SMAI ASSIGNMENT- 10 REPORT

APRIL 6

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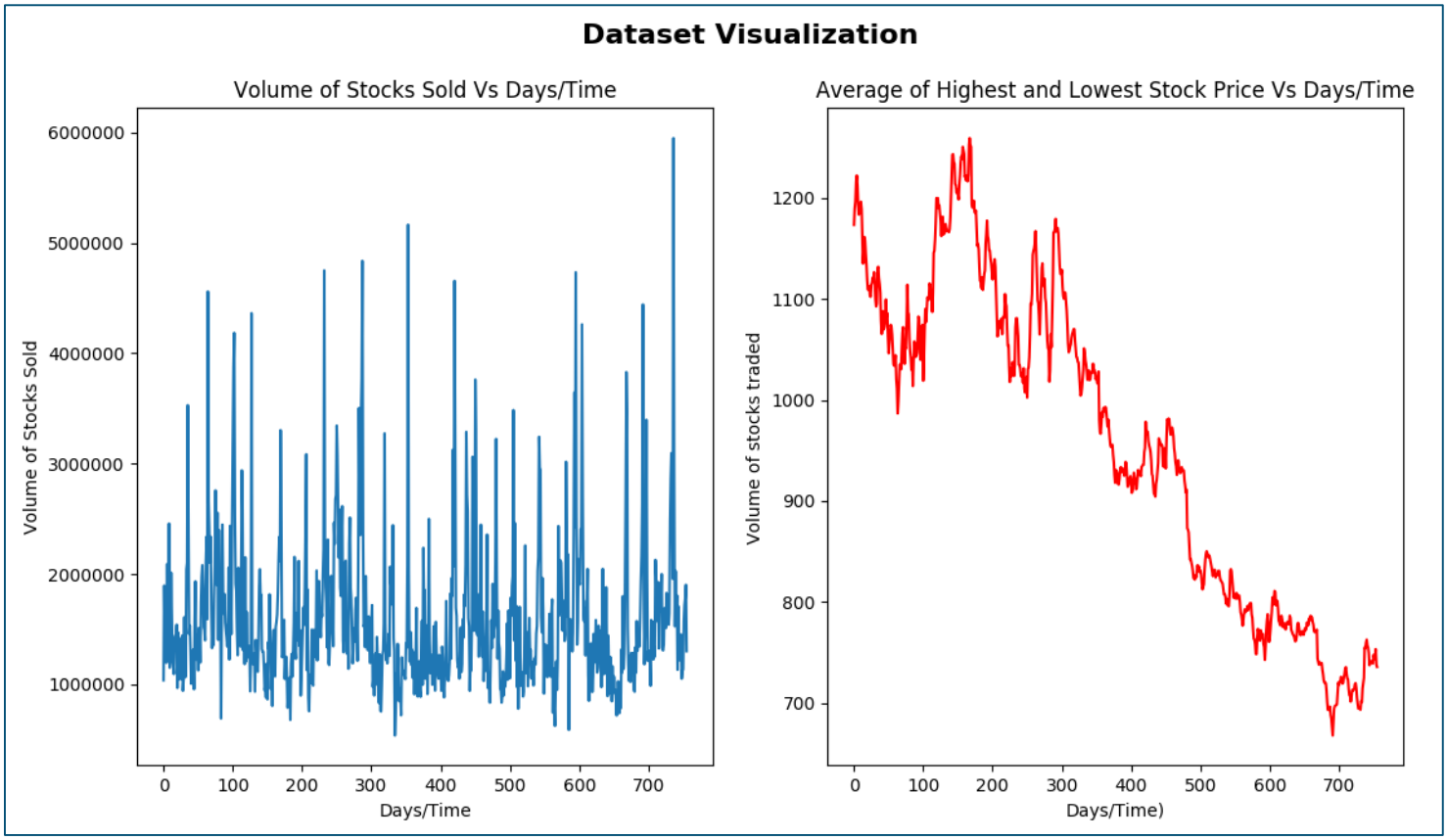
Opening Stock Price Prediction using RNN

Dataset Visualization:

This is a time series problem. We need to predict the Google stock prices considering the volume of the stocks traded from the previous days as well as the average of highest and lowest stock prices from previous days.



