Name: Om Sadigale

Student Id: w1943544

Group Number: 3

Topic: Water - contaminants and levels

Link to Streamlit app: Water - contaminants and levels Dashboard · Streamlit (w1943544dplc-cw-8fkxmsu2aerguogepqiewr.streamlit.app)

Link to video: https://westminster.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=e532ff14-2788-487e-bde4-b16900b3301c

Link to GitHub repository: https://github.com/OmSadigale/W1943544DPLC-CW

# Aims and Objectives:

Aims:

* The overarching goal is to develop an interactive dashboard that effectively communicates the insights and analyses generated from the group project centred around Water - contaminants and levels. This dashboard will serve as a pivotal tool for visualizing and disseminating key findings related to water quality parameters and contaminant levels.

Objective:

* Employing the comprehensive data analysis derived from the collaborative effort focused on Water - contaminants and levels, the objective is to develop an interactive dashboard tailored to present and engage with the findings about Water - contaminants and levels. This dashboard will serve as a dynamic platform for users to explore, visualize, and interact with the insights gleaned from the project's data analysis, facilitating a deeper understanding of water quality metrics and trends.

Key insights:

* The project focused on water contaminants has shed light on the pivotal role of wastewater as the strongest global metric impacting various facets of the environment and human health.
* It was found that by increasing the volume of urban wastewater premature deaths rise by approximately 0.844, highlighting significant health risks from inadequate wastewater management.
* Moreover, discharge volumes of urban, industrial, and agricultural wastewater have a direct impact on total wastewater discharges to sea or inland waters resulting in water pollution around the globe.
* Through rigorous analysis and literature review, it became evident that wastewater exerts a significant influence not only on environmental parameters but also on societal well-being.
* The findings underscore the interconnectedness between wastewater contamination and adverse impacts on ecosystems, public health, and societal dynamics.
* Furthermore, insights gleaned from the study indicate a correlation between wastewater pollution and carbon density, highlighting the broader implications for climate change mitigation efforts.
* By recognizing wastewater as a critical determinant of environmental sustainability and public health, the project underscores the urgency of addressing wastewater management challenges and implementing effective mitigation strategies.

# Requirements:

**Functional Requirements:**

Data Visualization Quality:

* The dashboard should provide interactive visualizations such as line charts, bar graphs, and maps to represent Total Wastewater discharge over time and across different geographical locations.

Filtering and Selection:

* Users should be able to filter and select specific parameters such as Year to customize their data views.

Trend Analysis:

* The dashboard should support trend analysis functionalities, allowing users to identify patterns and trends in Wastewater discharge, impact on Public Health and Ecosystem and track changes over time.

Comparative Analysis:

* Users should have the ability to conduct comparative analysis by comparing metrics between different regions, water sources, or time periods.

Geospatial Visualization:

* The dashboard should include geospatial visualization capabilities to display Total Wastewater discharge data on interactive maps, enabling users to explore spatial patterns and trends.

Data Export:

* Users should be able to export selected datasets or visualizations in various formats (e.g., CSV, PDF, Excel) for further analysis or reporting purposes.

**Non-functional Requirements:**

Performance:

* The dashboard should be responsive and provide quick data retrieval and visualization, even when handling large volumes of data.

Scalability:

* The dashboard should be scalable to accommodate increasing data volumes and user interactions without compromising performance.

Usability:

* The dashboard should be intuitive and easy to navigate, with clear instructions and user-friendly interfaces to facilitate user interaction.

Reliability:

* The dashboard should be reliable and available for use during scheduled hours of operation, with minimal downtime or disruptions.

