CDS6324 Data Visualization

Project Report

Group: P24

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1 | Data Sources

The dataset that we used for this project is obtained from the Kaggle website (https://www.kaggle.com/datasets/thedevastator/global-video-game-sales-ratings?select=Raw+Data.csv). This dataset contains video game sales data for game titles released between 2000 and 2016. It covers the sales across multiple regions including North America, Japan, the European Union, and the rest of the world. In addition to sales figures, the dataset includes detailed information such as critic scores, game genres, consoles, and more. The dataset attributes below are from a pre-processed dataset that has been conducted and filtered by our group to match our vision. The dataset consists of 16 columns and 6,148 rows. Below are the features and their descriptions:

Table 1: Description of the Dataset

| Features	Description
Game_Title	The name of the video game.
Platform	The platform the game was released on.
Release_Year	The year the game was released.
Genre	The genre of the game.
Publisher	The publisher of the game.
NA_Sales	The sales of the game in North America.
EU_Sales	The sales of the game in Europe.
JP_Sales	The sales of the game in Japan.
Other_Sales	The sales of the game in other regions.
Global_Sales	The total sales of the game across all regions.
Critic_Score	The score given to the game by critics.
Critic_Count	The number of critics who reviewed the game.
User_Score	The score given to the game by users.
User_Count	The number of users who reviewed the game.
Developer	The developer of the game.
Rating	The rating of the game.

2 | Visualizations

2.1 | Overall Dashboard Look

Page 1 of Dashboard:
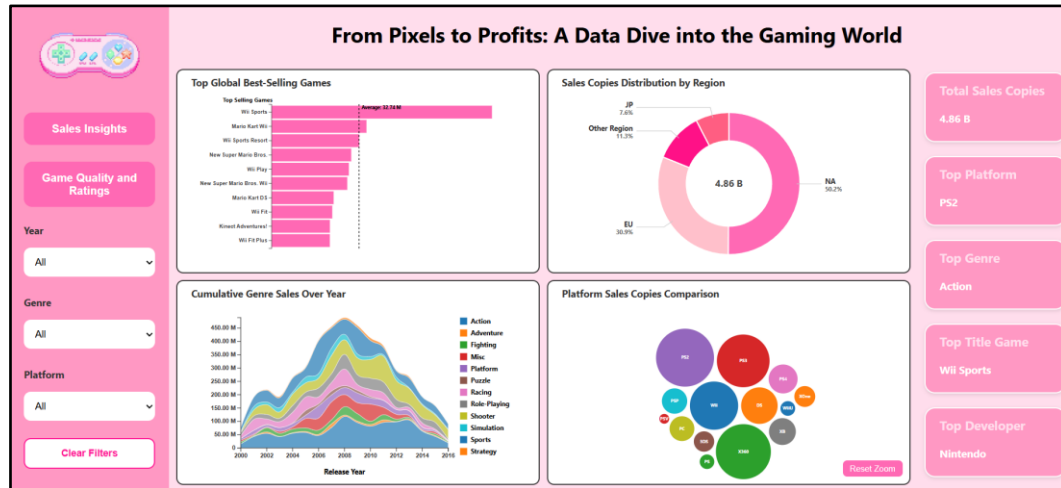
The **Sales Insights dashboard** serves as a foundation for analysing the performance of video games in the market and the way different factors contribute to making them a commercial success.

