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Notice for the PhD Viva-Voce Examination

Mr Chintakunta Manjunath (Registration Number: 1770076), PhD scholar at the School of Engineering and Technology, CHRIST (Deemed to be University), Bangalore will defend his PhD thesis at the public viva-voce examination on Thursday, 12 September 2024 at 10.30 am in the Conference Room, Block I, Bangalore Kengeri Campus, Bengaluru 560074.

Title of the Thesis	:	**A Comprehensive Model for Forecasting the Nifty50 Index Using Machine and Deep Learning Methodology with Reference to National Stock Exchange**
Discipline	:	**Computer Science and Engineering**
External Examiner (Outside Karnataka)	:	**Dr S Shanthi** Professor Department of CSE Malla Reddy College of Engineering and Technology Dulapally, Hyderabad Telangana State
External Examiner (Within Karnataka)	:	**Dr Mallanagouda Patil** Associate Professor Department of CSE RV Institute of Technology and Management J P Nagar, Bengaluru - 560076 Karnataka
Supervisor	:	**Dr Balamurugan M** Associate Professor Department of Computer Science and Engineering School of Engineering and Technology CHRIST (Deemed to be University) Bengaluru – 560074 Karnataka
Co-Supervisor	:	**Dr Bikramaditya Ghosh** Associate Professor Symbiosis Institute of Business Management Symbiosis International (Deemed University) Bengaluru – 560100 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar

Place: Bengaluru
Date: 09 September 2024

ABSTRACT

The volatility and uncertainty make stock and stock price index predictions challenging. Many financial professionals and academics are interested in stock price/index prediction studies. This study presents computational ML and DL intelligence techniques for estimating the NIFTY50 index closing value on the Indian NSE using Fundamental Analysis and Technical Analysis. To forecast the NIFTY50 index, we first employed Fundamental Analysis and max voting, bagging, boosting, and stacking ensemble learning techniques. An embedded feature selection algorithm is utilized to determine the model's best fundamental indicators, and a grid search is performed to tweak hyperparameters for each base regressor. Our results demonstrate that the bagging and stacking regressor model 2 beat all other models, with the lowest RMSE of 0.0084 and 0.0085, respectively, indicating an improved fit of ensemble regressors. Subsequently, TA research was done to exhibit the influence of deep learning on the NIFTY50. This method employs a data augmentation mechanism and three GRU model variations. It is examined using two datasets, TA1 and TA2, which include technical indicators from the NIFTY50 index. The GRU model enhanced the NIFTY50 index prediction using the TA1 technical indicator dataset.

Finally, the study examines a hybrid model to estimate equity market trends, combining PCA with ML methods such as ANN, SVM, NB, and RF. The proposed approach uses the trend deterministic data preparation layer to convert the continuous data to a discrete form denoted by +1 or -1. The empirical findings of this hybrid model demonstrate that the RF model with the first three principal components obtain precision of 0.9969, F1-score 0.9968 and AUC score of 1. Overall, the suggested research design outperforms baseline models in our experiments and shows promising results using fundamental and technical analysis indicators. Thus, this study provides an ideal tool for stock market prediction and financial decision-makers.

Keywords: Ensemble Techniques, GRU, LSTM, NIFTY50, PCA.

Publications:

1. **Manjunath, C.**, Marimuthu, B., and Ghosh, B., "Deep Learning for Stock Market Index Price Movement Forecasting Using Improved Technical Analysis", *International Journal of Intelligent Engineering and Systems*, vol.14(5), pp.129–141, 2021. https://doi.org/10.22266/ijies2021.1031.13. [Status: Published, Scopus Indexed: Q2].
2. **Manjunath, C.**, Marimuthu, B., and Ghosh, B., "Analysis of Nifty 50 index stock market trends using hybrid machine learning model in quantum finance", *International Journal of Electrical and Computer Engineering*, vol.13(3), pp.3549–3560, 2023. https://doi.org/10.11591/ijece.v13i3.pp3549-3560. [Status: Published, Scopus Indexed: Q2].
3. **Manjunath, C.**, Marimuthu, B., and Ghosh, B., "Stock market prediction employing ensemble methods: the Nifty50 index", *International Journal of Artificial Intelligence (IJ-AI)*, vol.13(2), pp.2049-2059, 20214, http://doi.org/10.11591/ijai.v13.i2.pp2049-2059. [Status: Published, Scopus Indexed: Q2].