# **Weather Forecast Application Documentation**

**GitHub Repository:** [Weather-Forecast-Application](https://github.com/Rawat107/Weather-Forecast-Application.git)**Live Demo:** [Weather Forecast App](https://weather-forecast-app-bs2a.onrender.com/)

## **Project Overview**

The Weather Forecast Application is a modern, responsive web application that provides real-time weather updates using the **OpenWeatherMap API**. It also enhances user experience by displaying dynamic background images sourced from the **Unsplash API**. Built with **HTML, Tailwind CSS, and Vanilla JavaScript**, this app offers a seamless and visually engaging weather tracking experience.

### **Key Features**

* **Real-Time Weather Data**: Displays current weather conditions, including temperature, humidity, wind speed, and visibility.
* **5-Day Forecast**: Provides a detailed 5-day weather forecast with hourly trends.
* **City Search & Geolocation**: Users can search for weather by city name or allow automatic geolocation-based weather retrieval.
* **Search History Storage**: Stores recent search history with case-insensitive deduplication.
* **Dynamic Backgrounds**: Enhances user experience with location-based background images.
* **Smooth Animations**: Implements modern animations and transitions for better UI interactivity.

## 

## **Development Process**

### **1. Project Setup**

* Initialized the project with **Vite** for efficient development and fast bundling.
* Integrated **Tailwind CSS** for responsive and utility-first styling.
* Configured **environment variables** using .env files to securely manage API keys.

### **2. Core Functionality Implementation**

* **Weather API Integration**: Fetches real-time weather data from OpenWeatherMap.
* **Dynamic Backgrounds**: Retrieves high-quality weather-based images from Unsplash.
* **User Input Handling**: Implements regex-based validation for city names to prevent incorrect entries.
* **Local Storage Management**: Saves and manages recent search history with auto-capitalization and duplicate prevention.
* **Error Handling**: Displays user-friendly error messages for API failures and denied geolocation access.
* **Responsive Design**: Optimized layouts with Tailwind CSS for mobile and desktop views.

### **3. Deployment**

* **Hosting**: Deployed on **Render** as a static site.
* **Environment Configuration**: Set up **environment variables** in Render’s dashboard to keep API keys secure.
* **Production Build**: Generated optimized production files using npm run build for improved performance.

## **Challenges & Solutions**

### **1. API Security**

* Used **Vite’s import.meta.env** to protect API keys from direct exposure in the frontend code.

### **2. CORS Issues with Unsplash API**

* Resolved image-fetching problems by handling CORS headers properly and implementing fallback images.

### **3. Managing Asynchronous Requests**

* Implemented async/await to sequentially load weather data and background images while ensuring proper error handling.

### **4. Responsive UI & Animations**

* Fine-tuned **Tailwind CSS transitions** for smooth and consistent animations across all devices and browsers.

### **5. Local Storage Optimization**

* Implemented **case-insensitive deduplication** to avoid redundant search entries while maintaining a manageable search history.

## **Getting Started**

### **1. Clone the Repository**

git clone https://github.com/Rawat107/Weather-Forecast-Application.git

cd Weather-Forecast-Application

### **2. Install Dependencies**

npm install

### **3. Set Up Environment Variables**

Create a .env file in the root directory and add your API keys:

VITE\_API\_KEY="your\_openweathermap\_api\_key"

VITE\_UNSPLASH\_ACCESS\_KEY="your\_unsplash\_access\_key"

### **4. Run Tailwind CSS in watch mode (in a separate terminal)**

npm run tw:watch

### **5. Run the App Locally**

npm run dev

### **6. Build for Production**

npm run build

## **Technologies Used**

* **Frontend**: HTML, Vanilla JavaScript, Tailwind CSS
* **APIs**: OpenWeatherMap (weather data), Unsplash (background images)
* **Tools**: Vite (build tool), Render (deployment), LocalStorage (data persistence)

## **Troubleshooting Guide**

| **Issue** | **Possible Cause** | **Solution** |
| --- | --- | --- |
| Blank Screen | API keys not set | Ensure correct .env setup |
| Geolocation Failure | Browser permissions disabled | Enable location access in browser settings |
| Missing Forecast Data | OpenWeatherMap API quota exceeded | Check API usage or switch to a new key |
| Background Images Not Loading | Unsplash API rate limit exceeded | Wait for reset or use a different key |

## **License**

This project is proprietary. Unauthorized distribution or commercial use is prohibited.

## **Acknowledgments**

* **Weather Data**: [OpenWeatherMap](https://openweathermap.org/)
* **Background Images**: [Unsplash](https://unsplash.com/)
* **Icons**: [Font Awesome](https://fontawesome.com/)