Team Details

a. Team name: THE ROVERS
b. Team leader name: Harpreet Sra
c. Problem Statement: Chronicles of Exoplanet Exploration

Brief about the idea

The discovery of exoplanets has profoundly expanded our understanding of the universe, revealing a vast diversity of planetary systems. However, traditional educational materials on this topic are often inaccessible to underserved communities and individuals with limited resources, creating a barrier to learning about these fascinating distant worlds. Our challenge is to develop creative, engaging and accessible learning materials through game that make exoplanet education interesting and available to all students, regardless of their background or resources. These materials should inspire curiosity and provide a comprehensive understanding of the wonders of exoplanets, ensuring inclusivity and fostering a new generation of space enthusiasts.

a. How different is it from any of the other existing ideas?

Our approach of integrating exoplanet education into a game is distinct from existing ideas in many ways

1. Interactive Learning
2. Immersive Storytelling
3. Creative Exploration of Exoplanet Diversity
4. Gamification of Education
5. Accessibility and Inclusivity

B) How will it be able to solve the problem?

Increased Engagement: Gamification makes learning about exoplanets fun and interactive, encouraging students to explore complex topics actively rather than passively.

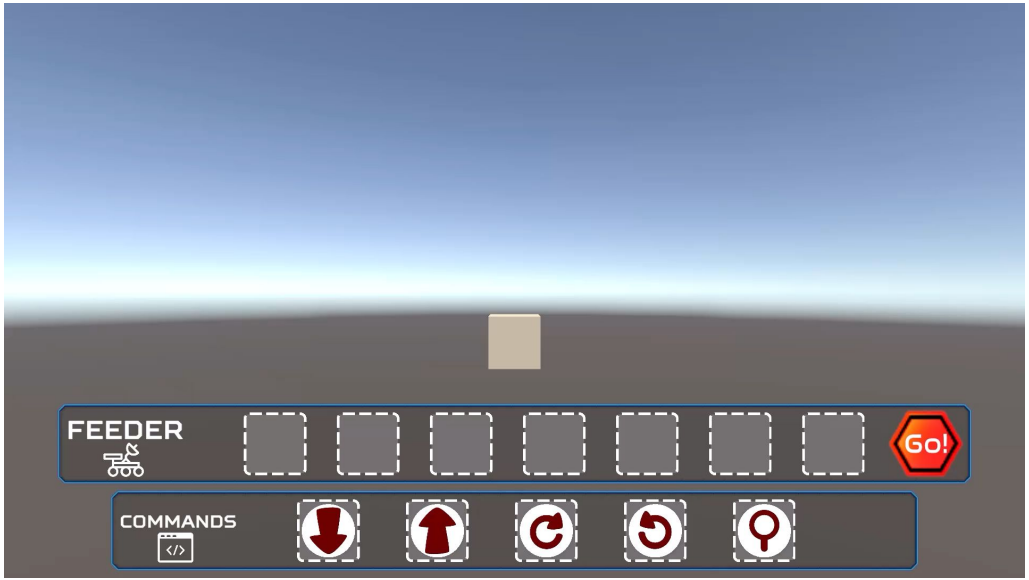
Accessibility: The game can be designed for multiple platforms, including low-tech or offline versions, ensuring it reaches underserved communities and those with limited resources.

Simplified Learning: By breaking down complex concepts into visual, interactive experiences, the game makes exoplanet science easier to understand, fostering both knowledge and critical thinking.

c) **Unique Selling Proposition (USP)** of the proposed solution:

In game uniquely combines **immersive storytelling** and **interactive gameplay** to teach complex exoplanet science, making learning fun and accessible to students of all backgrounds. Unlike traditional educational materials, it breaks down barriers by offering a **multiplatform, low-tech option** that ensures inclusivity while fostering **critical thinking** and **engagement** through gamified challenges and creative exploration of diverse planetary systems.

Wireframes/Mock diagrams of the proposed solution



Architecture diagram of the proposed solution

Key Components in the Architecture:

1.User Interface (UI)

1. Where players interact with the game, input commands, and receive feedback.
2. Possible sub-components:
    1. **Game Controls** (for sending commands to the rover)
    2. **Mission Selection** (choosing planets and missions)
    3. **Analysis Reports** (viewing results from the research centre)

2.Game Engine

1. The core logic that handles player actions, rover movements, and mission progress.
2. Sub-components:
    1. **Rover Movement Module** (processes player commands for movement)
    2. **Planetary Simulation** (virtual world representation of exoplanets)
    3. **Mission Tracking** (keeps track of user's current mission progress)

