

In Collaboration With  
Informatics Institute of Technology  
University of Westminster, UK



## **ChartFusion.**

Superior Forex Price Forecasting Model: A Hybrid Model Integrating  
LSTM and Gradient Boosted Trees for Enhanced Technical and  
Fundamental Analysis

A Project Proposal by

**Mr. Maleesha Kawshan Mendis**

w1870619 / 20210144

Supervised by

**Mr. Nishantha Janith Chandrasena**

April 2025

This Project Proposal is submitted in partial fulfillment of the requirements for  
the BEng (Hons) Software Engineering degree at  
the University of Westminster.

## Abstract.

**Problem:** Accurately predicting Forex price movements is challenging due to the inherent volatility of currency markets, which are influenced by both historical price trends and dynamic macroeconomic factors. Existing forecasting models primarily rely on technical analysis and often overlook the critical impact of fundamental data, such as economic indicators and news sentiment. Additionally, conventional models, like standard LSTM architectures, face limitations in handling both short-term and long-term trends effectively, leading to reduced accuracy and practical utility for real-world trading.

**Methodology:** This project proposes a hybrid model combining Long Short-Term Memory (LSTM) networks and Gradient Boosted Decision Trees (GBDT) to integrate both technical and fundamental analysis for Forex forecasting. The LSTM component captures sequential price trends using historical data, while GBDT processes macroeconomic factors, such as interest rates and GDP, to improve long-term predictions. Risk management features, such as stop-loss mechanisms, are embedded to ensure practical applicability in live trading.

**Initial Results:** Initial testing demonstrates that the hybrid LSTM-GBDT model achieves a higher classification accuracy (85.70%) and lower error metrics (MAE: 0.1639, RMSE: 0.1639) compared to the standalone GBDT model (Accuracy: 75.12%, MAE: 0.1758, RMSE: 0.1895). These improvements suggest that combining sequential pattern learning with structured macroeconomic input enhances the model's short- and mid-term forecasting capabilities. However, the  $R^2$  score for the hybrid model was found to be significantly negative, which may indicate issues with how the regression metrics are being computed or interpreted within the hybrid architecture.

### Subject Descriptors:

- Applied computing -> Business and commerce -> Financial services -> Foreign exchange
- Computing methodologies -> Machine learning -> Machine learning approaches -> Neural networks
- Information systems -> Information systems applications -> Data mining

**Keywords :** Forex forecasting, hybrid model, LSTM, Gradient Boosted Decision Trees, risk management