

Team Member Registration is Closed.

Challenge:

Exosky!

What would the night sky look like if you were standing on one of the many exoplanets discovered by astronomers and space missions? The list of 5500+ exoplanets at the NASA Exoplanet Archive can be combined with the latest star catalogs to translate the location and brightness of millions or even billions of stars to another perspective. From that perspective, anyone could use their imagination to draw constellations, much like our ancestors did on Earth thousands of years ago. Your challenge is to develop an app or interface for students that allows them to choose an exoplanet and then either display an interactive star chart or export a high-quality image for printing or viewing on a computer or virtual reality display, where they can draw and name constellations.

NAKSHTRA-EXOSKY

HIGH-LEVEL SUMMARY

We created a solution that integrates dataset APIs into a graphical application to explore deep space beyond darkness. Our interface is built using the React.js framework, and we leverage the Three.js library to enhance the visual experience. The React application allows users to explore space, select exoplanets, and retrieve detailed information about them. The application updates the night sky view based on the location of selected exoplanets and enables users to creatively reimagine the sky by drawing and saving their own constellations. The generated constellation views of the 3D space can also be exported as image files. For handling asynchronous processes and interactions with the APIs, we built a Flask backend to serve the React client.

PROJECT DEMO

<https://drive.google.com/file/d/1lH6LL7MsXkLhNzWAOjpSea483gBl2EgT/view?usp=sharing>

FINAL PROJECT

<https://nakshtra-exosky.vercel.app/>

PROJECT DETAILS

Our project is a React-based web interface that renders a 3D scene of space, where stars are plotted according to data from official resources (Gaia Dataset). In the 3D scene, the positions of both exoplanets and stars are known, and when an exoplanet is selected, the respective space view is updated accordingly.

Users can click on stars, select a set of them to draw constellations, generate images of the constellations, and save them to a collection. In the side panel, we provide detailed information about the selected exoplanet, which is retrieved from NASA's official exoplanet archive.

USE OF ARTIFICIAL INTELLIGENCE

Yes, we used various AI tools to enhance productivity while working on this challenge. Although AI was not directly integrated into the project solution, it played a significant role in the development process. For faster preprocessing of datasets related to exoplanets and stars, we utilized Python scripts generated by the ChatGPT AI model. GitHub Copilot was also employed to write advanced and efficient React interface code. AI tools for imagery generation based on prompts were used during the experimentation process. Python automation was the main focus of backend development, achieved by combining AI tools with programming best practices. GitHub Copilot further simplified collaborative work and code sharing through Git and GitHub.

SPACE AGENCY DATA

- Nasa Exoplanet Archive
- Gaia Dataset

REFERENCES

- Serving the Exoplanet Science Community
- Gaia Users Help desk
- Hack an Exoplanet activity Info
- Deep Star maps