
124     width: 100%;
125     display: flex;
126     justify-content: space-between;
127     margin-top: 30px;
128 }
129
130 .weather-details .humidity, .weather-details .wind{
131     display: flex;
132     align-items: center;
133     width: 50%;
134     height: 100px;
135 }
136
137 .weather-details .humidity{
138     padding-left: 20px;
139     justify-content: flex-start;
140 }
141
142 .weather-details .wind{
143     padding-right: 20px;
144     justify-content: flex-end;
145 }
```

```
146
147 .weather-details i{
148     color: □#06283D;
149     font-size: 26px;
150     margin-right: 10px;
151     margin-top: 6px;
152 }
153
154 .weather-details span{
155     color: □#06283D;
156     font-size: 22px;
157     font-weight: 500;
158 }
159
160 .weather-details p{
161     color: □#06283D;
162     font-size: 14px;
163     font-weight: 500;
164 }
165
166 .not-found{
167     width: 100%;
168     text-align: center;
169     margin-top: 50px;
170     scale: 0;
171     opacity: 0;
172     display: none;
173 }
174
```

```
175 .not-found img{  
176     width: 70%;  
177 }  
178  
179 .not-found p{  
180     color: #06283D;  
181     font-size: 22px;  
182     font-weight: 500;  
183     margin-top: 12px;  
184 }  
185  
186 .weather-box, .weather-details{  
187     scale: 0;  
188     opacity: 0;  
189 }  
190  
191 .fadeIn{  
192     animation: 0.5s fadeIn forwards;  
193     animation-delay: 0.5s;  
194 }  
195  
196 @keyframes fadeIn{  
197     to {  
198         scale: 1;  
199         opacity: 1;  
200     }  
201 }
```

Advantages:-

The advantages of weather app refers to the unique features and benefits that set it apart from other weather applications. Here are some potential advantages that a weather app could offer:-

- (i) Accurate forecasting: The app could utilize advanced weather prediction models, real-time data from reliable sources, and cutting-edge technology to provide highly accurate weather forecasts. This would be particularly valuable for users who need to plan outdoor activities or make travel arrangements with confidence.
- (ii) Localized weather updates: The app may offer hyper-local weather updates, allowing users to get information specific to their exact location. This level of detail can be crucial for people living in large cities with varying microclimates or those in remote areas.
- (iii) User-friendly interface: A well-designed and intuitive interface can enhance the user experience. The app might present weather information in a clear and easily understandable format, making it accessible to all users regardless of their technological expertise.

Disadvantage :-

Despite their usefulness, weather apps also come with some disadvantages, there are some potential drawbacks of using weather apps:-

- (i) Inaccuracy:- while many weather apps strive to be accurate, weather prediction is inherently challenging, and there can still be errors in forecasts. Users may rely heavily on the app's information and make plans based on it, only to encounter unexpected weather conditions.
- (ii) Data Source Reliability:- weather apps depend on data from various sources, including metrological agencies and weather stations. The reliability and accuracy of the app can be affected if the data source experiences technical issues or inconsistencies.
- (iii) Battery Drain:- weather apps often require location services and frequent data updates, which can consume significant battery power. This can be a concern, especially for users with older or low capacity smart-phones.
- (iv) Limited Accuracy for remote locations:- weather data might be less accurate or unavailable for remote or less populated areas, leading to less reliable forecasts for users in those regions.

Applications:-

A weather app is a versatile tool that can be applied in various situations and settings. Its primary purpose is to provide users with up-to-date weather information for a specific location or multiple locations. Here are some common applications of weather apps:-

- (i) Daily forecast: The most common use of weather apps is to check the daily weather forecast for your current location or multiple locations. You plan to visit. This helps you prepare for the day ahead, whether you need to dress appropriately, carry an umbrella or plan outdoor activities.
- (ii) Travel planning: Weather apps are handy when planning a trip or vacation. They allow you to check the weather conditions of your destination in advance, helping you pack the right clothing and gear and make any necessary adjustments to your itinerary.
- (iii) Outdoor Activities: Whether you're going for a hike, a picnic, or a day at the beach, a weather app can help you decide on the best time to go based on the weather conditions. It can also provide information about sunrise and sunset times, which is crucial for outdoor photography enthusiasts.

Conclusion:-

The Weather app is a web application that provides real-time weather information to users. By integrating the open weather map API and implementing an intuitive user interface, users can easily retrieve weather data for specific location. The project's modular structure allows for easy maintenance and further enhancements, such as adding additional features or optimizing the UI.

- (i) Safety and preparedness: Weather apps offer severe weather alerts, notifying users of potential hazards like storms, hurricanes, extreme temperatures.
- (ii) Environmental Awareness:- Some weather apps incorporate environmental data, such as air quality and UV index, promoting awareness of environmental factors that can affect health and well-being.

Future Scope :-

The weather app landscape was already well-established, with numerous weather apps available on various platforms, such as smartphones, tablets and computers. However, technology and users need evolve rapidly. There are some potential future scope and enhancements for weather app.

- (i) Hyperlocal and Real-time data: Future weather apps could provide even more granular, hyperlocal weather information with real-time updates. This could be achieved through the use of more advanced weather sensors, IoT devices and crowd-sourced data from user's smartphones.
- (ii) Personalization and AI-Driven insights: Weather apps could become more personalized by learning from user's preferences and behaviour patterns. Advanced AI algorithms could analyze user's historical data to provide personalized weather forecasts and relevant insights, such as weather-related health advisory.
- (iii) Augmented Reality (AR) Integration: AR features could allow users to visualize weather data overlaid on their surroundings. Users could point their smartphones at the sky to see real-time weather information for different parts of the sky & identify points of interest affected by weather conditions.

