**L&T Project**

**Weather Dashboard**

**Real-Time Weather Forecasting Web Application**

**Introduction**

The Weather Dashboard is a web-based application designed to provide users with current weather data and a 5-day weather forecast for any city in the world. Built using HTML, CSS, JavaScript, jQuery, and Bootstrap, this project integrates responsive design and interactive elements to deliver an engaging user experience. The application fetches live data from the JustWeatherAPI, ensuring up-to-date information about temperature, weather conditions, humidity, and more.

**Objectives**

* Enable users to search and retrieve weather data by city name.
* Display current weather, temperature, humidity, and weather conditions.
* Present a 5-day weather forecast with expected temperatures and conditions.
* Ensure usability on devices of all sizes through responsive design with Bootstrap.

| **Technology** | **Purpose** |
| --- | --- |
| HTML | Page structure and layout |
| CSS | Styling and visual presentation |
| Bootstrap | Responsive and mobile-friendly UI |
| JavaScript | Logic and API integration |
| jQuery | Simplified DOM manipulation |
| JustWeatherAPI | Weather data retrieval |

**Technologies Used:**

**System Design and Architecture**

**User Flow**

* User enters a city name into the search bar.
* The application sends a request to the JustWeatherAPI
* Current weather and 5-day forecast data are retrieved and displayed in the dashboard cards.
* Responsive design ensures usability across desktop and mobile devices.

**Major UI Components**

* Search Bar: Allows input of city name.
* Weather Cards: Show current weather and forecast details.
* Responsive Layout: Utilizes Bootstrap grid and card components.

**Implementation Details**

* **HTML**: Main structure includes a container for the dashboard, a search field, and sections for weather info.
* **CSS/Bootstrap**: Uses Bootstrap’s grid and card system for layout, ensuring responsiveness and modern aesthetics.
* **JavaScript/jQuery**:
  + Handles user input events (button click, Enter key).
  + Sends AJAX/fetch requests to the weather API.
  + Parses and processes the API response.
  + Dynamically updates DOM elements with weather data and icons.
  + Manages error states and displays appropriate messages if a city is not found.

**Features**

* **Current Weather Display**: Shows city name, current temperature, humidity, and weather condition.
* **5-Day Forecast**: Presents daily high/lows and weather icons for each day.
* **Responsive Design**: Works seamlessly on phones, tablets, and desktops.
* **User-Friendly UX**: Modern card-based interface, clear information layout, and immediate feedback on errors.

**Testing and Validation**

* Manual testing performed across browsers (Chrome, Firefox, Edge).
* Mobile device responsiveness checked using Chrome DevTools device simulator.
* Verified handling of invalid city input and API failure scenarios.

**Results**

The developed Weather Dashboard successfully allows users to search for a city, displaying its current weather and a reliable 5-day forecast. All features work as intended on various screen sizes and browsers. API integration is robust, with user-friendly error handling and responsive updates.

**Conclusion**

The Weather Dashboard project demonstrates effective use of foundational web technologies with external API integration to address a real-world problem. The responsive and modern interface, combined with robust data-fetching logic, ensures a positive user experience and practical value.

**Future Enhancements**

* Add support for geolocation to auto-detect user’s city.
* Allow searching by zip code or latitude/longitude.
* Add historical weather data visualization.
* Introduce user authentication for saving favorite cities.

**References**

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