



5DATA004C.2

Data Science Project Lifecycle

Name: Sethmika Dias

UOW no: 19857518

IIT no: 20221906

Details

Name: Sethmika Dias Bellana

Student ID (UOW): 19857518

Student ID (UOW): 20221906

Group Number: 3

[Link to Streamlit app](#)

[Link to video](#)

[Link to GitHub repository](#)

Aims and Objectives

The primary aim of this project is to develop an interactive dashboard using Streamlit to explore and analyse the sales data from the “Superstore” dataset, which was obtained after cleaning from the group coursework. This dashboard will allow users to interactively explore key insights related to sales and profit metrics.

The main objectives of this project are:

- Design and implement an interactive and user-friendly dashboard using Streamlit. The dashboard will have interactive elements such as filters in the side bar and charts and KPI metrics, allowing users to explore and analyse the data based on their preferences and criteria.
- Identify and select the most significant key insights from the dataset. This includes metrics such as the sales, profit, and product performances. These insights will serve as the foundation for the dashboard’s content.
- Utilize appropriate data visualization techniques, including line charts, pie charts, bar charts and heatmaps to effectively present the selected key insights. The visualizations must be clear, understandable to non-technical reader while being informative, and visually appealing in order to enhance the user experience.
- Ensure that the dashboard provides enough functionality for users to interactively explore the data. Implement responsive elements such as date range filters, region selections, and sub-category filtering. This will enable the users to customize their analysis and drill down into specific subsets of the entire dataset.
- Utilize version control systems such as GITHUB and follow their best practices, such as performing regular commits with meaningful messages.

By achieving these objectives, the project aims to create a reliable and user-friendly dashboard that enables users to explore data, gain valuable insights, and make informed decisions. The dashboard will serve as a powerful tool for understanding and acting upon the analysed data.

Requirements

Functional Requirements (Alexsoft, 2023)

Data Visualizations:

The app should display key insights and trends from the dataset using various visualization types such as line charts, pie charts, bar charts and heatmaps.

Users should be able to select different metrics like sales, profit and various dimensions like based on region, product category, to visualise.

Interactive Filters:

The app should provide interactive filters allowing users to narrow down the data based on criteria such as date range, region, country, state, and product sub-category.

Users should be able to adjust the filters and observe the impact on the displayed visualizations in real-time.

Key Performance Indicators (KPIs):

The app should calculate and display key performance indicators (KPIs) such as total sales, total quantity, and total profit based on the filtered data.

KPI metrics should be updated at the same time, as users apply different filters or selections.

Navigation and User Experience:

The app should provide clear labels and instructions for users to explore different sections.

It should ensure consistent design elements (fonts, colours) for a more pleasing user experience.

User Control and Exploration:

Users should have control over the exploration of data insights through interactive elements like dropdown menus and date inputs.

The app should enable users to drill down into specific data subsets, compare different metrics, and discover patterns and be able generate business decisions accordingly.

Non-Functional Requirements (Alexsoft, 2023)

Performance:

The app should load quickly and respond promptly to user interactions (e.g.: filtering, changing views).

Smooth User Experience: Visualizations and data updates should be smooth, without noticeable delays.

Usability:

The app should be user friendly and easy to use without the need for extensive training.

The visualisation and controls should also be well designed for easy representation, by having a proper order in the app and with clear and simple labels.

Reliability:

Data filtering and visualisations should be consistent and accurate and provide reliable insights and analysis.

In summary the app should provide help users easily explore data and make informed decisions while prioritizing performance, usability, and reliability.

