Chronicles of Exoplanet Exploration

Subject

Chronicles of Exoplanet Exploration

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Embark on a thrilling journey to revolutionize exoplanet education! The discovery of exoplanets has redefined our understanding of planetary systems, expanding what we know about our place in the universe. From scorching gas giants to potentially habitable rocky worlds, these distant worlds offer a glimpse into the remarkable diversity of planetary configurations. Traditional educational materials about this topic may not be accessible to everyone, particularly those from underserved communities or with limited access to resources. Your challenge is to develop engaging and accessible learning materials that leverage creativity to enlighten students about the wonders of exoplanets.

Scope

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Tycho Exoplanet Exploration is an immersive virtual reality (VR) educational game where players take on the role of an exoplanet analyst. Using real NASA data and scientific tools, players explore stars and detect exoplanets through interactive and engaging gameplay. The game is divided into phases, guiding players through the process of analyzing stars, identifying exoplanets, and studying their characteristics.

The goal is to make complex astronomical concepts accessible and fun, while fostering interest in STEM fields, particularly space exploration and planetary science.

Features

Immersive Virtual Reality (VR) Environment:
Players experience an interactive, 3D simulation where they assume the role of an exoplanet analyst, exploring stars and detecting exoplanets.

Real NASA Data Integration:
The game utilizes actual NASA data like Kepler, allowing players to work with real scientific information during gameplay.

Phased Gameplay Structure:
The game is divided into distinct phases:

- Phase 1: Analyze stars to detect potential exoplanets.
- Phase 2: Identify the type and mass of detected exoplanets.
- Phase 3: Explore the surface of the exoplanet and collect valuable data.

Gamification of Scientific Concepts:
Complex astronomical concepts are presented in a simplified, gamified format, making it accessible and fun for users of all technical levels, like “Who is who?”.

Customizable Exploration Tools:

Players can interact with a variety of tools and sensors, simulating real scientific instruments used in exoplanet detection.

User-Driven Learning:
The game encourages players to take notes, gather evidence, and draw their own conclusions, promoting critical thinking and problem-solving skills.

Challenges

Developing an Immersive VR Experience:
Creating a fluid and engaging virtual reality environment that allows players to explore and interact with celestial bodies while ensuring high-quality graphics and performance.

Gamifying Complex Scientific Concepts:
Simplifying intricate astronomical theories and methods into a format that is both educational and entertaining, making it accessible to users with varying levels of knowledge.

Data Interpretation and Analysis:
Designing gameplay elements that enable players to analyze and interpret data effectively, ensuring they can draw meaningful conclusions about the exoplanets they discover.

User Engagement and Retention:
Keeping players motivated and engaged throughout the different phases of the game, encouraging continued exploration and learning while maintaining a sense of fun and challenge.

Technical Development and Optimization:
Overcoming technical challenges related to VR development, such as optimizing performance for various hardware configurations and ensuring a smooth user experience without motion sickness.

Testing and Feedback Integration:
Gathering user feedback during testing phases to refine gameplay mechanics and educational content, ensuring that the final product meets the needs and expectations of players.

Team members:

Luis Maria Prieto: Cybersecurity technician, 42 school student

Marco Antonio Hernani: Data analyst, math student

Luis Eduardo Soto: Software developer, 42 school student

Fernando Aguilar: Product graphic designer

Alba Sans: Software student, 42 school student

Management

The whole assignation of tasks was optimized in order to fit with members knowledge.
That issue becomes into a fast progress development.
Some problems appear in data handling because of the acquisition in a useful format for our model.
That issue was solved ignoring some invalid data and transforming it into a processed dataset.
Our resources and our working capacity was optimized by assigning someone with a low working
load or almost finish the assigned task.

Final results

All the challenges assumed has been accomplished and the whole team has developed a
perfect performance in order to reach the deadlines established.

Webgraphy and references

Story telling:

Planeta extrasolar - Wikipedia, la enciclopedia libre

Exoplanet Watch - NASA Science

https://www.spaceappschallenge.org/nasa-space-apps-2024/challenges/chronicles-of-exoplanet-exploration/

Front:
- https://svs.gsfc.nasa.gov/13022
Bender models: Sol;
asset_base_id:e7777ea0-e155-4979-9f0c-fe80d75cdf74

https://drive.google.com/file/d/1S0xMR7MLOThxpB-H-dzcLzbn_6038a93/view?usp=sharing

https://drive.google.com/file/d/14mGSkZKvfu49l8iFs73e913pcvedcDoi/view?usp=sharing

https://drive.google.com/file/d/1hVwEx3KDj01JE5isXJYd-vcX7MXFF4t2/view?usp=sharing

Back (API + data filter):

Install the Meta Quest Link app for your PC | Meta Store

Data:

Observatori del Montsec - Observatori del Montsec (ieec.cat)

https://science.nasa.gov/exoplanet-catalog/

https://github.com/nasa/spaceapps/