# Tesla Stock Market Analysis Report

## 1. Introduction

This report provides an analysis of Tesla (TSLA) stock performance using historical market data. The analysis includes stock trends, volatility assessments, and predictive insights using technical indicators like Moving Averages and Bollinger Bands. The goal is to extract valuable insights to support investment decisions.
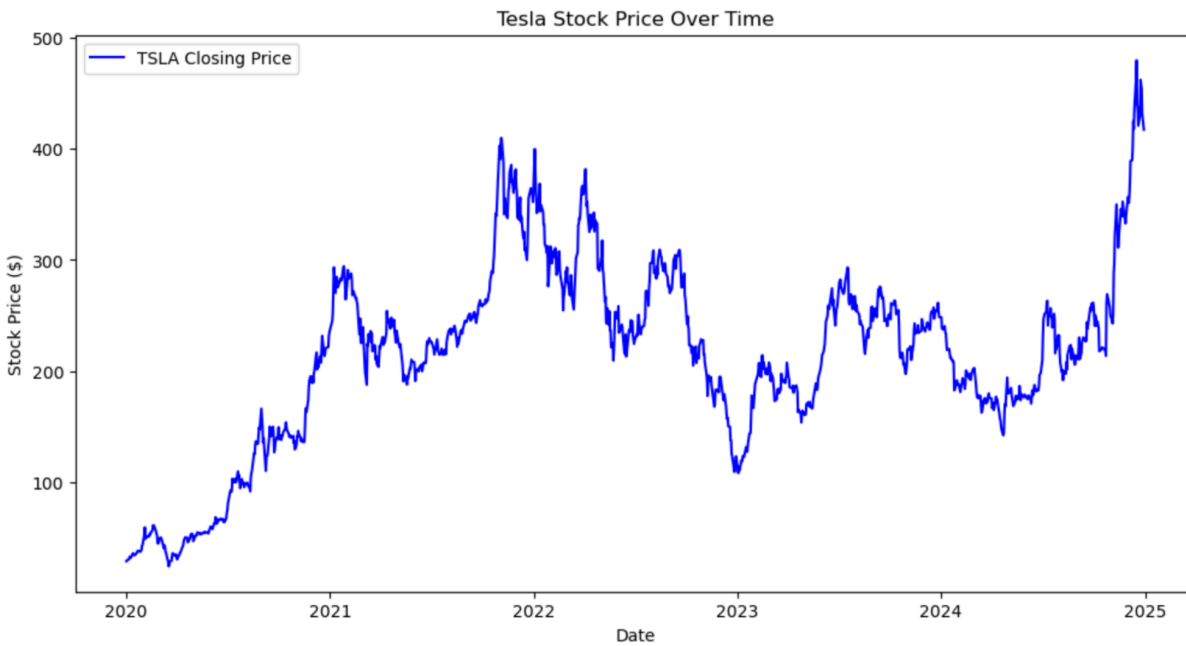
## 2. Data Overview

- **Stock Ticker:** TSLA (Tesla Inc.)
- **Data Source:** Yahoo Finance API
- **Time Period:** January 2023 - December 2024
- **Key Columns:** Date, Open, High, Low, Close, Volume