Page 2 of Dashboard:
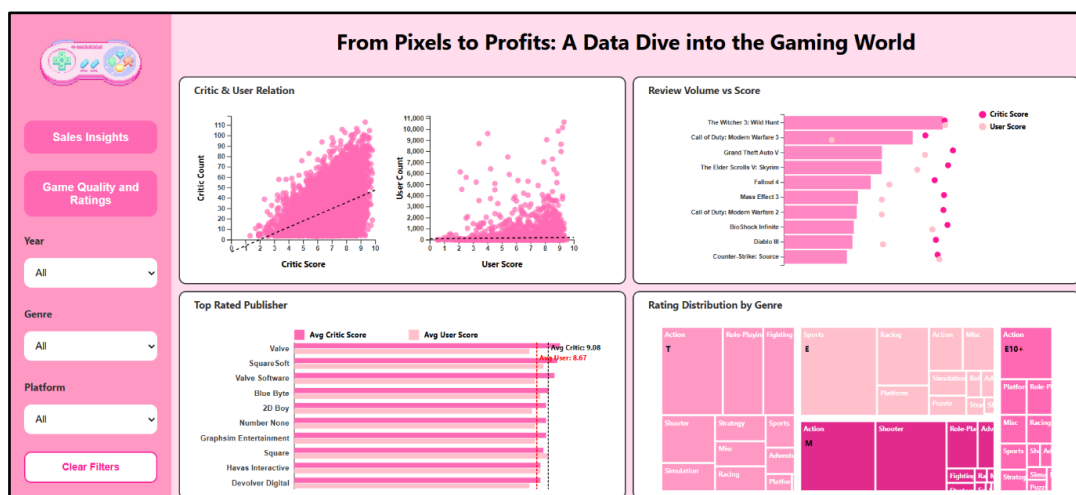
The **Game Quality and Ratings dashboard** sets the groundwork to present different perspectives on game evaluation and audience response.

2.2 | First Dashboard Visualizations

Total Sales Copies	Top Platform	Top Genre	Top Title Game	Top Developer
4.86 B	PS2	Action	Wii Sports	Nintendo

The **KPIs** presents an at-a-glance summary of the total global sales copies, the top-performing platform, most popular genre, best-selling game title, and leading game developer.
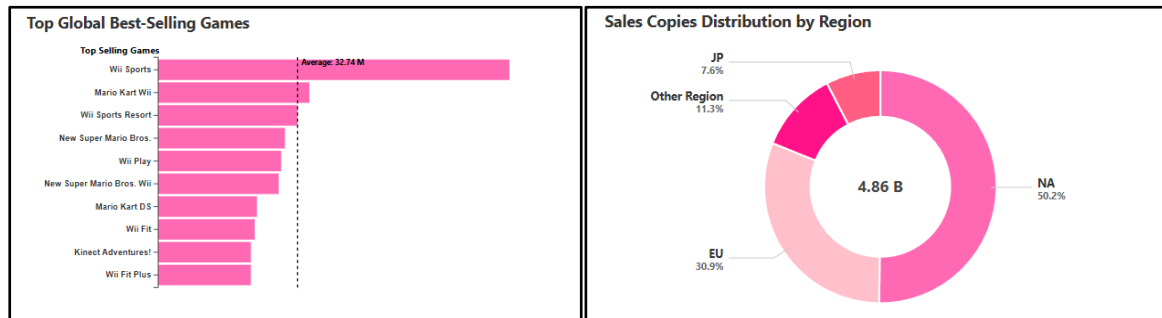

The **Top Global Best-Selling Games** chart is a horizontal bar chart that displays the ten highest-selling video game titles based on global sales volume. Each bar represents a game, with the length corresponding to the number of copies sold. A vertical dashed line marks the average sales figure, providing a reference point to compare individual game performance against the overall average. The **Sales Copies Distribution by Region** chart is a donut chart that displays the proportion of global video game sales attributed to different geographic regions. The total sales copies are shown at the center, while each segment represents a region's contribution to the overall sales. This chart helps visualize the regional market share within the global gaming industry.
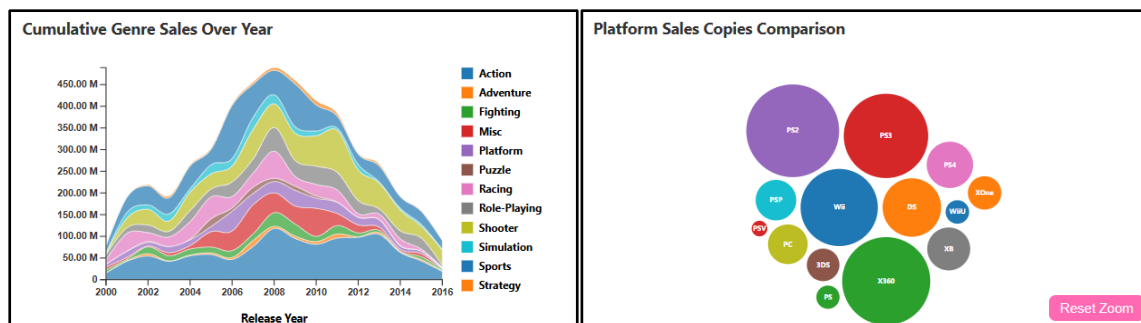

