Stock Price Movement Analysis

A PROJECT REPORT for
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Submitted by

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OUTPUT EXPLANATION

Graph 1: Stock Price and 20-Day Moving Average

Description:

- The blue line represents the normalized closing stock price of Tesla (TSLA).
- The red dashed line is the 20-day Simple Moving Average (SMA), which smoothens price fluctuations by averaging the last 20 closing prices.
- SMA helps in identifying trends, reducing noise, and providing buy/sell signals.

Interpretation:

- When the stock price crosses above the SMA, it may indicate a **bullish trend** (buy signal).
- When it crosses below the SMA, it may suggest a **bearish trend** (sell signal).
- If the SMA and price are close together, the market is **stable**, whereas large deviations indicate **high volatility**.

Graph 2: Correlation Heatmap of Stock Features

Description:

- This heatmap shows how different stock market features (like Close price, Volume, and Daily Returns) are correlated.
- Values range from **-1 to 1**:
- **1 (or close to 1):** Strong positive correlation (both move together).
- **-1 (or close to -1):** Strong negative correlation (move in opposite directions).
- **0 (or close to 0):** No correlation (independent variables).

Interpretation:

- If Close and SMA_20 have a high correlation (close to 1), it means the SMA is a reliable indicator of price movement.
- If Volume has a weak correlation with Close, then trading volume does not strongly impact Tesla's price changes.

Graph 3: ARIMA Model Stock Price Prediction

Description:

- The blue line represents actual stock prices.

- The red dashed line shows the **forecasted values from the ARIMA model**, which is a time-series forecasting method.
- ARIMA uses past stock prices to predict future movements based on **AutoRegressive (AR)** and **Moving Average (MA)** components.

Interpretation:

- If the forecasted values follow the actual prices closely, the model is **accurate**.
- If there are large deviations, it suggests **poor forecasting** and might need parameter tuning.
- A well-fitted ARIMA model can be used for short-term stock price prediction and trend analysis.

Graph 4: Actual vs. Predicted Values Description:

- **Blue Line**: Actual stock prices.
- **Red Line**: Predicted values from the model.
- **X-Axis**: Time, **Y-Axis**: Normalized stock price.

Interpretation:

- If both lines are close, the model predicts well.
- Large gaps indicate **errors**, needing **better features, tuning, or more data**.
- **Smooth red line?** → Underfitting (not capturing trends).
- **Erratic red line?** → Overfitting (memorizing, not generalizing).