

III Year B. Tech II Semester Mini Project Work
Project- Pulse

Branch : CSE(DS)

Academic Year : 2024-2025

Course Name: Mini Project with Seminar

Course Code : GR22A3089

Domain Stock Market

Project Title Stocks Unveiled: LSTM vs. Classical Models in Price Prediction

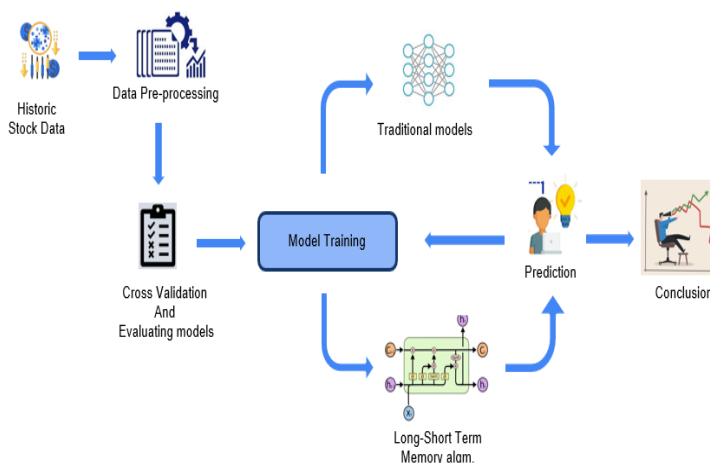
Abstract

This study presents a comparative analysis of traditional machine learning models and advanced deep learning architectures for stock price prediction. Utilizing historical stock data from 17 prominent companies across various sectors, models such as Linear Regression, Decision Tree, Random Forest, Support Vector Regression (SVR), K-Nearest Neighbors (KNN), Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM), Convolutional Neural Networks (CNN), and hybrid models combining CNN, RNN, and LSTM were evaluated. The performance of these models was assessed using the coefficient of determination (R^2) metric. Results indicate that deep learning models, particularly the proposed Final Hybrid model, outperform traditional machine learning models in predictive accuracy.

Objectives

- To implement and evaluate traditional machine learning models for stock price prediction.
- To develop and assess deep learning models, including LSTM, CNN-LSTM, and hybrid architectures.
- To compare the performance of traditional and deep learning models using appropriate evaluation metrics.

Architecture Diagram



Significance of the work

The proposed Final Hybrid Model demonstrated superior performance over standalone traditional and deep learning models. It effectively captured temporal patterns and non-linear trends, especially in volatile stocks.

Dataset Details

The dataset comprises historical stock data collected from Alpha Vantage API for 17 globally recognized companies including AAPL, MSFT, GOOG, META, TCS, INFY, and others. The data spans from 2000 to early 2025 and includes attributes such as opening price, closing price, high, low, volume, and adjusted close.

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Standards and tools:

Used Standard names
conventions in Python

Tools: Google Colab

Results and Analysis:

A. Performance Comparison: The final hybrid model outperformed both traditional ML and standalone DL models across all performance metrics. Notably, the final hybrid model achieved R^2 scores exceeding 0.95 for most stocks, indicating high predictive accuracy.

B. Company-wise Analysis: The models demonstrated varying performance across companies' stocks, with technology stocks showing higher predictability. The hybrid model maintained consistent performance across different sectors, highlighting its robustness.

C. Visualization: Graphs depicting actual vs. predicted prices, error metrics, and model performance across different stocks were generated to provide visual insights into model efficacy.

Project Content's Google Drive Link:

[Documentation Link](#)

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