Implementing RNN LSTM:

For RNN LSTM to predict the data we need to convert the input data. Input data is in the form: [Volume of stocks traded, Average stock price] and we need to create a time series data. The time series data for today should contain the [Volume of stocks traded, Average stock price] for past 50 days and the target variable will be Google's stock price today.

As the stock price prediction is based on multiple input features, it is a multivariate regression problem.

LSTM expects the input data in a specific 3D format of [test sample size, time steps, no. of input features].

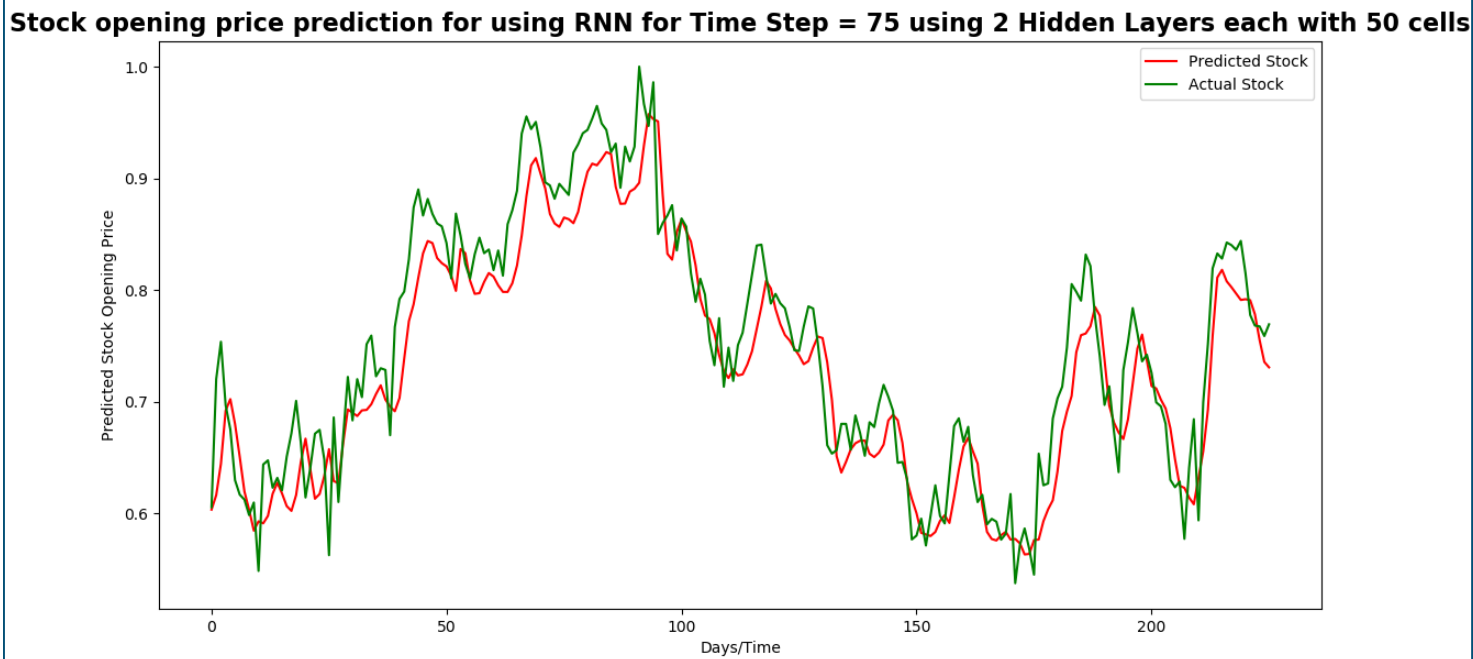
LSTM Model Summary

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm_1 (LSTM)                (None, 75, 50)            10600
_________________________________________________________________
dropout_1 (Dropout)          (None, 75, 50)            0
_________________________________________________________________
lstm_2 (LSTM)                (None, 50)                20200
_________________________________________________________________
dropout_2 (Dropout)          (None, 50)                0
_________________________________________________________________
dense_1 (Dense)              (None, 1)                 51
=================================================================
Total params: 30,851
Trainable params: 30,851
Non-trainable params: 0

