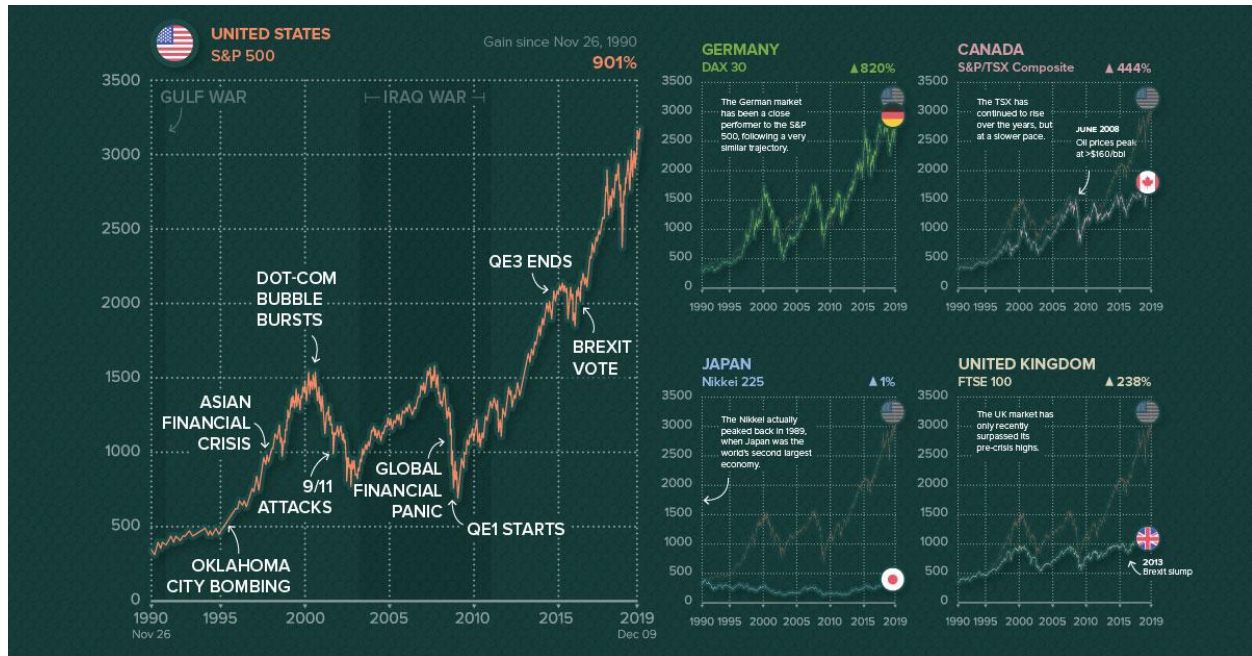


Stock Market Prediction

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Introduction

Stock market prediction is an excellent application of Modern AI/ML, revolutionizing the way of trading in the stock market. In this project, we are using the TATA stock market dataset and built four different models from basic intuition to complicated math for better understanding; We have shown the prediction graphs and actual values which can be used in virtual trading.

