Project Initialization and Planning Phase

Date	15 July 2024
Team ID	739766
Project Title	**SDSS galaxy classification using Machine Learning**
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

The Sloan Digital Sky Survey(SDSS) has amassed a vast repository of galaxy images aand spectra, offering a rich dataset for astronomical research. Traditional mathods of classifying galaxies based on visual inspection are time-consuming and subjective. This project purposes a leaverage machine learning techniques to automate the classification process, aiming to enhance accuracy and efficiency in identifying galaxy types within the SDSS database.

Project Overview	
Objective	Improving efficiency and accuracy over manual methods, facilitating faster analysis and deeper insights into astronomical data
Scope	Classify galaxies by analyzing their spectra, identifying types like spirals or ellipticals, aiding in understanding cosmic structure and evolution.
Problem Statement	
Description	SDSS uses machine learning to classify galaxies by analyzing their spectra, distinguishing types like spirals or ellipticals, enhancing our understanding of cosmic structure and evolution.
Impact	SDSS's machine learning-driven galaxy classification revolutionizes astronomy by automating and refining categorization, enabling large-scale studies of galaxy populations, evolution, and the broader universe.
Proposed Solution	
Approach	SDSS employs supervised machine learning models trained on galaxy spectra to classify types such as spirals or ellipticals, enhancing accuracy and scalability in large-scale astronomical surveys.
Key Features	SDSS uses machine learning to classify galaxies based on spectral features, employing algorithms like random forests and neural networks for accurate identification of galaxy types and properties.

Resource Requirements

Resource Type	**Description**	**Specification/Allocation**
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	NVIDIA RTX 3090
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD

Software		
Frameworks	Python frameworks	TensorFlow, PyTorch
Libraries	Additional libraries	Matplotlib, Seaborn
Development Environment	IDE, version control	Jupyter Notebook, Python
Data		
Data	Source, size, format	Kaggle dataset, csv