SYMBIOSIS INSTITUTE OF TECHNOLOGY, PUNE

Department of AI and Machine Learning

SYMBIOSIS Golden Jubilee — Celebrating 50 Years of Excellence

PROJECT TITLE: Bull's Eye: Intelligent Trading with Deep Learning for Forex Markets

INTRODUCTION

'Bull's Eye' uses Deep Learning to predict optimal stock sale points, maximizing gains and minimizing losses in volatile markets.

Traditional methods often miss complex signals but combining LSTM and Transformer models with technical indicators like RSI (Relative Strength Index) and MACD (Moving Average Convergence Divergence) enables the model to capture nuanced temporal patterns in stock prices.

Analyzing historical data and market signals, the project identifies ideal 'buy' and 'sell' points, capturing price dependencies and enhancing trend recognition. This data-driven approach empowers investors with precise trade signals for better risk management and profit maximization.

OBJECTIVES & AIMS:

The objectives of the project are to:

- Develop a Deep Learning model to predict optimal stock sale points using technical indicators and historical price data.
- Empower investors to make data-driven, profitable decisions in volatile markets.
- Create a reliable and adaptive trading tool combining LSTM, Transformers, RSI, and MACD.
- Identify accurate "buy" and "sell" signals to help investors maximize gains and minimize risks.
- Enhance trading outcomes through precise timing and effective trend recognition.

METHODOLOGY

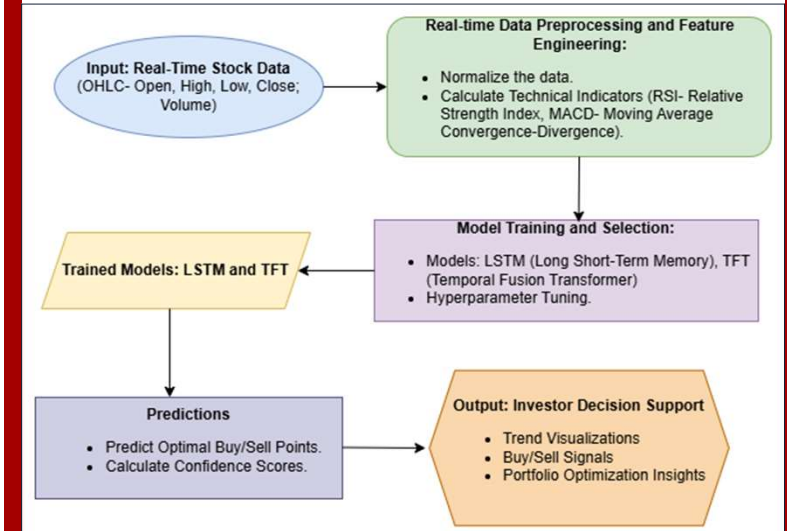


Fig : Project Framework Diagram

Algorithms Used:

- **LSTM (Long Short-Term Memory):** Captures long-term dependencies and sequential patterns in time-series data.
- **Temporal Fusion Transformer (TFT):** Integrates time-series with attention mechanisms, enhancing prediction accuracy by highlighting key temporal dependencies.
- **RSI (Relative Strength Index):** Quantifies momentum, indicating potential overbought/oversold conditions.
- **MACD (Moving Average Convergence Divergence):** Analyzes trend strength by examining short- and long-term price movements.

Equations :

$$RSI = 100 - \left(\frac{100}{1 + \frac{\text{Average Gain}}{\text{Average Loss}}}\right)$$

$$\text{MACD} = \text{EMA}_{\text{Fast}} - \text{EMA}_{\text{Slow}}$$

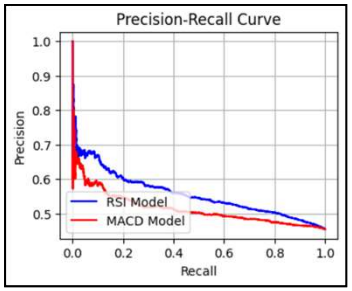
EMA : Exponential Moving Average to calculate the Convergence and Divergence
EMA_{fast} : EMA with Period 12
EMA_{slow} : EMA with Period 26

DATASET

Source	Metatrader
Size	500000 Rows, 7 Columns
Modality	Time Series

Symbol	EURUSD
Timeframe	5-Minute
Duration	2022 - Current

RESULTS:

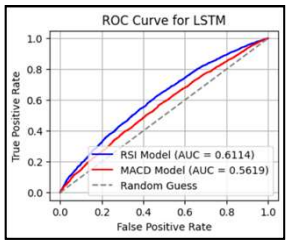


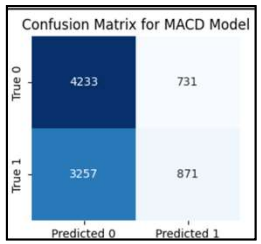
Classification Report for RSI

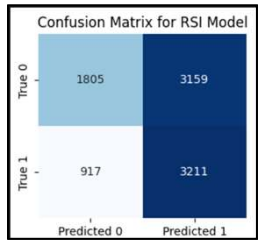
	precision	recall	f1-score	support
0.0	0.54	0.61	0.57	1046
1.0	0.46	0.39	0.43	899
accuracy			0.51	1945
macro avg	0.50	0.50	0.50	1945
weighted avg	0.50	0.51	0.50	1945

Classification Report for MACD

	precision	recall	f1-score	support
0.0	0.58	0.28	0.38	1046
1.0	0.48	0.76	0.59	899
accuracy			0.50	1945
macro avg	0.53	0.52	0.48	1945
weighted avg	0.53	0.50	0.48	1945







CONCLUSION AND FUTURE SCOPE: This project demonstrates the potential of Deep Learning Models to optimize trading strategies in volatile markets. Future work will focus on incorporating diverse data sources and refining model accuracy for robust, real-time financial forecasting.

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