3.Rover Module

1. Simulates the behaviour of the rover, including:
    1. **Command Processor** (interprets commands from the user)
    2. **Movement Module** (controls the rover's movement across the planet)
    3. **Element Detection System** (detects elements on the surface)

Rover Module

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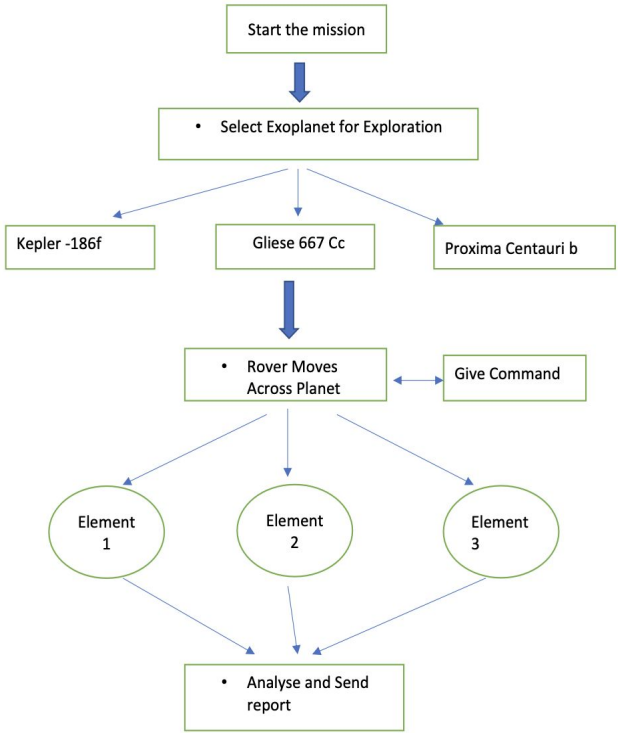
2. Backend/Server

1. Manages data, missions, and communication between components.
2. Sub-components:
    1. **Planet Database** (stores data for different exoplanets)
    2. **Element Database** (stores details of elements found)
    3. **Research Center** (analyzes elements and provides results)**Data Storage**

3. API Layer

1. Facilitates communication between the game engine, backend, rover module, and research center.

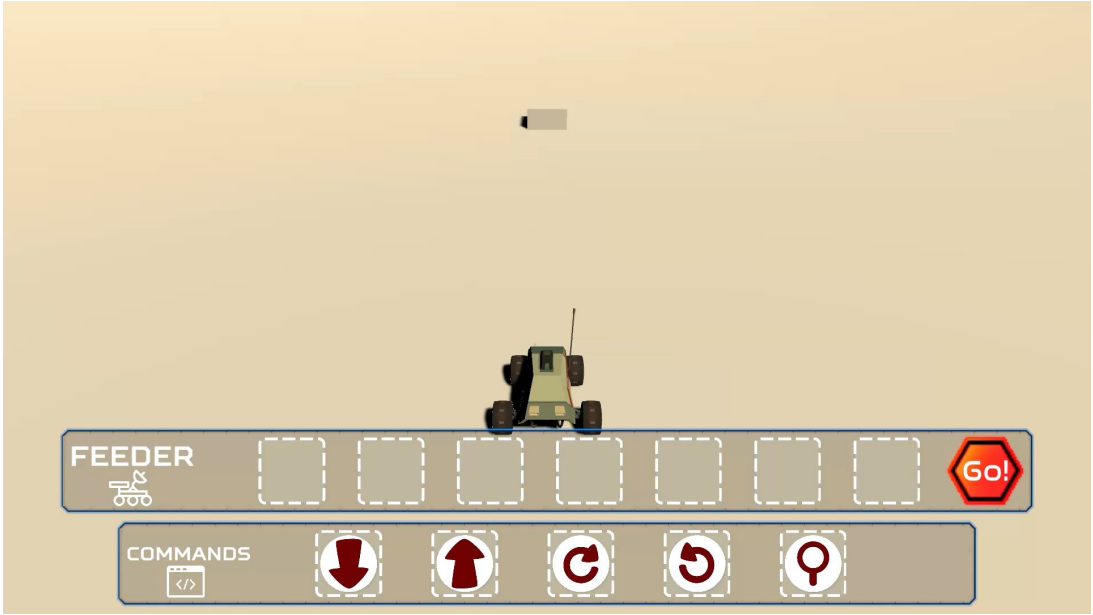
Process flow diagram



Technologies to be used in the solution

- Unity
- Visual studio
- Chatgpt
- Adobe Photoshop
- Blender
- Google

Snapshots of the prototype



Video of the prototype

Provide links to your:

