Flood Monitoring Tool

Overview

The Flood Monitoring Tool is a web-based application designed to provide real-time monitoring and analysis of flood data from various monitoring stations. The tool serves as a vital resource for government agencies, emergency responders, and the general public to assess flood risks, track water levels, and make informed decisions during flood events.

Purpose

- Collect and aggregate data from flood monitoring stations across different locations.
- Visualize the collected data in the form of interactive charts and tables for easy analysis.
- Enable users to select specific monitoring stations and view historical flood data.
- Assist in flood risk assessment, emergency planning, and decision-making processes.

Goals

The key goals of the Flood Monitoring Tool include:

- Enhancing flood preparedness and response capabilities by providing access to real-time flood data.
- Improving situational awareness during flood events through intuitive data visualization and analysis tools.
- Facilitating data-driven decision-making by delivering actionable insights derived from flood monitoring data.
- Promoting transparency and public awareness regarding flood risks and water level fluctuations.

Functional Requirements:

1. Station Selection Control:

- The tool shall provide users with a control mechanism to select an individual measurement station from the UK Environment Agency's flood monitoring API.

- Users shall be able to search for stations by the name from the dropdown.
- Upon selection, the tool shall retrieve and display the chart and the associated table with readings for the chosen station.

2. Data Visualization:
- Once a singular station is selected, the tool shall generate a line graph depicting the station's readings over the last 24 hours.
- The line graph shall visually represent the fluctuations in readings over time.

Non-Functional Requirements:

1. User Experience (UX):
- The tool shall have an intuitive and user-friendly interface, ensuring ease of navigation and station selection.
- Interactive elements (e.g., dropdown menus) shall be responsive and provide immediate feedback to user actions.
- Visualizations (graph) shall be clear, concise, and easy to interpret, catering to users with varying levels of technical expertise.

2. Performance:
- The tool shall efficiently retrieve and process data from the UK Environment Agency's flood monitoring API, minimizing latency in displaying station readings.
- Graph rendering shall be optimized to ensure smooth performance even with large datasets.

3. Security:
- The tool shall implement secure communication protocols (e.g., HTTPS) when fetching data from external APIs to protect user privacy and data integrity.
- Input validation mechanisms shall be in place to prevent injection attacks or other security vulnerabilities.

4. Compatibility:
- The tool shall be compatible with modern web browsers (e.g Chrome, Firefox, Safari).

5. Documentation:
- Comprehensive documentation shall be provided, including installation instructions, usage guidelines, and details on the data sources and API usage.
- Additionally, the tool shall incorporate in-app tooltips or help sections to assist users in understanding the functionality and interpreting the displayed data.

6. Maintainability:

- The tool's codebase shall follow best practices for maintainability, including modularization, code commenting, and adherence to coding standards.

Additional Notes:

- The tool shall leverage the UK Environment Agency's flood monitoring API (https://environment.data.gov.uk/flood-monitoring/doc/reference) to retrieve real-time data for the selected measurement stations.