AI-Driven Insights for Stock Market Forecasting

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Introduction

What is the Stock Market?

The stock market serves as a venue for investors to purchase and sell shares of publicly traded companies. It is essential to the economy, offering a means for companies to secure funding while allowing investors to engage in trading securities. Stock prices vary due to changes in supply and demand, company performance, and overall economic conditions.

Methods

Data Preprocessing:

The initial step involves cleaning and normalizing historical stock market data to ensure consistency and eliminate outliers. Relevant features are then created, including technical indicators and lagged values.

ELM-ABC Model Architecture:

The ELM-ABC model is trained using the preprocessed stock market data to predict future stock prices accurately. It utilizes the optimization capabilities of the Artificial Bee Colony (ABC) to refine the parameters of the Extreme Learning Machine (ELM), ensuring strong performance even in volatile market conditions.

Training and Testing:

The model undergoes training and testing on a comprehensive dataset that includes historical stock prices and financial indicators. This dataset is divided into training, validation, and testing subsets, facilitating effective evaluation and parameter tuning of the model.

Data Analysis

Stock market data undergoes preprocessing to maintain consistency and eliminate outliers, followed by the development of relevant features such as moving averages, RSI, and other technical indicators. These features are crucial for capturing key market trends and patterns, facilitating accurate forecasting.

Training Data:

The dataset includes Reliance stock prices and financial indicators, with labels that reflect stock price movements. This data is divided into training, validation, and testing sets to ensure effective model training and evaluation.

Model Performance:

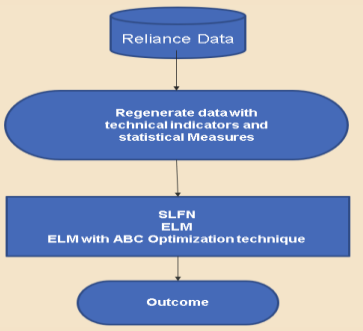
Evaluation metrics such as accuracy, mean absolute error (MAE), mean squared error (MSE), and R-squared (R^2) are utilized to assess the model's effectiveness in predicting stock prices and trends.

Findings and Results

This project analyzed Reliance stock market data using SLFN, ELM, and ELM with ABC optimization to improve stock price prediction accuracy. The results showed that ELM-ABC outperforms other models, providing the most reliable 1-day predictions with the lowest error rates. ELM performed well for multi-day forecasts, while SLFN had the highest error rates and was less reliable. The findings confirm that AI-driven techniques with optimization enhance stock forecasting, helping investors make more accurate and data-driven decisions.

Conclusions

This project successfully applies AI-driven models for stock price prediction, with ELM-ABC achieving the best accuracy for short-term forecasts. The results show that optimization improves prediction reliability, making it useful for investors. The study confirms that AI can enhance stock market forecasting, providing better decision-making insights compared to traditional methods.



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