AstroTrio

A project made by

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This project was made as part of the COM-480 - Data Visualization at EPFL

Project Goal

This project offers a set of interactive visualizations that explore space across three levels: Earth, the Solar System, and the Milky Way. Each module focuses on a specific theme: the rocket launches over time, a comparative planetary data analysis, and the discovery of exoplanets, using real-world dataset. Together, these visualizations aim to make complex astronomical information more accessible and engaging, especially for educational purposes.

Dataset

Different datasets from Kaggle were used for the visualizations, one for each.

-The first contains all the rocket launches from earth since 1957. The coordinates of the different launch station was obtained by looking at the station on google maps.

-Then, a dataset gathering the different characteristics of the 8 planets of the solar system.

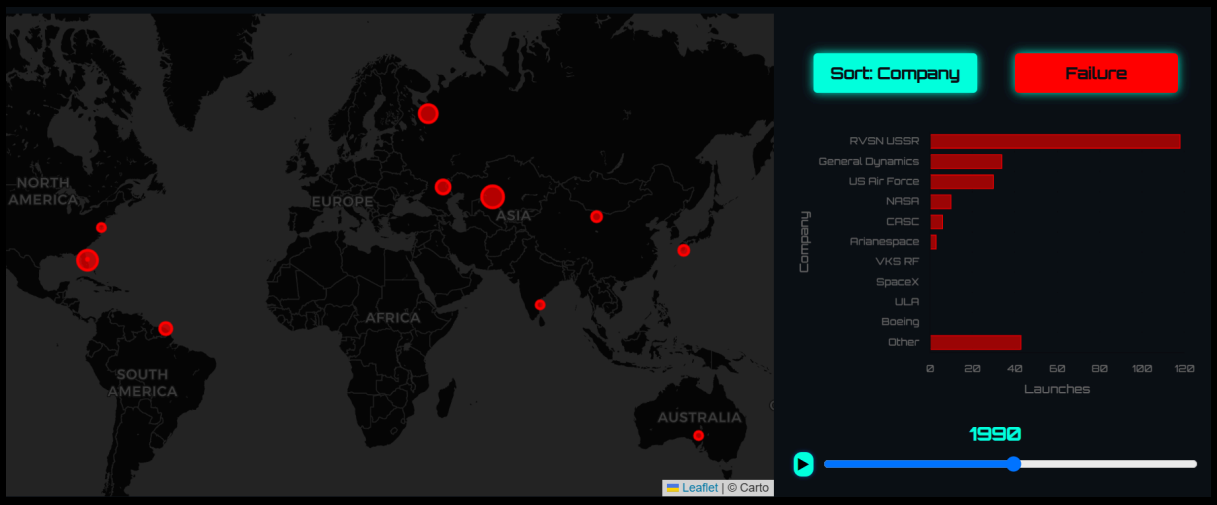
-Finally, a dataset about the discovery of exoplanets with their distance from earth and some characteristics.

Visualisations

Launch Map

The first visualization we decided to create focuses on a historical exploration of global rocket launches from Earth since 1957. Our goal with this visualization is to provide a dynamic overview of space exploration activity over time, highlighting the

evolution of launch frequency, geographic distribution, and national contributions to spaceflight. By displaying this data on an interactive world map, we aim to make the scale and growth of global launch efforts both engaging and accessible.



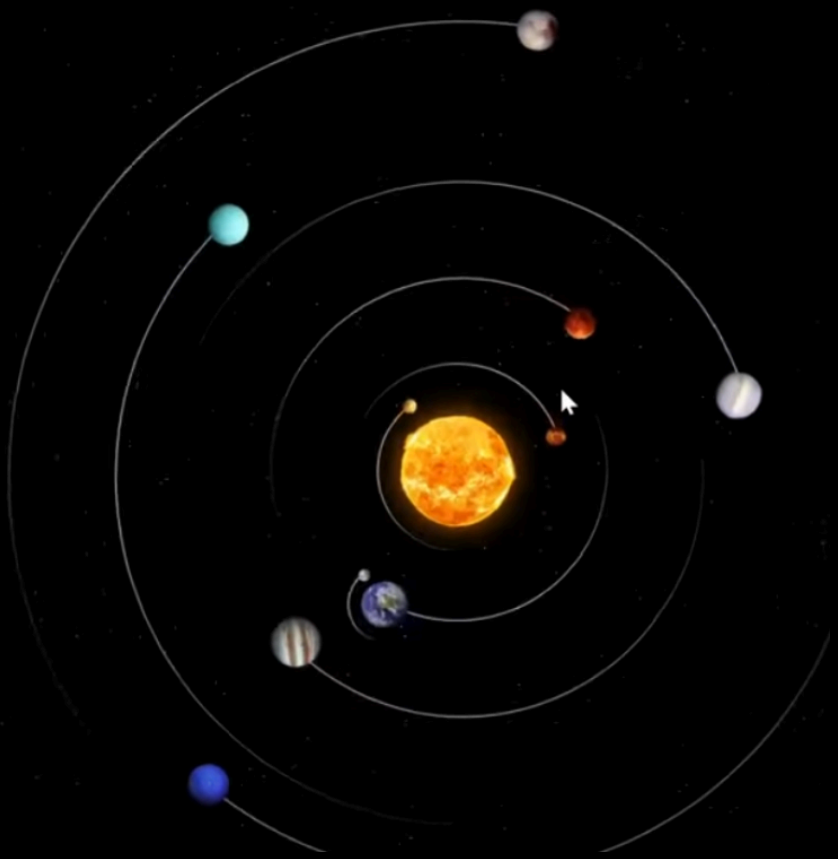
The launch map features a time slider that animates launches year by year, allowing users to observe how launch activity has shifted across decades. Users can filter the data by success or failure, and a horizontal bar chart displays the top countries by number of launches for the selected year, offering a comparative perspective. The user can also choose to sort by company instead of country, and click on individual companies to view additional contextual information and descriptions.