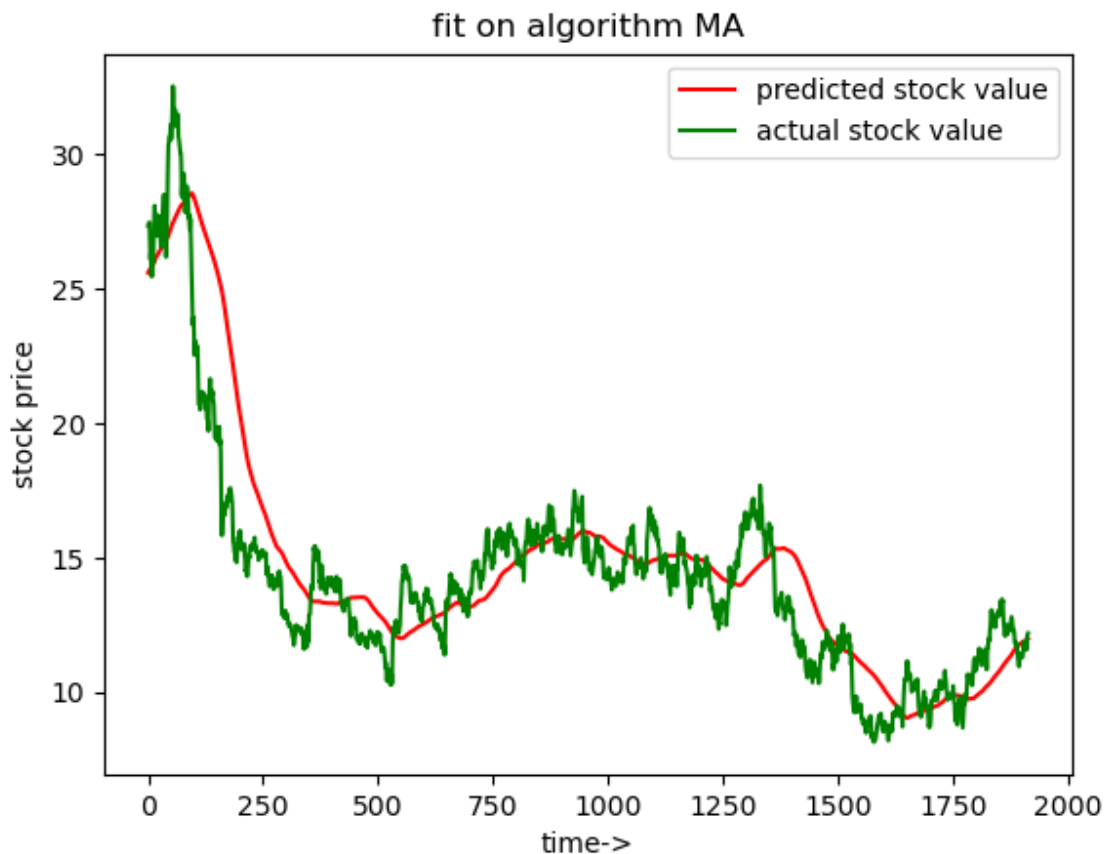
Models

We started with Moving Average, then Normal Neural Nets, then LSTM, and finally, the most accurate GRU.

