# Market Analysis Tool for Space Commercialization

This report outlines the development of a Python-based Market Analysis Tool for evaluating the impact of space commercialization events on stock market performance.

## 1. Data Collection

The stock market data was collected using the `yfinance` library, which provides historical price data for various equities. For this project, the dataset focused on Virgin Galactic (SPCE) from January 1, 2023, to January 1, 2024.

## 2. Data Preprocessing

Preprocessing steps included:

* - Calculating the daily percentage change in stock prices ('Daily Change').
* - Computing a 5-day moving average to smooth out short-term fluctuations.

- Dropping rows with missing values to ensure data consistency.

## 3. Exploratory Data Analysis (EDA)

The exploratory analysis provided insights into stock price trends and volatility:

* - Line charts visualized the closing prices alongside the 5-day moving average.
* - A histogram displayed the distribution of daily price changes, revealing volatility patterns.

## 4. Predictive Modeling

A Random Forest Regressor was used to predict stock prices based on features such as:

* - Open, High, Low, and Volume prices.
* - 5-day moving average as a derived feature.

Performance metrics:

* - Mean Absolute Error (MAE): Measures average prediction error.
* - Root Mean Squared Error (RMSE): Evaluates the magnitude of prediction errors.

## 5. Visualization Dashboard

An interactive dashboard was created using Plotly Express to provide dynamic visualizations of stock price trends over time. Users can explore patterns interactively.

## 6. Scenario Analysis

Scenario analysis can incorporate simulations using Monte Carlo techniques or event-driven modeling to predict how specific space commercialization milestones might influence stock prices.

This tool demonstrates the potential of Python and machine learning in financial analysis, especially for niche sectors like space commercialization. Future work can expand on this foundation to include sentiment analysis and broader economic indicators.