

Stock Price Forecasting

Impact of Different Predictors and Forecasting Architecture

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Project Aim and Objectives

Stock price forecasting is a complex and challenging task that is influenced by a multitude of factors. This paper aims to investigate the impact of different predictors on the performance of stock price forecasting and propose a novel forecasting pipeline and architecture for stock price forecasting.

Proposed Architecture

The proposed architecture is an end-to-end forecasting pipeline comprising of 3 main sections:

- **Data Preparation:** Retrieve, process, extract & engineer features such as news sentiment, fundamental indicators, and technical indicators.
- **Feature Selection & Feature Importance Ensemble:** Feature selection is a hybrid method consisting of multi-criterion filter and wrapper methods. Model-centric feature importance is also utilized. The resulting subset provides insight into the importance of predictors in stock price forecasting.
- **Predictive Model:** The predictive model comprises of a bi-directional LSTM layer and a fully connected layer.

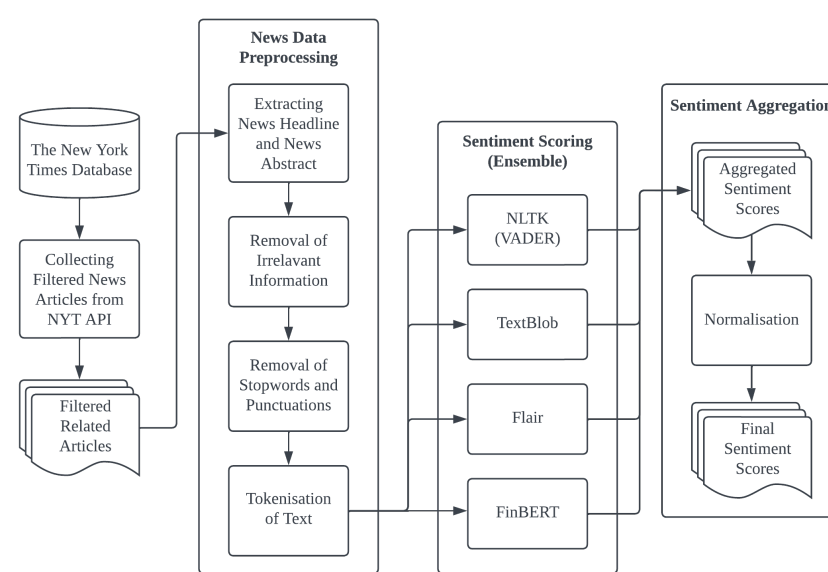


Figure 1: Sentiment Analysis Architecture

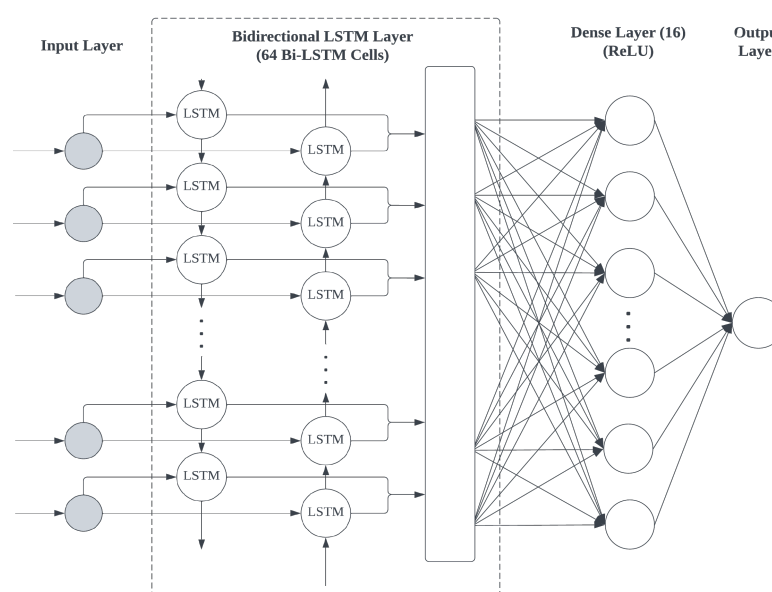


Figure 2: Predictive Model Architecture

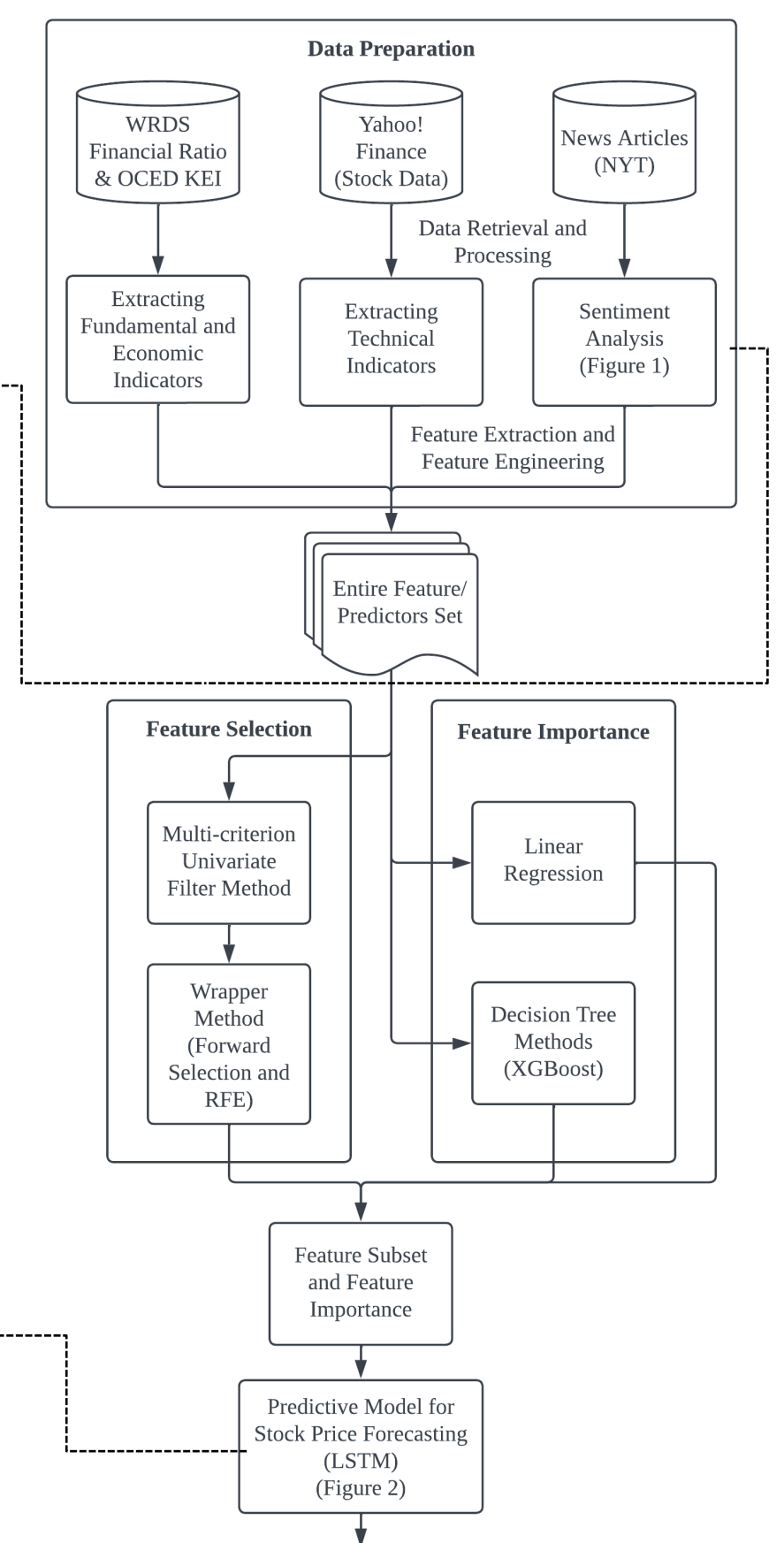


Figure 3: Overall Forecasting Pipeline and Architecture

Results

The proposed solution reduced the dimensionality of the dataset from 197 initial predictors to 29 predictors, leading to an improved forecasting performance. With the optimal feature subset, the model achieves an RMSE of 0.0175.

Model	Accuracy (RMSE)
Bi-LSTM (Base)	7.5804
Proposed Model (All Predictors)	1.0375
ANN	0.0806
Multivariate Regression with LSTM	0.0800
BST-LSTM	0.07416
ARDL-ARIMA-ANN	0.01883
Proposed Model (Optimal Predictors Subset)	0.0175
Enhanced NN (Levenberg-Marquardt backpropagation)	0.00597

Table 1: Proposed solution's accuracy vs. benchmarks' accuracy