# Test Cases:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC1 | | Title: | Data Visualization quality |
| Description | | To verify that the data visualization components in the interactive dashboard for water contaminants and levels are functioning correctly and effectively represent the analysed data. | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser ''. 2. Ensure that the dashboard displays relevant data related to insights on water contaminants and levels. 3. Verify that the dashboard elements (e.g., charts, graphs) respond to user interactions such as hover, click, and selection. 4. Verify that the data is represented visually in an understandable and informative manner. 5. Check for the presence of appropriate chart types (e.g., line charts, bar graphs, maps) based on the nature of the data. | | |
| Dependencies | | Not dependency | | |
| Expected result | | The dashboard should display relevant data related to water contaminants and levels.  Data visualizations should respond to user interactions and update dynamically.  The content displayed on the page must be free of errors and inaccuracies and be easy to understand. | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC2 | | Title: | Verify Navigation Accuracy |
| Description | | To verify the system navigates to all the pages without any error. | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser. 2. Check by clicking the tabs for each page on the left side of the web page. 3. Click the Public Health and Ecosystem buttons on the Dashboard. | | |
| Dependencies | | No dependency | | |
| Expected result | | When clicked on the tabs, it should navigate the viewer to the proper page.  When clicked on the Public Health button, the Public Health page should be visible.  When clicked on the Ecosystem button, the Ecosystem page should be visible. | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC3 | | Title: | Verify Responsiveness to Interaction |
| Description | | To verify that the selection functionalities in the interactive dashboard allow users to customize their data views effectively. | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser. 2. Check for the presence of selection options such as Year. 3. Verify that the data visualizations reflect the selected Year, displaying trends and variations over time. | | |
| Dependencies | | No dependency | | |
| Expected result | | Filter option for Year is available and functional.  Selecting a filter option updates the data visualizations to display relevant data based on the selected criteria. | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC4 | | Title: | Design and Usability Evaluation |
| Description | | To verify the layout of the dashboard is easy and understandable to use | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser. 2. Verify the Design elements (headers, fonts) and layout across the dashboard. 3. Verify the convenience of navigating through the dashboard. | | |
| Dependencies | | No dependency | | |
| Expected result | | Improved layout of the dashboard for easy movement.  Able to navigate through the dashboard and multiple pages. | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC5 | | Title: | Dashboard Data Accuracy |
| Description | | To verify the trends represented on the dashboard are true to the data feeds and reflects the key insights | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser. 2. Verify each chart or map displayed on the dashboard are aligned with insights. 3. Check if the functions such as filtering and sorting are available and functional. | | |
| Dependencies | | No dependency. | | |
| Expected result | | The dashboard should operate without errors and function properly for uncovering key insights. | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | TC6 | | Title: | Geospatial Visualization |
| Description | | To verify that the geospatial visualization functionalities in the interactive dashboard accurately represent spatial patterns and trends. | | |
| Steps and input data | | 1. Open the interactive dashboard in a web browser. 2. Locate and access the geospatial visualization component within the dashboard interface. 3. Check that the geospatial visualization covers the relevant Country. 4. Interact with the map by zooming in and out, panning, and hovering over different regions. | | |
| Dependencies | | No dependency | | |
| Expected result | | The geospatial visualization covers the relevant Country and provides meaningful insights into spatial patterns and trends.  Users can interact with the map smoothly | | |

# Test log:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TC | Date | Executed by | Actual result | Pass/Fail | Notes |
| TC1 | 06/05/2024 | Om Sadigale | All the data visualizations loaded without any error and responded to the user interactions correctly | Pass | The dashboard displayed all the visualizations accuratley |
| TC2 | 06/05/2024 | Om Sadigale | Navigation between multiple pages was seamless and without error | Pass | The click of the buttons was working as expected |
| TC3 | 06/05/2024 | Om Sadigale | The dashboard updated correctly as per the interactive selection. | Pass | The interactive selection effectively worked to display the trends. |
| TC4 | 06/05/2024 | Om Sadigale | The Navigation through the dashboard was easy and the layout is consistent. | Pass | The dashboard is self-descriptive. |
| TC5 | 06/05/2024 | Om Sadigale | The trends displayed on the dashboard are aligned with key insights | Pass | Various charts and trends can be seen |
| TC6 | 06/05/2024 | Om Sadigale | The countries are accurately represented on the map and the interaction with map is seamless. | Pass | Able to zoom in and zoom out successfully. |

# Reference:

docs.streamlit.io. (n.d.). *Chart elements - Streamlit Docs*. [online] Available at: https://docs.streamlit.io/develop/api-reference/charts [Accessed 7 May 2024].

‌