

NASA Space App Challenge Project

Exoplanet Habitability Predictor: Project Overview

Objective

The goal of this project is to build a machine learning model that predicts the habitability of exoplanets based on key planetary features such as radius, orbital distance from the star, and surface temperature. The project will also include a user-friendly web interface for real-time predictions.

Key Features

- **Real-Time Habitability Prediction:** Users can input planetary data to get instant feedback on the planet's potential habitability.
- **Simple and Intuitive Web Interface:** Built using Streamlit for ease of interaction.
- **Machine Learning Model:** A Random Forest Classifier trained on exoplanet data will serve as the core of the prediction system.

Project Focus

Given the tight deadline (October 5th), we are focusing on completing the core functionality:

1. **Data Collection:** Using NASA's Exoplanet Archive for sourcing planetary data.
2. **Feature Engineering:** Generating features like Goldilocks Zone and Rocky Planet classification.
3. **Model Development:** Building and training a Random Forest Classifier for predictions.
4. **Web Application:** Developing a Streamlit app to allow users to input planetary data and get habitability predictions.

Timeline

- **Day 1–2:** Data Collection and Preprocessing
- **Day 3:** Model Training and Evaluation
- **Day 4:** Web App Development
- **Day 5:** Final Testing, Deployment, and Submission

Tools & Technologies

- **Python** for data science and machine learning.
- **Pandas, NumPy, and Scikit-learn** for data manipulation and model training.
- **Streamlit** for building the web app.
- **NASA Exoplanet Archive** for the dataset.

This streamlined approach focuses on the essential aspects to ensure project completion and submission by October 5th.