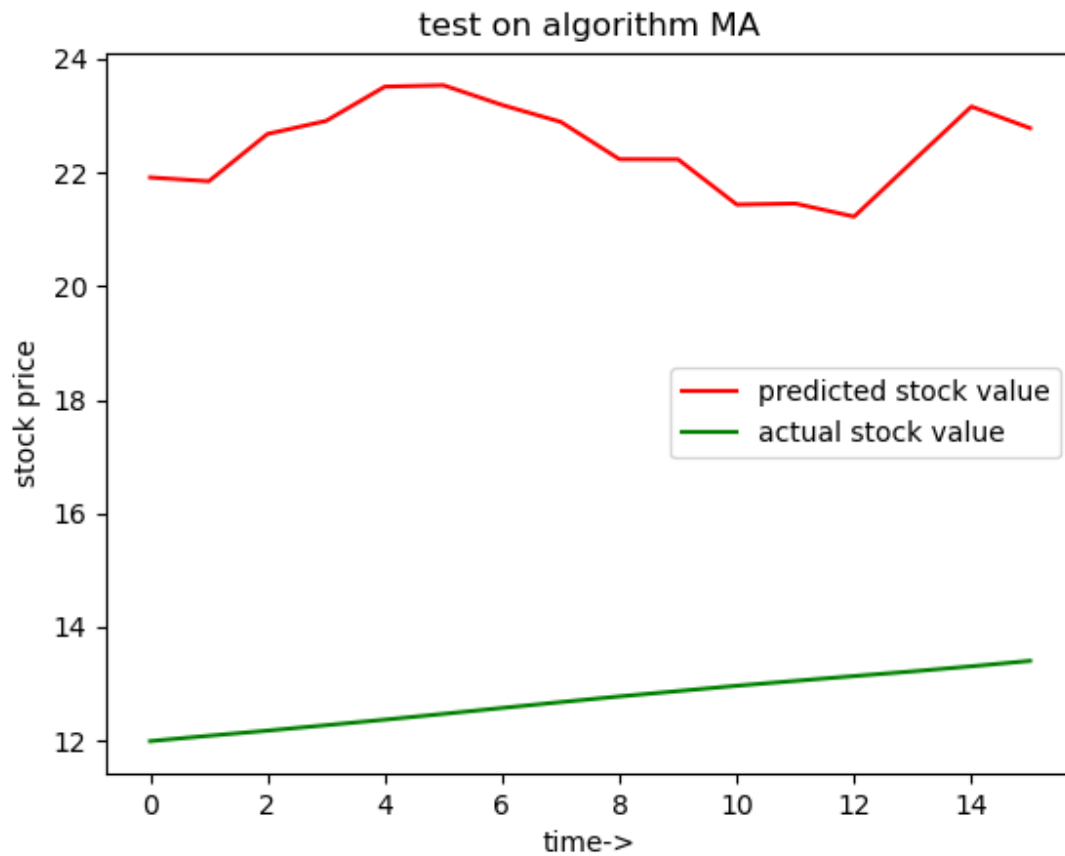
Moving Average

Moving average is a calculation used to analyze data points by creating a series of averages of different subsets of the entire data set. By calculating the moving average, the impacts of random, short-term fluctuations on the price of an asset over a specified time frame are mitigated.

