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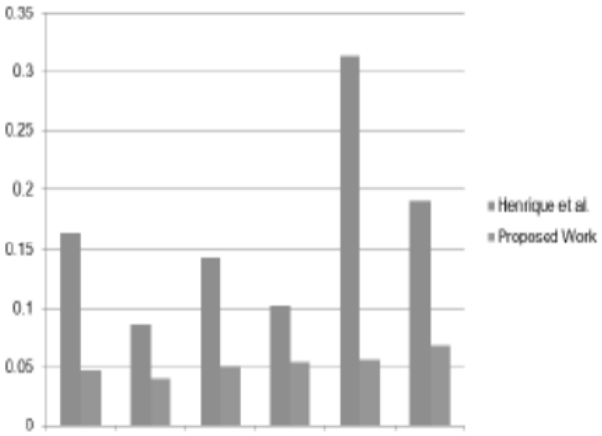

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Original Article

LinVec: A Stacked Ensemble Machine Learning Architecture for Analysis and Forecasting of Time-Series Data

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ABSTRACT

Objectives: The proposed work integrates multiple Machine Learning approaches in a single model to be used for the analysis and forecasting of Time Series data. **Methods:** In the present work, the concept of Stacked Ensemble learning is proposed that uses Multiple Linear Regression and Support Vector Regression techniques as the base models. A Meta Model is constructed based on Multiple Linear Regression with necessary modifications. The outputs from the base models are fed into the meta-model which is mended with the capability of combining the predictions from the two base models to produce better results than the individual constituent parts, after running a k-fold training procedure. **Findings:** The proposed model is capable of analyzing and predicting any Time Series data. In the present study, stock data of six companies enlisted in the National Stock Exchange of India are analyzed for the prediction of the next day's Open, High, and Low prices. The proposed work achieves better accuracy and reduces the error in prediction when compared to similar works done in the same field. **Novelty:** The amalgamated technique used in this work can be considered as a generalization of the stacked ensemble method in a broader aspect. The proposed model combines the strengths of multiple Machine Learning methods into a single model to achieve better performance than its individual counterparts. Further, several recent works have tried to predict only the next day's Open and Closing Prices of stocks, but for an intraday trader, prediction of the next day's Low and High prices of a stock are more significant than the closing prices. Very few works have predicted all of the Open, High and Low prices in a single study, our present work achieved this quite successfully.

Keywords: Machine Learning; Stacked Ensemble Model; Support Vector Regression; Multiple Linear Regression; Time Series data analysis; Stock Price Prediction

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