Stock Price Prediction App using Machine Learning Models Optimized by Evolution

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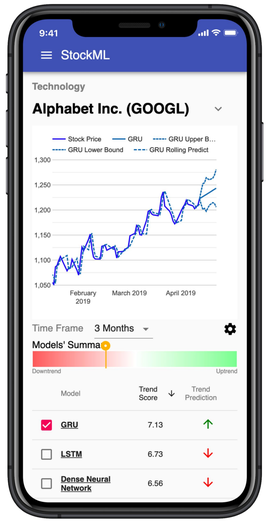
Democratizing Machine Learning Technologies for Retail Investors.

The ultimate goal of our application is to serve retail investors as a third party investment tool that uses machine learning to help them navigate in the fast-changing stock market.

The project aims to introduce and democratize the latest machine learning technologies for retail investors so they can better predict trends of stock prices.



2 Simple Objectives

Optimize Prediction Models

Use machine learning models optimized by evolution algorithm to predict next 10 days stock prices, evaluated based on historical predictions.

Responsive Web Application

Develop a progressive web application for retail investors to compare and contrast different machine learning models easily.

Application Features

Price & Trend Prediction

Upper/Lower Error Bounds and Buy/Sell Score for investors to quickly spot an opportunity.

Historical Stock Price

Up to 20 years of stock data enables investors to see how stocks move in the past.

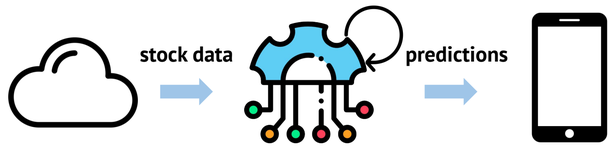
Different Models Compared Side-by-Side

Trend Scores and Predicted Direction for comparing how well individual models predict.

Test Set Performance for Advanced Users

Historical predictions with model configurations for advanced users to inspect.

System Design



1. Get Stock Data

Daily Closing Prices from AlphaVantage

2. Evolve Models

Automation of Architecture Search

3. Predict Prices

Delivery of Daily Predictions to Users

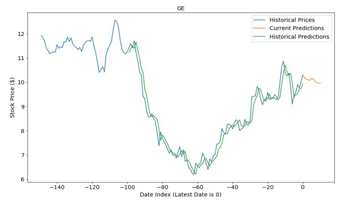
Models Explored

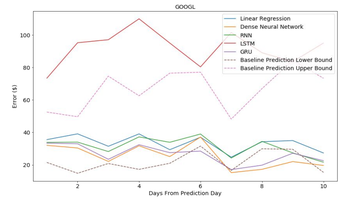
#Neural_Network #Recurrent_Network #LSTM_Network #GRU_Network

Research Findings

1 Predicted Prices Lookalike Exponential Moving Average

Prediction line looks like a 1-day shift of prices, and it smoothes out some volatility, which looks like an EMA curve with predictive power. The predictions put heavy weights on closer prices, and light weights on older prices, which fits normal trader behavior.





2 Trend Predictions Reached 60-70% Accuracy

Predictions are comparable to a baseline of a hypothesized investor trading based on technical analysis who always know the movement direction but not the exact price. It implies that price trend is predictable despite random walk on precise price.

3 Models' Performance Increases With Evolution Algorithm

The accuracies of the models improve as more iterations of the evolution algorithm is run, clearly demonstrating the effectiveness of the algorithm in searching for better models.