The **Cumulative Genre Sales Over Year** chart is a stacked area chart that visualizes the total global sales of video games over time, categorized by genre. Each coloured area represents a genre, and the vertical accumulation shows the combined sales across all genres for each year. This chart provides an overview of how genre popularity and overall market activity have evolved from 2000 to 2016, capturing both growth trends and fluctuations in the gaming industry. The **Platform Sales Copies Comparison** chart uses a bubble chart to compare the total sales across various gaming platforms. Each bubble represents a platform, and its size reflects the volume of sales attributed to that platform. This visualization allows for a quick comparison of platform performance, emphasizing the relative success of consoles and handheld systems within the dataset.

2.3 | Second Dashboard Visualizations
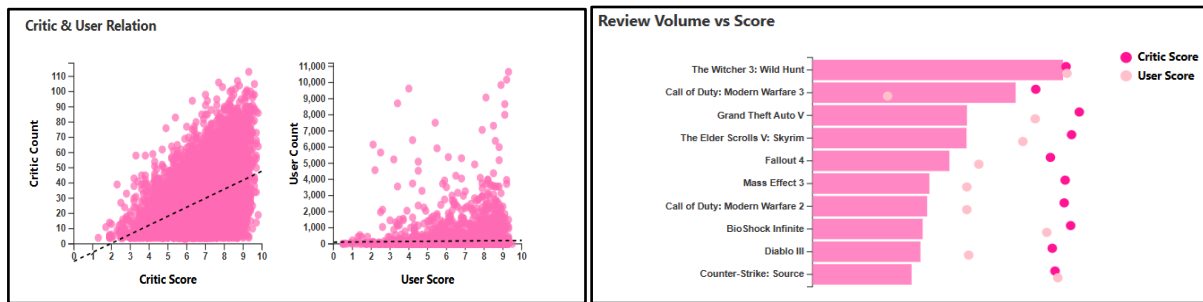
The **Critic & User Relation** chart is a dual scatter plots that visualizes the relationship between review scores and the number of reviews for each video game, separately for critics and users. Each point represents a game, and the dashed line indicates the overall trend. The left chart highlights a moderate positive correlation where higher scores tend to attract more critic reviews. These visualizations help assess whether better-rated games generally receive more attention. **The Review Volume vs Score** chart is a dual-axis horizontal bar chart displaying ten most-reviewed games by total volume. Each game is represented by a bar, with separate dot markers for Critic Score and User Score overlaid. This design allows for direct comparison between critic and user reception for the most popular titles. Games like The Witcher 3: Wild Hunt and Call of Duty: Modern Warfare 3 shows notable score differences, revealing gaps between professional and public opinion.
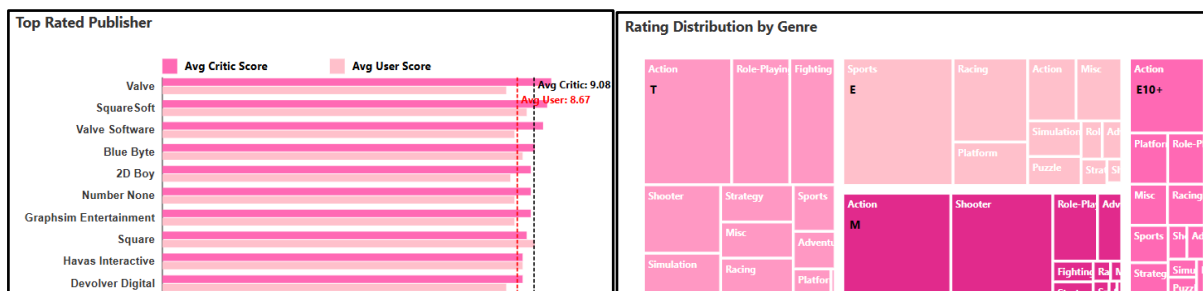