## 3. Key Insights & Findings

### 3.1 Stock Price Trends

- Highest Closing Price: $479.85
- Lowest Closing Price: $24.08
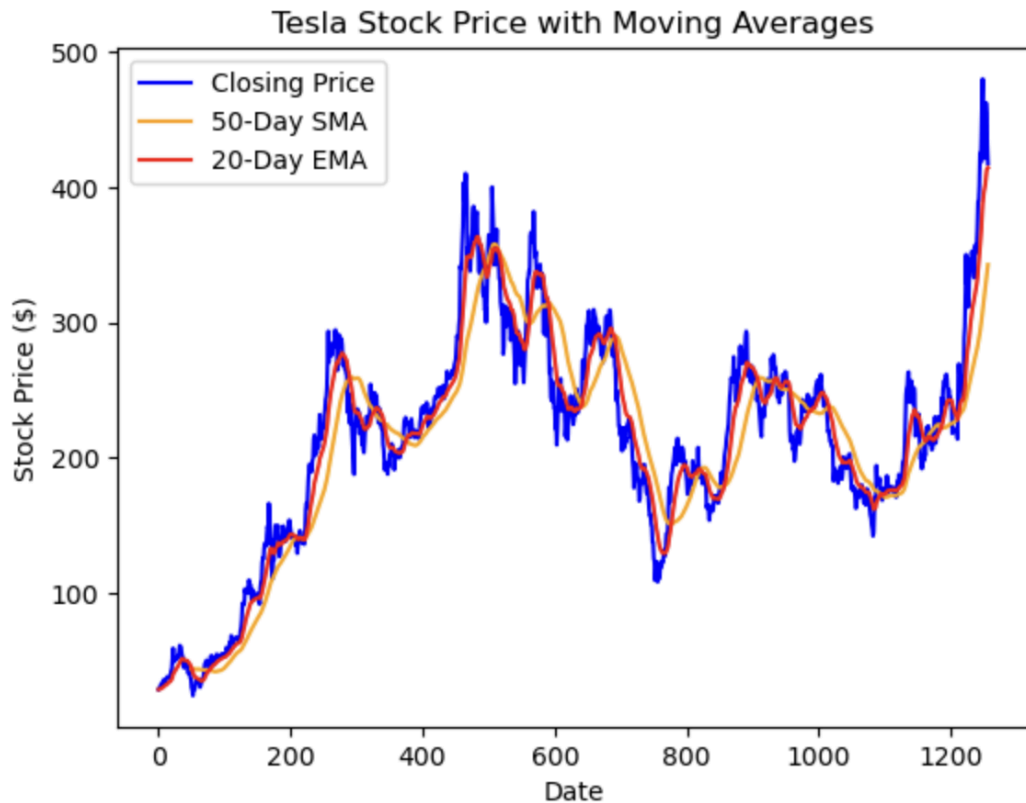- Overall Trend: Tesla's stock exhibited an upward trend over the analyzed period.

**Visualization:** *Stock Price Trend Line Chart*



Tesla Stock Price Over Time

## 3.2 Moving Averages Analysis

- 50-Day Simple Moving Average (SMA): Helps identify long-term trends.
- 20-Day Exponential Moving Average (EMA): Captures short-term price movements.

**Visualization:** *Stock Price with SMA & EMA*
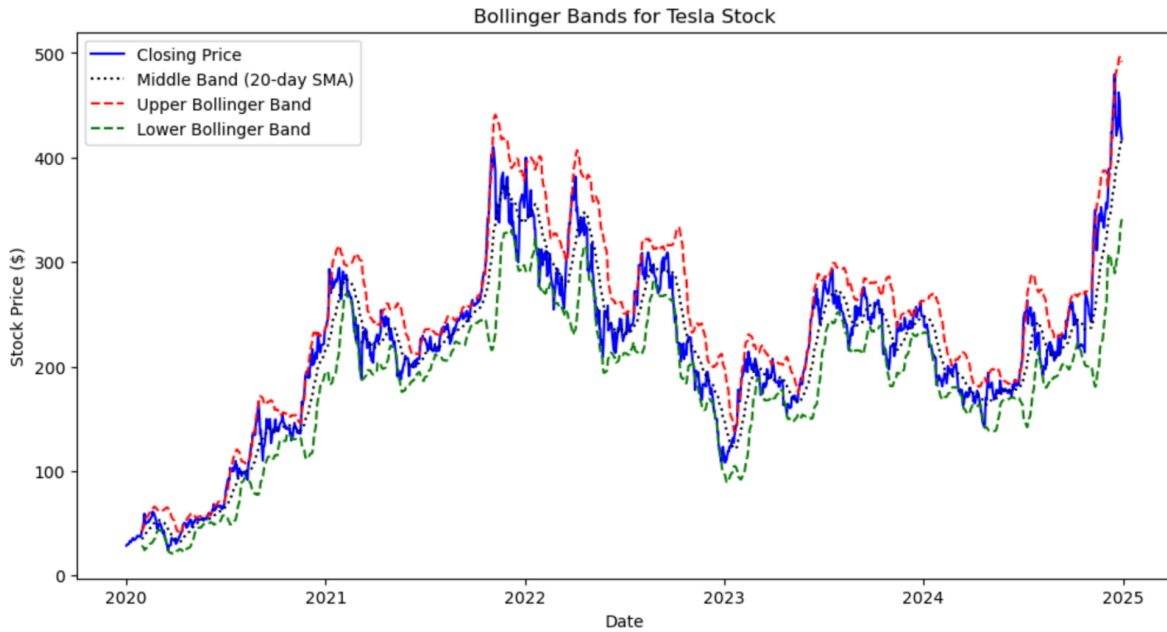
Tesla Stock Price with Moving Averages

