SYNOPSIS

- **Project title:**

  Share Price Prediction Using Machine Learning

- **Introduction:**

  Stock market prediction is a significant area of interest for financial experts and investors, as accurate forecasts can lead to informed decision-making and potential profit maximization. Share prices are influenced by numerous factors, including market trends, economic conditions, and company performance. Given the complexity of these factors, traditional methods of predicting share prices often fall short. This mini project aims to apply machine learning algorithms to predict future stock prices by analyzing historical stock data. The project seeks to explore whether machine learning models can effectively identify patterns in stock price movements and provide accurate forecasts.

- ***Objectives:***

  The key objectives of this project are:

  - To build a machine learning model capable of predicting future stock prices based on historical data.
  - To evaluate the accuracy of different machine learning algorithms, such as Long Short-Term Memory (LSTM) networks and Random Forest.
  - To identify the key features that influence stock price predictions, such as historical closing prices, trading volume, and market trends.

- ***Methodology:***

  The project will follow a systematic approach to develop the prediction model:

  1. **Data Collection**: Historical stock price data will be collected from reliable financial data sources like Yahoo Finance or the Alpha Vantage API.
  2. **Data Preprocessing**: The dataset will be cleaned and preprocessed by handling missing values, normalizing the data, and selecting relevant features for the model.
  3. **Model Selection**: Two machine learning models—LSTM for time series forecasting and Random Forest for regression—will be implemented to predict stock prices.

4. **Training and Testing**: The models will be trained on historical data, and their performance will be tested using standard evaluation metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE).
5. **Evaluation**: The accuracy of both models will be compared, and the best-performing algorithm will be selected based on prediction accuracy.

- ***Tools and Technologies:***

The project will be implemented using the following tools and technologies:

- **Programming Language**: Python
- **Libraries**: Pandas, NumPy, Scikit-learn.
- **Data Source**: Yahoo Finance or Alpha Vantage API for stock data

- ***Expected Outcomes:***

The project is expected to result in a predictive model that can accurately forecast share prices based on historical data. The performance of the machine learning models will be compared, and the best approach will be identified. Insights into the key features influencing stock prices will also be gained.

- ***Scope and Limitations:***

The project will focus on predicting short-term stock prices for selected companies using historical data.
Limitations include the unpredictability of external events (e.g., market crashes) that can dramatically impact stock prices and are difficult to forecast using historical data alone.

- ***Conclusion:***

This mini project will explore the use of machine learning techniques to predict stock prices, offering a practical application of data-driven models in financial forecasting. By comparing different models, the project aims to demonstrate the potential of machine learning in enhancing stock market predictions, thus contributing to more informed investment strategies.

- ***References:***

Historical stock data from Yahoo Finance or Alpha Vantage API

Research papers and articles on stock price prediction using machine learning techniques

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