

Project Initialization and Planning Phase

Date	15 July 2024
Team ID	739760
Project Title	SpaceX Falcon 9 First Stage Landing Success Predictor
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	Develop a predictive model to determine the likelihood of a successful landing of the Falcon 9 first stage booster, enhancing mission planning and risk assessment capabilities.

Scope	The project includes data collection, preprocessing, feature engineering, model development, evaluation, deployment, and validation. Historical launch data from SpaceX will be used.
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Problem Statement

Description	SpaceX Falcon 9 is a reusable rocket developed by SpaceX for carrying payloads into space. The first stage of the Falcon 9 rocket is designed to return to Earth after launch and land vertically on a
	designated landing pad or drone ship. This technology enables SpaceX to reduce the cost of space launches by reusing the rocket instead of discarding it after a single use. The success of Falcon 9 first stage landing launches depends on various factors such as flight number, payload mass, orbit, launch site, and others.

Impact	<p>By building a machine learning model that can predict the success of these launches based on various factors, we can provide valuable insights for space agencies, researchers, and other stakeholders. Space agencies can use this tool to evaluate the risks associated with launching payloads into space using Falcon 9 rockets. Researchers can study the factors that contribute to the success of space launches and identify areas for improvement. Additionally, stakeholders such as investors and commercial space companies can make informed decisions about the feasibility and profitability of space launches.</p>
Proposed Solution	
Approach	<p>The methodology includes collecting historical launch data, preprocessing the data, engineering relevant features, and developing machine learning models to predict landing success. Models such as logistic regression, decision trees, random forests, and neural networks will be explored.</p>
Key Features	<p>Comprehensive data analysis and preprocessing</p> <p>Multiple machine learning models for robust predictions</p> <p>Continuous model updates and validation using new data</p> <p>Deployment using cloud infrastructure or local servers</p>

Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	Scikit-learn, Pandas, Numpy
Development Environment	IDE, version control	VS code, Git

Data

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	T4 GPU
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	512 SSD
Data	Source, size, format	SpaceX launch data, CSV format, approximately 90 launch records