Technical Document: Stock Price Prediction Model

The FinanceGPT stock price prediction model uses machine learning techniques to predict future stock prices based on historical data. The model is implemented in PHP and uses the Rubix ML library for machine learning, the Scheb YahooFinanceApi for fetching historical stock data, and the Chartisan library for visualizing the predicted data.

Overview

The main class PortfolioForecastService is responsible for fetching the historical data of a portfolio's assets, predicting future prices, and generating a chart of the predicted data. The class uses several machine learning algorithms, including Gradient Boost, KD Neighbors Regressor, KNN Regressor, Regression Tree, and Extra Tree Regressor, combined in a Committee Machine to make the predictions.

Main Methods

getPortfolioForecast($portfolio, $timePeriod)

This method fetches the historical data of the portfolio's assets and predicts their future prices. It first retrieves the portfolio's assets and their symbols. Then, for each symbol, it fetches the historical data and predicts the future prices. The predicted data and the accuracy scores of the predictions are stored in arrays.

getForecastData($symbol, $historicalData)

This method predicts the future prices of a stock symbol based on its historical data. It first prepares the training data by calculating the changes in the open, high, low, and volume prices, and the moving averages. Then, it trains the estimator (a Committee Machine of several regressors) with the training data. If the model file doesn't exist, is older than a day, or the score is less than 0.7, the estimator is retrained. Then, it predicts the future prices and returns the predicted data and the accuracy score.

calculateStockReturn($historicalData)

This method calculates the stock returns based on the historical data. The stock return is calculated as the change in the closing price divided by the initial closing price.

calculateStockVolatility($stockReturns)

This method calculates the volatility of the stock based on the stock returns. The volatility is calculated as the standard deviation of the stock returns.

standard_deviation($aValues, $bSample = false)

This method calculates the standard deviation of an array of values.

convertToUSD($amount, $currency, $symbol)

This method converts an amount in a specific currency to USD. It fetches the conversion rate from the Yahoo Finance API and multiplies the amount by the conversion rate.

Summary

The stock price prediction model uses machine learning techniques to predict future stock prices based on historical data. The model is implemented in PHP and uses several libraries for fetching data, machine learning, and data visualization. The model can be used to predict the future prices of a portfolio's assets and visualize the predicted data in a chart.