Project Initialization and Planning Phase

Date	17 July 2025
Team ID	739816
Project Title	Galactic Gazetter:A comprehensive dataset of planet classification images.
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

Project Overview	
Objective	The objective of the Galactic Gazetteer is to develop a comprehensive, standardized, and accessible dataset of planetary classification images, encompassing a wide range of planetary types and features, to support research, education, and public engagement in planetary science.
Scope	The scope of the Galactic Gazetteer encompasses the development of a comprehensive and standardized dataset of planetary classification images, integrating data from diverse astronomical sources to represent a wide array of planetary types and features. This initiative aims to support scientific research, educational endeavors, and public engagement by providing accessible and detailed visual resources that enhance the understanding of planetary bodies within our galaxy. The project will involve collaboration with the global scientific community to ensure the dataset remains current and reflective of the latest discoveries in planetary science.
Problem Statement	
Description	The Galactic Gazzater is a comprehensive dataset containing a vast collection of planet classification images, categorized by various planetary types and characteristics. It includes data on terrestrial planets, gas giants, ice giants, exoplanets, and dwarf planets, each labeled with key attributes such as size, composition, atmosphere, and distance from their star. The dataset provides visual representations of planets in different stages of formation, surface features, and potential

	habitability, designed to aid in the study of planetary systems and facilitate machine learning models for automatic classification and analysis.
Impact	The impact of Galactic Gazzater lies in its ability to significantly advance the study of planetary systems by providing a rich, diverse dataset for planetary classification. It aids in the development of more accurate machine learning models for identifying and categorizing planets, enhances our understanding of planetary characteristics, and facilitates the exploration of exoplanets. By offering detailed visual data on various planetary types and features, it supports researchers in predicting habitability, formation processes, and potential life-sustaining conditions, ultimately contributing to the broader field of astronomy and space exploration.
Proposed Solution	
Approach	The methodology for Galactic Gazzater involves collecting and preprocessing planetary images, followed by feature extraction using image processing techniques. Machine learning models, primarily CNNs, are used for classification, with data augmentation and simulated images to expand the dataset. Models are trained and validated using cross-validation and performance metrics like accuracy and F1 score. The dataset is continuously updated with new data, and the model is deployed for real-time classification. Visualization tools allow users to explore classified planets and derive insights on planetary patterns and habitability.
Key Features	Key features of Galactic Gazzater include its comprehensive planetary classification system, leveraging advanced machine learning (CNNs) for automated image classification. It incorporates data augmentation and synthetic planet generation for a balanced dataset. The solution offers real-time classification of planetary images, with continuous updates from new astronomical discoveries. Interactive dashboards enable users to explore and analyze classified planets, providing valuable insights into planetary types, formation, and habitability. The system is designed to enhance both research accuracy and accessibility in planetary science.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	e.g., 2 x NVIDIA V100 GPUs
Memory	RAM specifications	e.g.8 GB
Storage	Disk space for data, models, and logs	e.g., 1 TB SSD
Software		
Frameworks	Python frameworks	e.g., Flask
Libraries	Additional libraries	e.g., tensorflow,numpy,pandas,
Development Environment	IDE, version control	e.g., Jupyter Notebook, Git
Data		
Data	Source, size, format	e.g., Kaggle dataset, 10,000 images