Stock Price Prediction using Machine Learning

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## Problem Statement:

In this project, we are excited to combine our passion for trading and our fascination with machine learning to create a robust stock price prediction model. Trading has always intrigued us, the dynamic nature of markets, the challenge of identifying patterns, and the potential for informed decision-making are aspects that we find incredibly engaging. Through this project, we aim to harness the power of machine learning to enhance our trading insights and contribute to the broader understanding of predicting stock prices.

The aim of this project is to develop a machine learning model that can predict the future stock prices of a selected company based on historical stock price data and relevant technical indicators. By doing so, we intend to explore whether machine learning algorithms can capture underlying patterns and trends in the stock market to provide useful insights for investors and traders.

# Dataset Selection:

By selecting a company that aligns with our trading interests, I intend to gather historical stock price data and relevant indicators. This data will serve as the foundation for our model's training, validation, and testing. As we delve into this dataset, we hope to uncover hidden trends and dynamics that could potentially improve our trading strategies.

1. To build the stock price prediction model, we will use the NSE TATA GLOBAL dataset. This is a dataset of Tata Beverages from Tata Global Beverages Limited, National Stock Exchange of India: [Tata Global Dataset](https://data-flair.training/blogs/download-tata-global-beverages-stocks-data/)
2. To develop the dashboard for stock analysis we will use another stock dataset with multiple stocks like Apple, Microsoft, Facebook: [Stocks Dataset](https://data-flair.training/blogs/download-stocks-price-data/)

The dataset will include daily stock prices, trading volumes, and a selection of common technical indicators such as moving averages, RSI, and MACD. The dataset will span a period of several years to ensure sufficient historical context for analysis. Preprocessing steps will involve handling missing values, scaling the features, and engineering additional relevant features from the raw data.

# Model Architecture:

The initial model for this project will be based on a simple linear regression algorithm. This choice is made to establish a baseline and understand the feasibility of predicting stock prices using basic machine learning techniques. We plan to include features such as daily closing prices, trading volumes, and a set of technical indicators as input to the model. Additionally, we may experiment with more advanced models such as Random Forests or LSTM networks to potentially capture more complex patterns in the data.

# Tools:

For this project, we will primarily use the following tools and libraries:

* Python programming language
* Pandas for data manipulation and preprocessing
* Keras for building and training neural networks
* Matplotlib for data visualization

# Expected Challenges:

* **Noisy Data:** Stock price data can be noisy and influenced by external factors. Filtering out irrelevant noise while retaining essential information will be a challenge.
* **Feature Selection:** Selecting the most relevant features from a set of technical indicators and market data is crucial to improve model performance.
* **Model Complexity:** Achieving accurate stock price predictions requires sophisticated models. Finding the right balance between model complexity and interpretability will be a challenge.
* **Market Dynamics:** Stock prices are influenced by numerous unpredictable events like economic news, geopolitical events, and corporate announcements. The model might struggle to capture such events accurately.
* **Overfitting:** Avoiding overfitting while training the model on historical data to ensure generalization to future unseen data.

Despite these challenges, this project presents a valuable opportunity to delve into the intersection of finance and machine learning, gaining insights into how technology can potentially contribute to investment decision-making.