Training Data:-



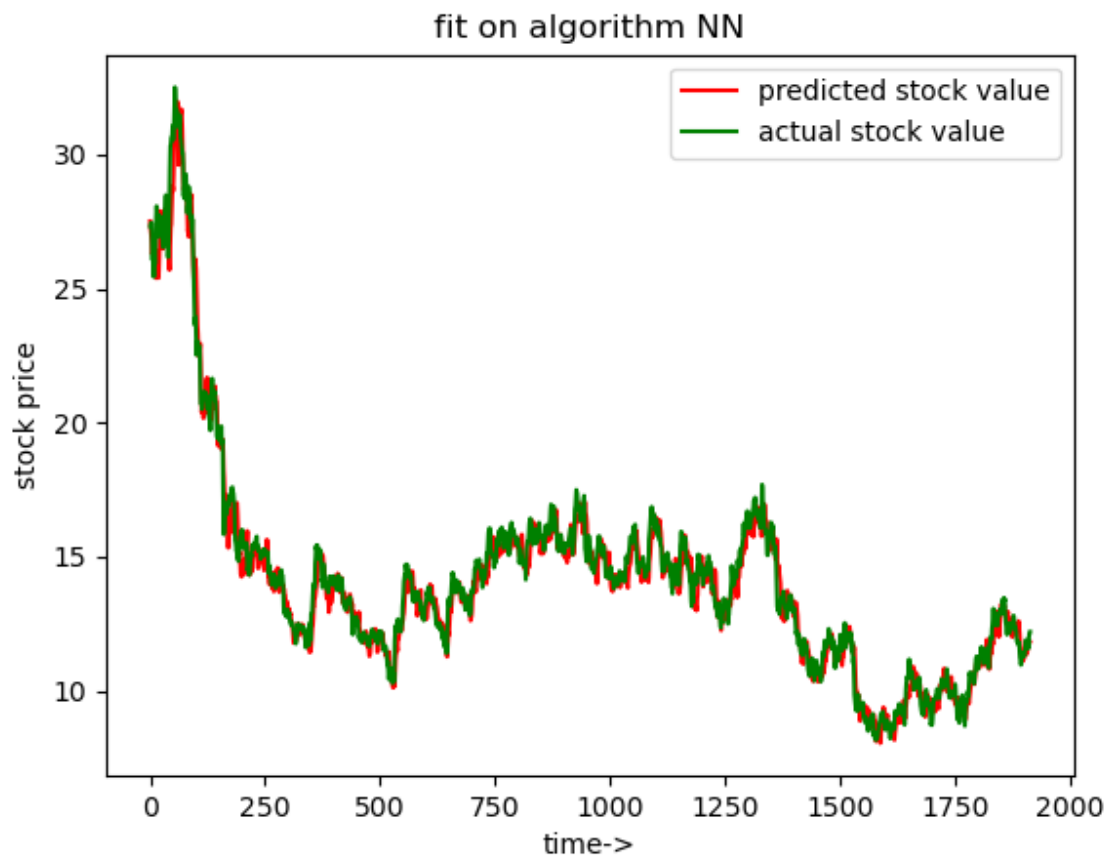
Test Data:-



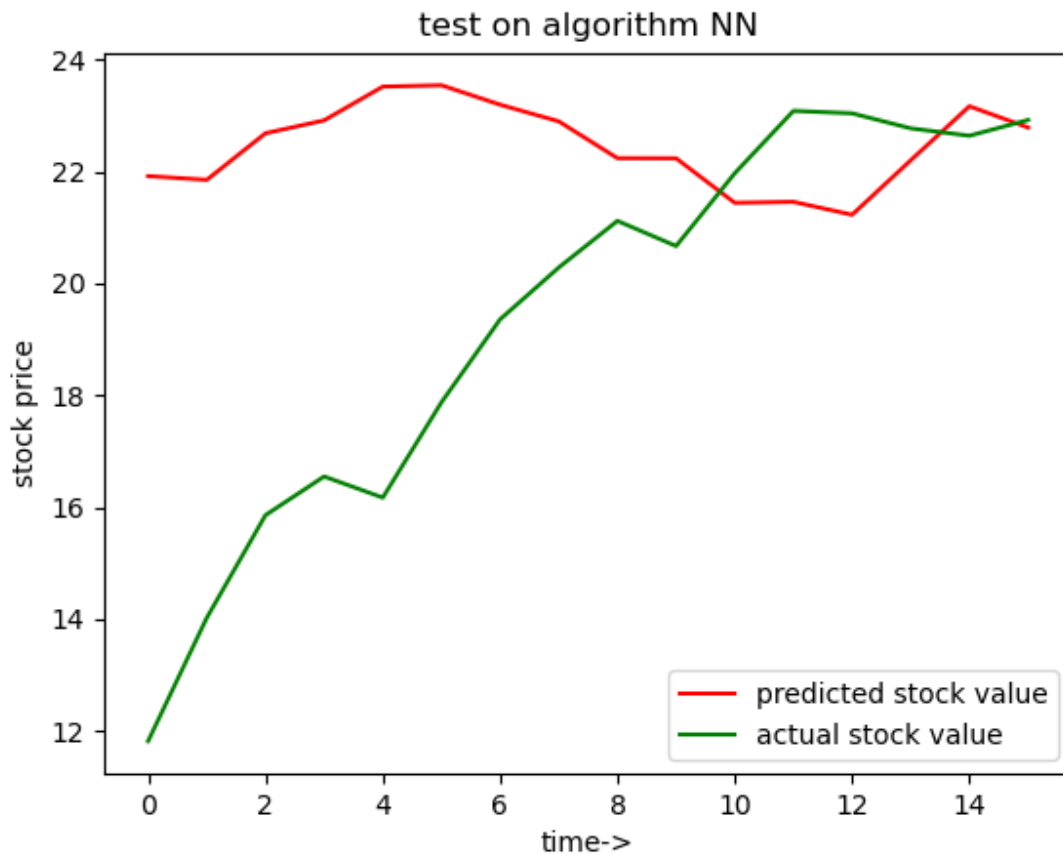
Neural Nets

We have used 4-5 layers, using ReLU and Sigmoid activations, to get the average stock value on the given day. The plots show that prediction is better than the case of the Moving Average. Below are the plots of training fit and prediction values.