Test Cases

TC1: ANALYSIS FOCUS AND GRAPHS	
DESCRIPTION	Verify that the analysis focus feature correctly generates the appropriate graphs for different aspects of the data: sales analysis, profit analysis, and product insights.
STEPS AND INPUT DATA	<ol style="list-style-type: none">1. Launch the Streamlit app.2. Note down the initial state of the app(this is the "Sales Analysis")3. Choose the “Sales Analysis” and then the "Product Insights" focus from the available options.4. Check if the app displays relevant graphs related to each analysis option selected
DEPENDENCIES	Ensure that the dataset contains valid data for sales, profit, and product insights.
EXPECTED RESULT	When selecting each analysis focus, the app should display the appropriate graphs and visualizations related to that focus.
TC2 : METRICES UPDATE WITH FILTER	
DESCRIPTION	Verify that the metrics (total sales, total quantity, and total profit) dynamically update when filters (e.g., date range, region, sub-category) are applied.
STEPS AND INPUT DATA	<ol style="list-style-type: none">1. Launch the Streamlit app2. Note down the initial values of the metrics.3. Apply a filter by selecting a specific region (e.g., “North America”) from the sidebar.4. Check if the metrics update dynamically based on the applied filters.5. Verify that the displayed values reflect the filtered data accurately.
DEPENDENCIES	Ensure that relevant data exists for the specified date range, region, and sub-category.
EXPECTED RESULT	The metrics (total sales, total quantity, and total profit) should change according to the applied filters.
TC3 : DATE RANGE VALIDITY	
DESCRIPTION	Verify that the date range filter allows only valid years within the dataset (from 2011 to 2014)
STEPS AND INPUT DATA	<ol style="list-style-type: none">1. Launch the app2. Note down the initial date range displayed in the date filter (e.g: “2000-01-01” to “2024-12-31”).3. Attempt to set an invalid year (e.g: 2001)4. Check if the date range filter correctly restricts the years to the valid range (2011 to 2014).

DEPENDENCIES	Ensure that the date filter is functional, and that the dataset contains data for the years 2011 to 2014.
EXPECTED RESULT	The date range filter should prevent selecting years outside the valid range (2011 to 2014). The displayed date range should reflect the valid years.
TC4:	VERIFY IF THE FILTERS APPLY TO THE VISUALISATIONS
DESCRIPTION	Test if the app correctly filters data when filters are given
STEPS AND INPUT DATA	<ol style="list-style-type: none"> 1. Launch the Streamlit app 2. Select a random date range region, country, state, and a product category.
DEPENDENCIES	Ensure that data for these filters exists.
EXPECTED RESULT	The app should display data only for the specified filter
TC5 :	FILTER DEPENDENCIES
DESCRIPTION	Verify that the region, country, and state filters are correctly connected and dependent on each other.
STEPS AND INPUT DATA	<ol style="list-style-type: none"> 1. Launch the Streamlit app 2. Choose a specific region (e.g., "North America") from the region filter. 3. Check if the country filter displays only countries belonging to the selected region. 4. Check if the state filter displays only states within the selected country.
DEPENDENCIES	Ensure that the dataset contains valid region-country-state relationships.
EXPECTED RESULT	<p>The country filter should show only countries associated with the selected region.</p> <p>The state filter should display only states within the chosen country.</p>
TC6 :	DATA VISUALIZATION INTERACTION
DESCRIPTION	Verify that users can interact with the visualizations to obtain detailed information.
STEPS AND INPUT DATA	<ol style="list-style-type: none"> 1. Launch the Streamlit app. 2. Navigate to a visualization (e.g., Sales Trend Over Time). 3. Hover over data points on the visualization to view specific information (e.g., sales amount, date). 4. Click on elements within the visualization (e.g., segments in a pie chart) to filter or drill down into the data.
DEPENDENCIES	Ensure that the visualizations are interactive and respond to user interactions.
EXPECTED RESULT	Users should be able to interact with the visualizations to obtain detailed information and perform further analysis.

Log files

Test Case ID	Date Executed	Executed By	Actual Result	Pass/Fail	Notes
TC1	5/6/2024	Sethmika	Appropriate visualisation shown for the selected analysis focus	Pass	-
TC2	5/6/2024	Sethmika	Metrices are not changing according to the filters	Fail	Issue: Metrics are set outside the filter options.
TC2	5/6/2024	Sethmika	Metrics change according to the filters	Pass	-
TC3	5/6/2024	Sethmika	The date range allows to pick invalid dates	Fail	Set the maximum and minimum dates for both the start and end date filters.
TC3	5/6/2024	Sethmika	The date range only allows the valid dates from year (2011 - 2014)	Pass	-
TC4	5/6/2024	Sethmika	Visualizations change according to the filters	Pass	-
TC5	5/6/2024	Sethmika	The region, country, state filters are not dependent. Once you pick a region can also pick countries and states that doesn't belong to that region too.	Fail	Implement logic that ensures the selected options in each filter are consistent with one another.
TC5	5/6/2024	Sethmika	The region, country, state filters are dependent. Once you pick a region, the countries and states belonging to that region can only be picked after.	Pass	-
TC6	5/6/2024	Sethmika	Visualizations are interactive	Pass	-

References

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