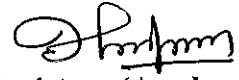# Notice for the PhD Viva Voce Examination

Ms Ashy Sebastian, Registration Number: 2070010, PhD Scholar at the Department of Commerce, School of Commerce, Finance and Accountancy, CHRIST (Deemed to be University), Bangalore Central Campus will defend her PhD thesis at the public viva-voce examination on Friday, 01 August 2025 at 10.15 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru – 560029, Karnataka, India.

Title of the Thesis	:	**Stock Price Prediction and Portfolio Optimisation using Deep Learning Techniques**
Discipline	:	**Commerce**
External Examiner - I	:	**Dr D Sathish** Professor Department of Finance and Accounting IBS Hyderabad, IFGE Deemed University Hyderabad, Telangana - 501203
External Examiner - II	:	**Dr N Ramu** Associate Professor IFIM School of Management KIADB Industrial Area Electronic City, Phase I Bengaluru - 560100 Karnataka
Supervisor	:	**Dr Veerta Tantia** Associate Professor Department of Commerce School of Commerce, Finance and Accountancy CHRIST (Deemed to be University) Bengaluru - 560029 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 (Academics)

Place: Bengaluru
Date: 28 July 2025

ABSTRACT

Stock market analysis is a well-explored field, with accurate prediction becoming increasingly essential. Forecasting stock market behavior is a complex task that requires a detailed examination of data patterns. Deep learning techniques represent the latest advancements in this domain, and their application in stock market prediction and portfolio optimization is gaining significant traction in research. This study focuses on stock market dynamics in developing economies, which are generally considered less stable than their developed counterparts. The research is structured in two stages. In the first stage, a novel multi-output stacked LSTM model is developed for daily predictions of NIFTY stocks. While previous studies primarily employed LSTM for single-output stock market forecasting, this study overcomes those limitations by predicting the entire OHLC price range, delivering a more holistic outlook of price dynamics.

The model integrates historical prices and STIs as input features and applies PCA for dimensionality reduction. To evaluate performance, the model is benchmarked against existing studies using metrics such as MAE, MSE, RMSE, and accuracy rate. In the second stage, stocks selected based on predicted returns from the first stage are used to construct 30 different portfolios, each consisting of the top 7, 8, 9, and 10 return generating NIFTY stocks. These portfolios are then assessed based on risk and returns metrics. The results indicate that portfolios with five stocks yield the highest returns, while increasing the portfolio size beyond nine stocks leads to excessive diversification and complexity. Consequently, the findings suggest that the proposed two stage portfolio optimization approach effectively balances historical and predictive asset information, making it a promising investment strategy.

Keywords: *Stock price prediction, Portfolio optimization, Deep learning, Emerging markets, Indian stock markets, LSTM, NIFTY*

Publications:
1. **Sebastian, A.,** & Tantia, V. (2024). From data to decisions: Harnessing AI and big data for advanced business analytics. Social Reflections of Human-Computer Interaction in Education, Management, and Economics (pp. 97-124). IGI Global, July 2024, 10.4018/979-8-3693-3033-3.ch006
2. **Sebastian, A.,** & Tantia, V. (2024). Transforming Finance With Deep Learning Predictions. Navigating the Future of Finance in the Age of AI (pp. 227-252). IGI Global, August 2024. 10.4018/979-8-3693-4382-1.ch012
3. **Sebastian, A.,** & Tantia, V. (2024). Deep Learning for Stock Price Prediction and Portfolio Optimization. International Journal of Advanced Computer Science & Applications, 15(9), September 2024, Vol. 15, No. 9, pp 926- 941,10.14569/IJACSA.2024.0150995
4. **Sebastian, A.,** & Tantia, V. (2025). Multi-variate LSTM with attention mechanism for the Indian stock market. International Journal of Information Management Data Insights, 5(2), 100350, 10.1016/j.jjimei.2025.100350

Patent:
1. **Sebastian, A.,** & Tantia, V. (2025) Multi Output Attention Based LSTM Model With Integrated Hardware System For Intraday Stock Prediction In The Indian Market