Training Data fit:-



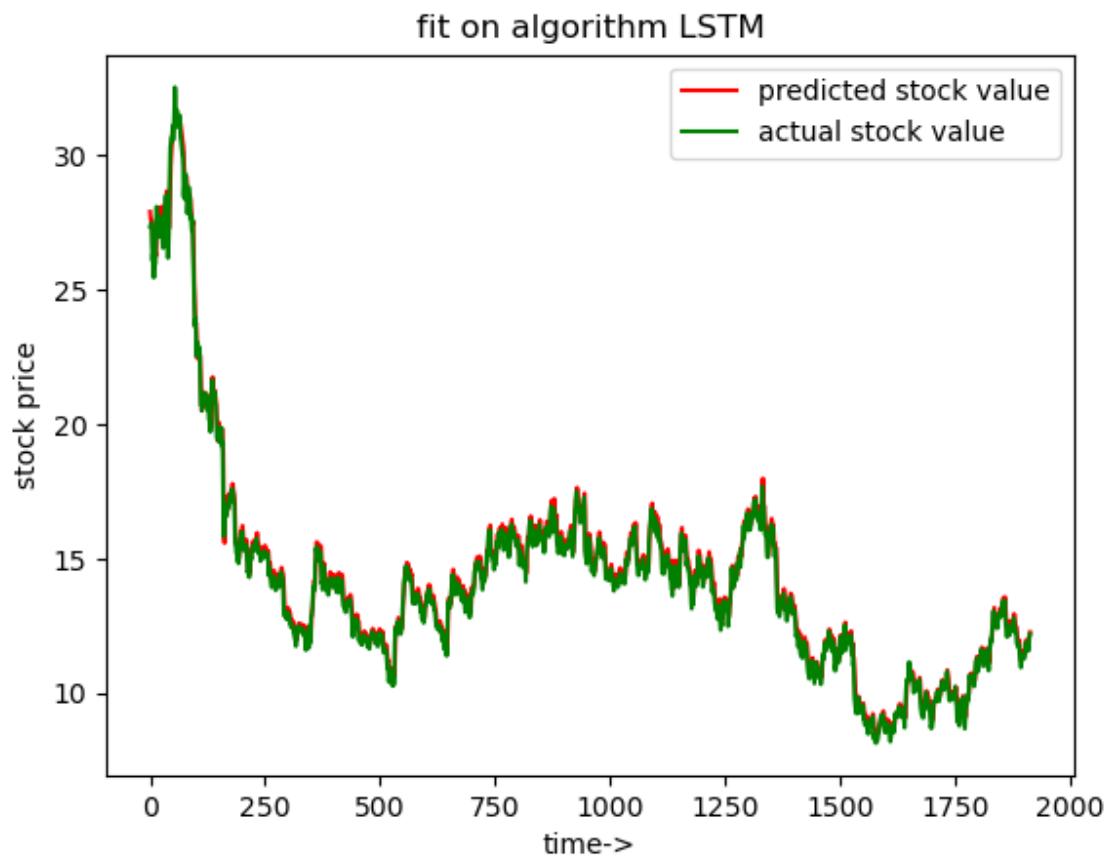
Test data prediction:-



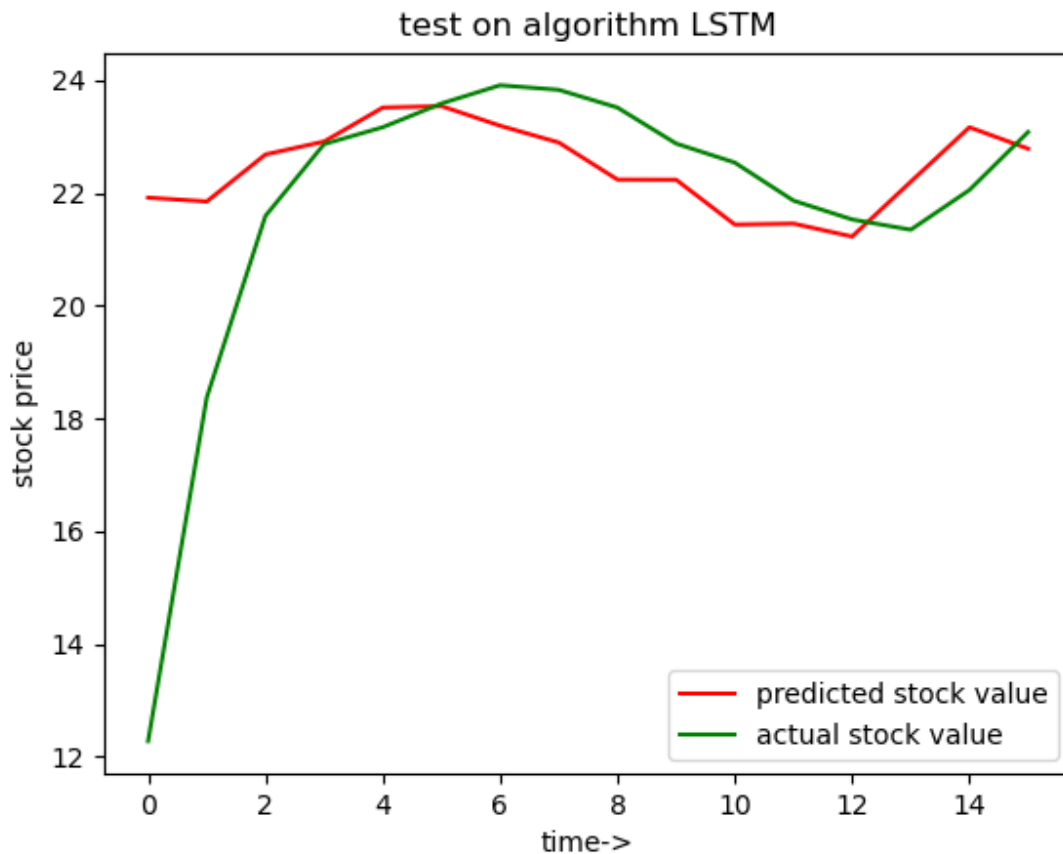
LSTM

LSTM is a recurrent neural network (RNN) architecture that REMEMBERS values over arbitrary intervals. LSTM is well-suited to classify, process, and predict time series given time lags of unknown duration. Relative insensitivity to gap length provides an advantage to LSTM over alternative RNNs, hidden Markov models, and other sequence learning methods. We have used two hidden layers, time_step of 120, optimizer adam. This predicts better than the Neural nets because it uses the last previous values to predict the current value. This is shown in the below plots of training fit and test prediction.