1. GitHub Public Repository

https://github.com/Preet-Sra/therovers-nasa-spaceapp-2024-submission

2. Final Product Link

https://drive.google.com/drive/folders/1PqtPSBojaZChCbjorRVYEX9fx5cx_OMV?usp=drive_link

3. Demo Video
https://drive.google.com/drive/folders/1PqtPSBojaZChCbjorRVYEX9fx5cx_OMV?usp=drive_link

Future Development

1. Multiplayer Mode:

- **Objective**: Allow multiple users to collaborate in real-time on missions. For example, one user could control the rover while another handles analysis or resource management.
- **Architecture Addition**: Introduce a multiplayer server and communication layer that syncs user actions across devices. Implement a **Multiplayer Coordination Module** to handle collaborative gameplay.

2. Procedurally Generated Planets:

- **Objective**: Create endless exploration opportunities by generating random exoplanets with unique environments, challenges, and elements to discover.
- **Architecture Addition**: Implement a **Procedural Planet Generator** in the backend that randomly creates planets with different terrains, climates, and resources. This could be tied to a physics engine to simulate gravitational differences, weather patterns, etc.

3. Virtual Reality (VR) Integration:

- **Objective**: Enable users to explore planets in a fully immersive 3D virtual reality environment, enhancing the experience of piloting the rover and analyzing environments.
- **Architecture Addition**: Introduce a **VR Layer** for the UI and integrate it with the existing backend to allow real-time interaction with the virtual environment.

4. Real-Time Planetary Updates:

•**Objective**: Provide real-time updates about space exploration, such as newly discovered exoplanets or NASA missions, directly within the game.

•**Architecture Addition**: Add a **News and Update Service** that pulls from real-time APIs and space databases to show live data about space missions and discoveries.

5. AI Analysis of Collected Elements:

•**Objective**: Enhance the depth of the research center by allowing advanced AI algorithms to analyze collected elements, providing players with deeper insights and learning.

•**Architecture Addition**: Incorporate **AI-Based Research Module** to conduct deeper, more nuanced analysis of collected materials and suggest potential uses or origins for those elements.

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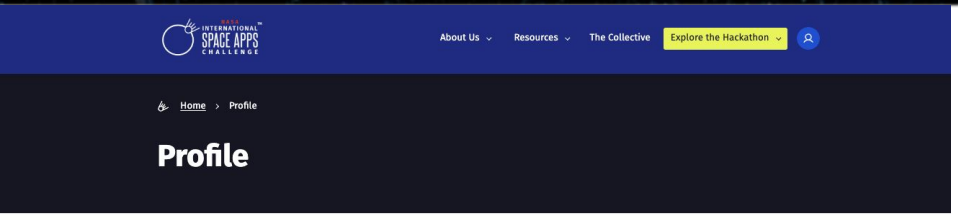

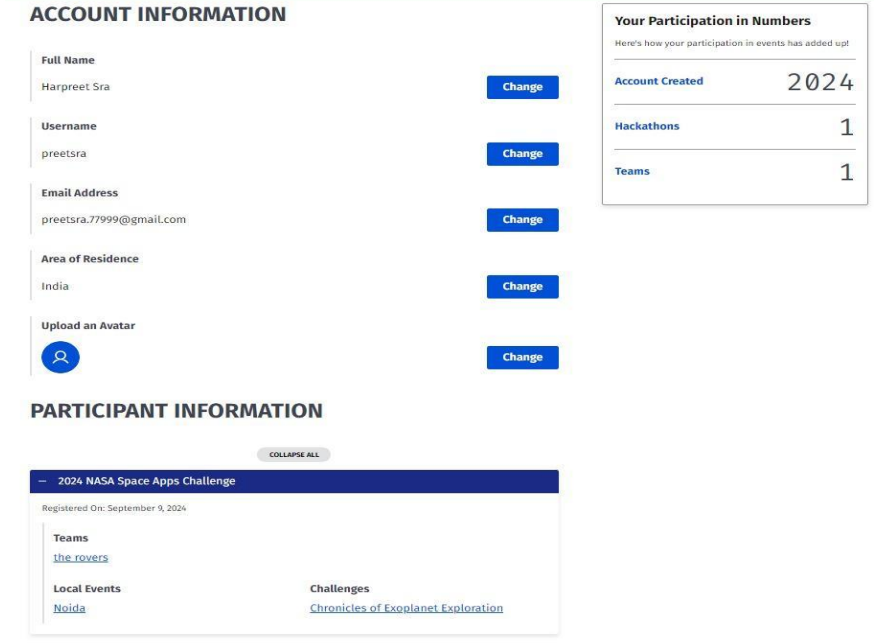

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