**Tesla Stock Prediction: Project Report**

**Overview**

This project is focused on analyzing and forecasting Tesla’s stock performance using historical data. With the ever-growing interest in stock market prediction, especially in tech giants like Tesla, this project explores data-driven techniques to uncover trends, calculate returns, and help build a foundation for more advanced financial forecasting using machine learning in the future.

**Objective**

The goal of this project is to perform exploratory data analysis (EDA) on Tesla’s stock prices and gain useful insights into its behavior. By visualizing trends and calculating key indicators like daily returns, we aim to understand how Tesla’s stock has performed over time and prepare the data for potential forecasting tasks.

**Key Steps Performed**

**1. Data Collection and Import**

We began by importing Tesla’s stock data from a CSV file. The dataset includes essential fields such as opening price, closing price, volume traded, and date-wise stock movements.

**2. Data Cleaning**

Before jumping into any analysis, we made sure the data was clean and usable:

* Checked for missing values.
* Filled missing entries with the average values of respective columns.  
  This ensured that we weren’t feeding incomplete data into our visualizations or calculations.

**3. Exploratory Data Analysis (EDA)**

To understand how Tesla’s stock has behaved historically, we performed a series of analyses:

**a. Trend Visualization**

We plotted the closing price of Tesla’s stock over time. This gave us a clear view of how the stock value has changed—revealing periods of growth, drops, and stability.

**b. Daily Return Calculation**

To understand stock volatility and performance, we computed daily returns (the percentage change in stock price from one day to the next). This helped us capture short-term trends and price shifts, which are key in financial analysis.

**c. Distribution of Returns**

Using a histogram, we visualized how often certain return values occurred. This gave us a sense of Tesla's volatility—whether the returns were generally stable or highly variable.

**Insights Gained**

* Tesla's stock price shows strong growth over the long term but is also characterized by noticeable fluctuations in the short term.
* Daily returns vary frequently, suggesting the stock experiences frequent highs and lows, typical of a tech company influenced by innovation, market sentiment, and global news.
* The histogram of daily returns showed a bell-shaped curve, indicating a somewhat normal distribution of returns with occasional outliers.

**What’s Next?**

While this project focused on analysis and trend observation, it sets a solid base for predictive modeling using:

* Time Series forecasting (e.g., ARIMA, LSTM)
* Technical indicators (like moving averages)
* Sentiment analysis from news or social media

These models can be added to make actual predictions about future stock movements, offering practical value for investors or researchers.

**Conclusion**

This project was a foundational exercise in financial data analysis using real-world data from Tesla Inc. It allowed us to apply data science techniques—like cleaning, visualization, and return computation—to extract valuable insights. With further development, this work could evolve into a robust stock forecasting tool powered by machine learning and AI.