The **Top Rated Publisher** chart is a horizontal bar chart comparing average critic and user scores across the top ten game publishers. Each publisher has two bars, one for Average Critic Scores and another for Average User Score, coloured distinctly. Vertical dashed lines indicate the overall average scores to highlight which publisher exceed or fall below the mean. SquareSoft stand out as highly rated by both critics and users. The **Rating Distribution by Genre** chart is a tree map that breaks down game genres by ESRB rating categories such as E, T, M, E10+. Each block represents a genre-rating combination, with size corresponding to the volume of games in that category. For example, Action games are dominating in both T and M ratings, while E ratings dominate sports and racing genres. This visualization provides an overview of content maturity across different game types.
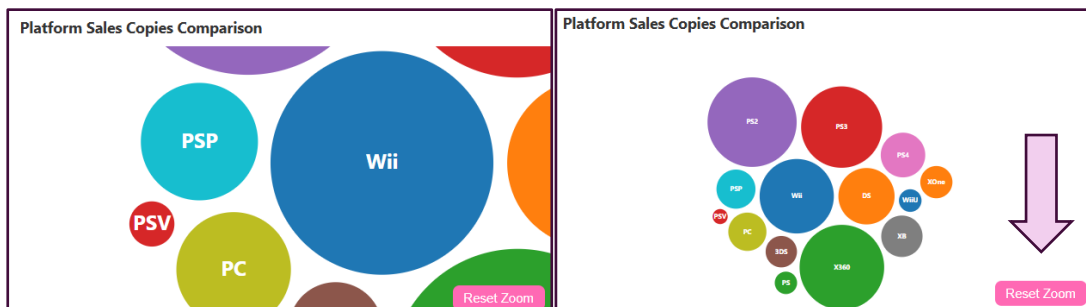
3 | Interactivity

The dashboard includes several interactive elements that enhance user engagement and data exploration:

- **Tooltip**: Hovering over data points reveals tooltips that provide additional information such as game title, exact scores, review count, and publisher names. This helps users gain insights without cluttering the visual layout.
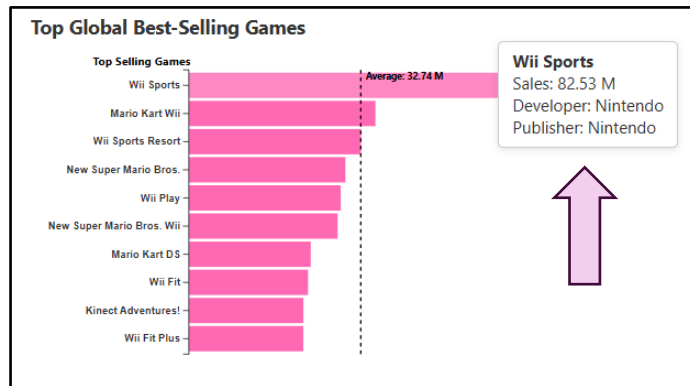
- **Zoom In**: The bubble chart (Platform Sales Copies Comparison) in dashboard 1 supports zooming, allowing users to focus on specific bubbles that represent individual platforms. This is useful for examining small bubbles, which may otherwise be difficult to distinguish or read. A reset button lets users quickly return to the default full-view layout after zooming.

- **Interactive Filters**: Filters for Year, Genre, and Platform allow users to focus on specific subsets of the data, making it easier to identify trends within a category. A 'Clear Filters' button is also available to remove all selections and restore full dataset view

4 | Visualization Design Principles

The visualizations in this data story were guided by a combination of **Shaffer's 4Cs** (Context, Clarity, Cohesion, Communication) and **Cole Nussbaumer's 4As** (Affordance, Aesthetics, Alignment, Annotation) to ensure an effective and engaging user experience.

Context is established through the division of dashboards into two thematic areas: **Sales Insights** and **Game Quality and Ratings**, with interactive filters allowing users to refine their view based on year, genre, and platform. **Clarity** is achieved through clean chart types, clear titles, and the consistent colour usage and **Aesthetics** are enhanced by a cohesive, pink-themed design that balances function with the visual appeal. **Cohesion** and **Alignment** are evident in the uniform layout and consistent placement of filters, charts, and KPIs, ensuring a logical flow of information. **Communication** is strengthened through focused visualizations that support the narrative purpose of each dashboard, and **Affordance** is implemented in intuitive elements such as filter dropdowns and zoom controls that engage interaction, with a zoom reset button provided as well. Lastly, **Annotation**, such as chart titles, legends, and average reference lines, guides the interpretation without overwhelming the viewer.