Additionally, this visualization encourages reflection on the geopolitical and technological developments that have shaped modern space exploration, while laying the groundwork for future enhancements such as mission classification or destination mapping.

Solar system

The second visualization centers on an educational exploration of the Solar System, offering users an interactive interface to compare and understand the characteristics of planets and

other major celestial bodies. The goal of this visualization is to provide an intuitive and engaging way to examine planetary data, encouraging users to explore both numerical properties and categorical features such as composition, surface characteristics, and color.



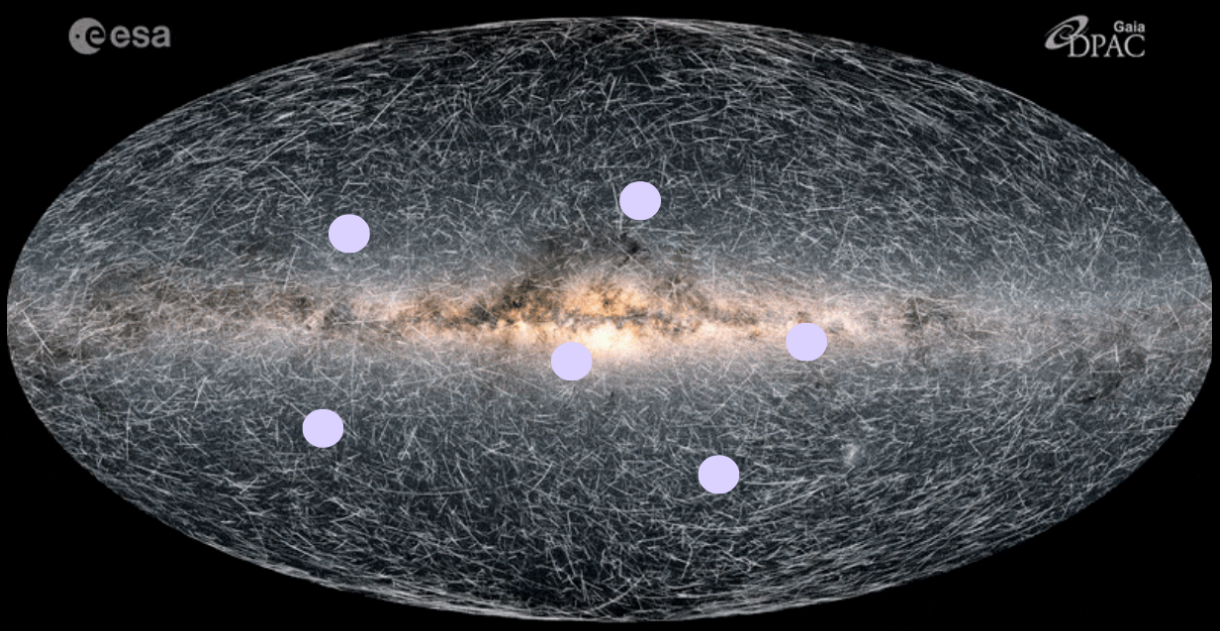
At the core of the interface is a dynamic Solar System view, where planets orbit the Sun and can be selected to reveal detailed information in a radar chart. This comparative chart visualizes key quantitative attributes such as mass, diameter, gravity, and temperature, providing a multidimensional perspective on planetary differences. Users can also explore other static charts highlighting temperature ranges and additional numerical comparisons across Solar System bodies.

This visualization is designed to be both informative and exploratory, helping users grasp the diversity of our Solar System through interactive elements. Future improvements could include support for elliptical orbits, the inclusion of major moons

and artificial probes, or even 3D rendering to enhance spatial understanding.

Milky way

The third visualization focuses on the discovery of exoplanets within the Milky Way. It offers an animated view of how exoplanet discoveries have evolved over time, highlighting key trends and the growing reach of astronomical observation. Users can explore when and where planets were found, as well as interact with filters and panels to examine properties such as orbital radius, temperature, and discovery method.



This visualization aims to show both the scale of our galaxy and the increasing sophistication of space detection technologies. Future additions could include star–planet linking, habitability metrics, or a 3D representation of nearby exoplanet systems.

Website implementation

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Peer assignment

Iman

Iman was responsible for the Solar System visualization. She implemented the interactive interface representing the celestial bodies and developed the comparative charts across planets. She also handled the overall structure of the website, ensuring a coherent layout across the different sections.

Léo

Léo implemented the launch map visualization displaying global rocket launches since 1957. He developed the time-based animation, filtering options, and the bar chart comparing countries by number of launches. He also contributed to the technical explanations and documentation related to this module.

Maud

Maud created the Milky Way visualization focused on discovered exoplanets. She managed the temporal animation of discoveries and built the interactive panels showcasing the different properties of the exoplanets. She also helped refine the narrative around this part of the data story.

Links and references

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