Training data fit:-



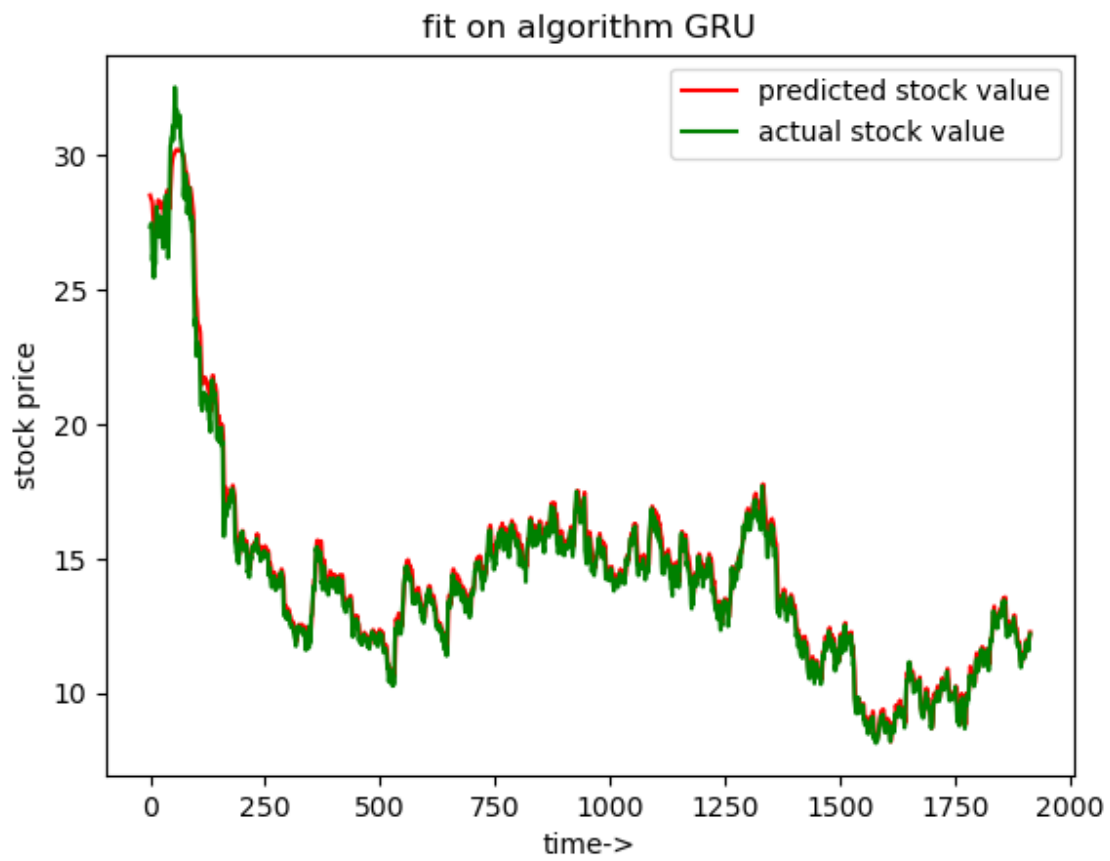
Testing data fit:-



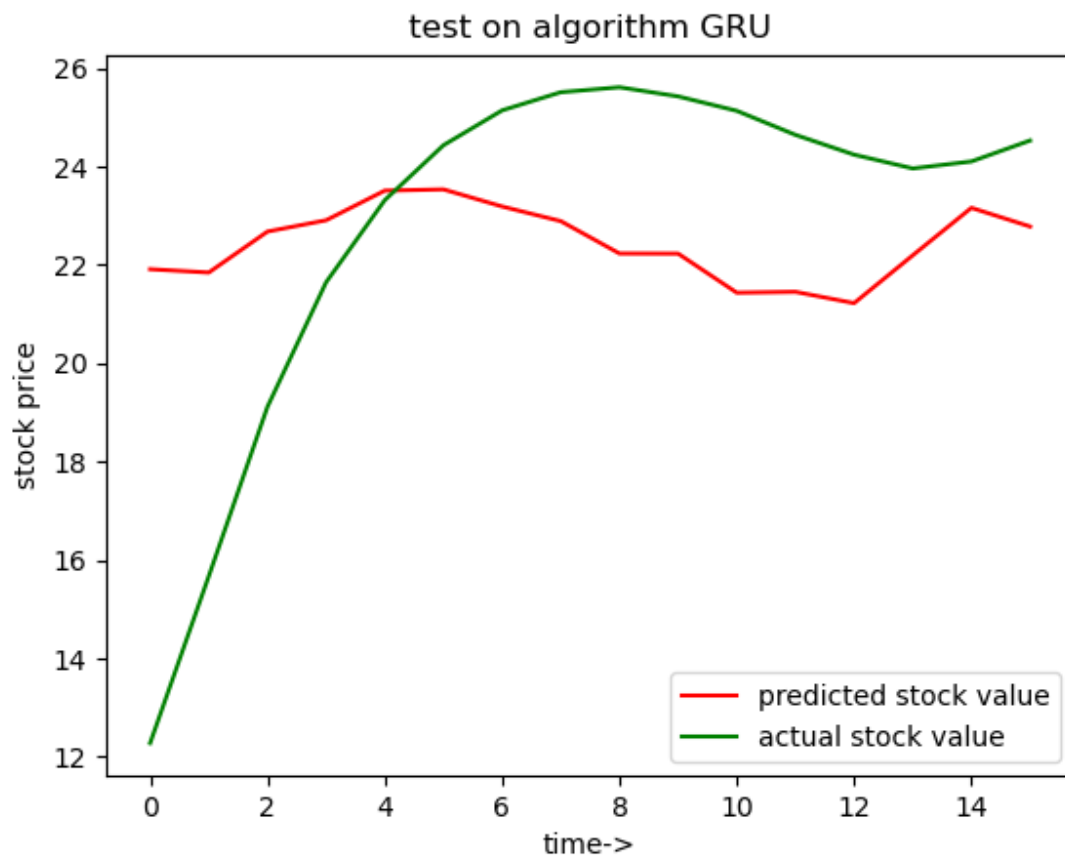
GRU

GRUs is an improved version of a standard recurrent neural network. To solve the vanishing gradient problem of a standard RNN, GRU uses the so-called update gate and reset gate. These two vectors decide what information should be passed to the output. The unique thing about them is that they can be trained to keep information from long ago without washing it through time or removing information irrelevant to the prediction. We have used 2 GRU layers, time_step of 120, sigmoid, and ReLU activations with adam optimizer. Below are the plots for the training fit and test predictions.

Training Data fit:-



Test data prediction:-



Thus, LSTM is better at predicting the stock values and can thus be used for further calculating the projections.

-----Thank you-----