5 | Challenges and Solutions

The following are the challenges that we faced when doing the dashboard and the solutions that we have implemented to solve the challenges:

| Challenges	Solutions
Implementing the layout (Visuals overflows, shrinks or disappears from the containers.)	Implemented a debugging technique by adding dotted border outlines around all containers and frames in CSS.
Some of the bubble in bubble charts are too small to see.	Implemented a zoom interactivity along with a 'Reset Zoom' button.
The containers misalign when the size of the page changes.	By giving every <svg> a viewBox and preserveAspectRatio="xMidYMid meet" and styling its width and height to 100%, each chart automatically scales up or down to fit its container without distortion.
The chart extends outside its container.	We enforced overflow: hidden and width: 100%/height: 100% on each chart container and always remove existing <svg> elements before rendering new ones, guaranteeing every chart fits snugly within its box without clipping, duplication, or distortion.

6 | Development Processes

Our members were tasked with different works, depending on their skills, as shown in the table below:

Members	Tasks
Shahnaz	- Created area chart - Created dual axis bar and dot plot chart
Yusriena	- Created barplot chart - Created dual barplot chart
Farid	- Led the group discussion - Combined two dashboard pages - Created bubble plot chart - Created scatter plot chart - Finalize dashboard layout
Jia Qian	- Implemented dashboard layout - Created filters interactivity - Created donut chart - Created treemap chart

The following are the Gantt chart of our project timeline:
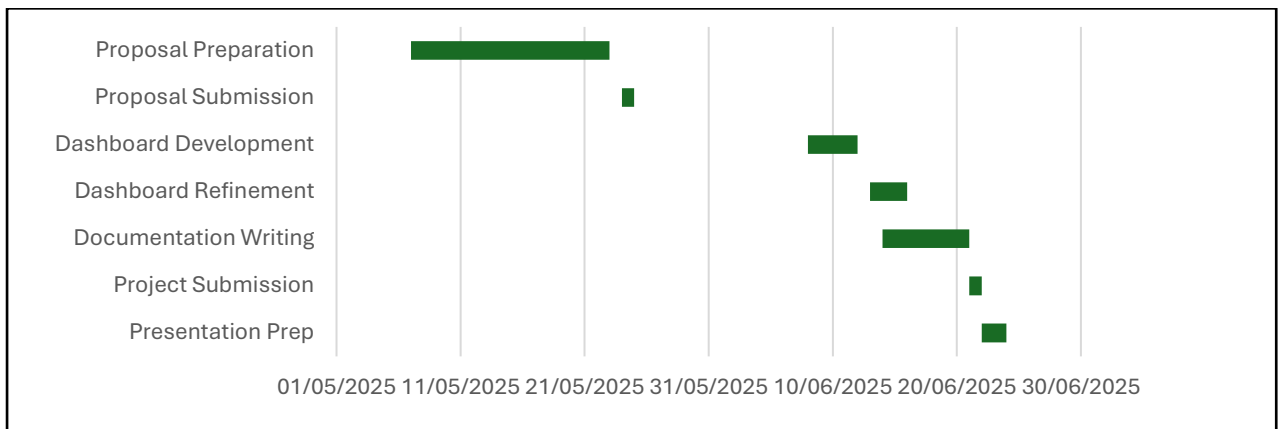
For the project, we implemented the initial dashboard layout with the chosen theme colour. The function to render the chart is then defined and the filter interactivity is implemented. After the layout and filter implementation is ready, the members proceed to complete their tasked visualizations. Then, the leader did the checking and troubleshooting to finalize the dashboard layout. After the dashboard is completed, each of the members helped in the documentation. We spent approximately 2-3 hours per day in developing the dashboard and the charts, and 1 hour per day after the development of the dashboard to do the documentation so that we can finish the work before the due date. The aspect that took most of the time is finalizing the dashboard layout as it took some time to determine the correct height and width for both the containers and the charts so that the chart can fit in the container without overflowing.