**Insight:** Tesla's stock crossed above the 50-day SMA, indicating a **bullish** trend.

### 3.3 Volatility Analysis (Bollinger Bands)

- Bollinger Bands (20-Day SMA ± 2 Standard Deviations) measure stock volatility.
- **Key Observations:**
  - When the stock price touched the Upper Band, it signaled potential overbought conditions.
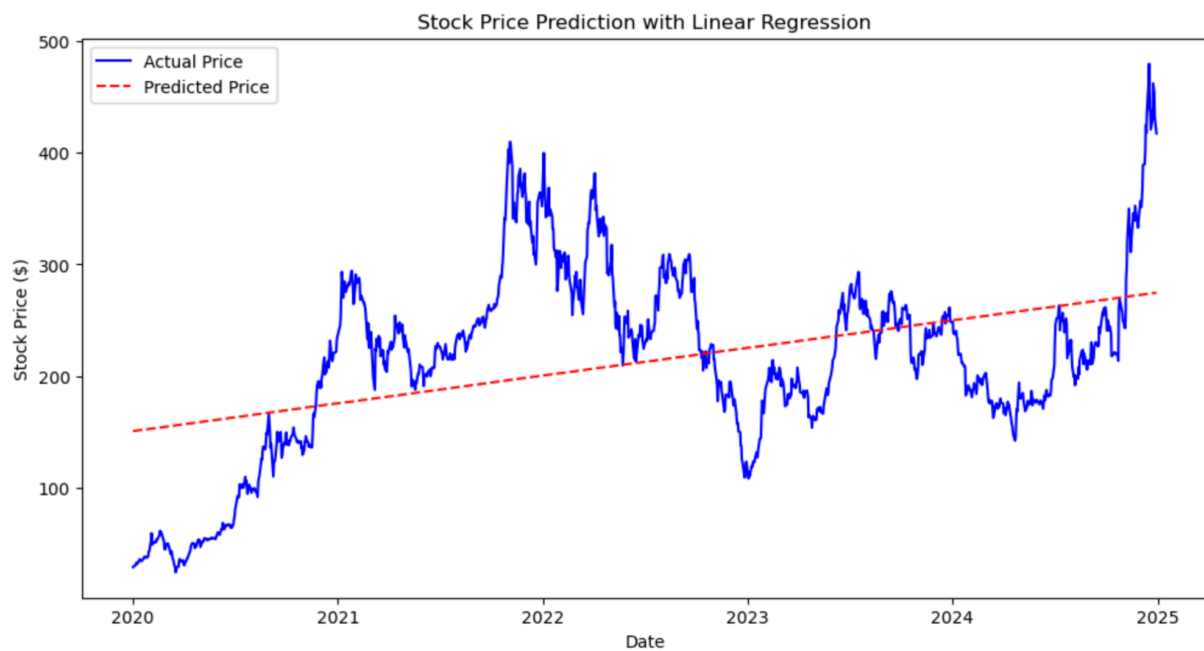  - When the stock price approached the Lower Band, it indicated a possible buying opportunity.

**Visualization:** *Bollinger Bands Chart*

Bollinger Bands for Tesla Stock

## 3.4 Stock Price Prediction (Machine Learning)

- Model Used: Linear Regression
- Accuracy Score: [20.90%]

**Visualization:** *Stock Price vs. Predicted Price*



Stock Price Prediction with Linear Regression

***Insight:*** *The model predicts a **downward** trend for Tesla stock in the coming months.*

## 4. Business & Investment Recommendations

- ❖ Buy Signal: If stock price nears the **Lower Bollinger Band** and shows signs of reversal.
- ❖ Sell Signal: If price crosses **Upper Bollinger Band**, indicating overbought conditions.
- ❖ Monitor Moving Averages: A crossover between **SMA & EMA** can indicate trend shifts.
- ❖ Use Advanced ML Models: Improve predictions using **LSTM neural networks**.

## 5. Conclusion

This analysis of Tesla's stock shows key price movements and trends using technical indicators. The findings suggest potential trading strategies based on volatility signals and moving averages. Future improvements include more advanced ML models for price forecasting.