Epoch 1/200
681/681 [==============================] - 4s 6ms/step - loss: 0.0631
Epoch 2/200
681/681 [==============================] - 2s 3ms/step - loss: 0.0108
Epoch 3/200
681/681 [==============================] - 2s 3ms/step - loss: 0.0057
Epoch 4/200
681/681 [==============================] - 2s 3ms/step - loss: 0.0053
Epoch 5/200
681/681 [==============================] - 2s 3ms/step - loss: 0.0051
Epoch 6/200
681/681 [==============================] - 2s 3ms/step - loss: 0.0050
```

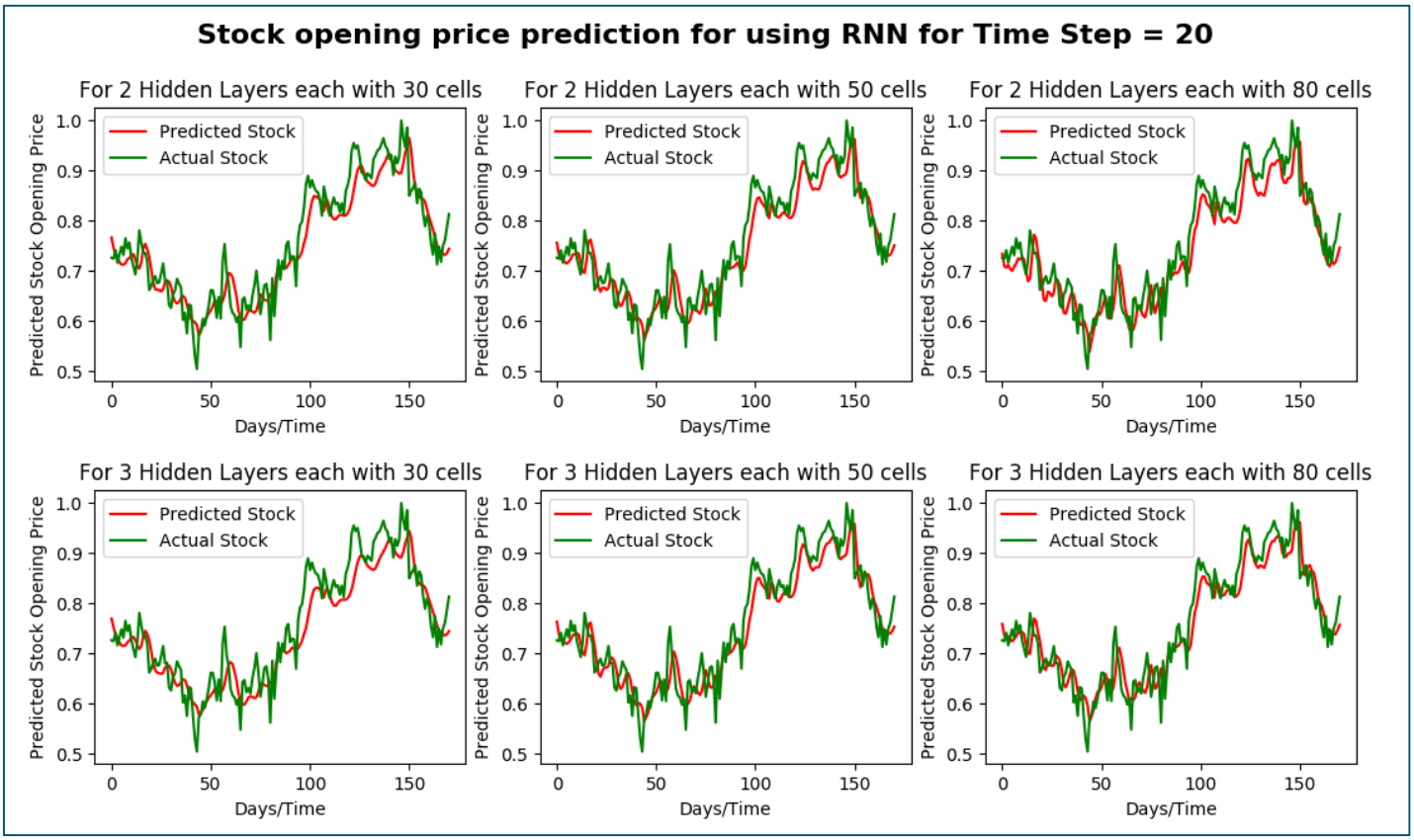
Continue till Epoch 100/100

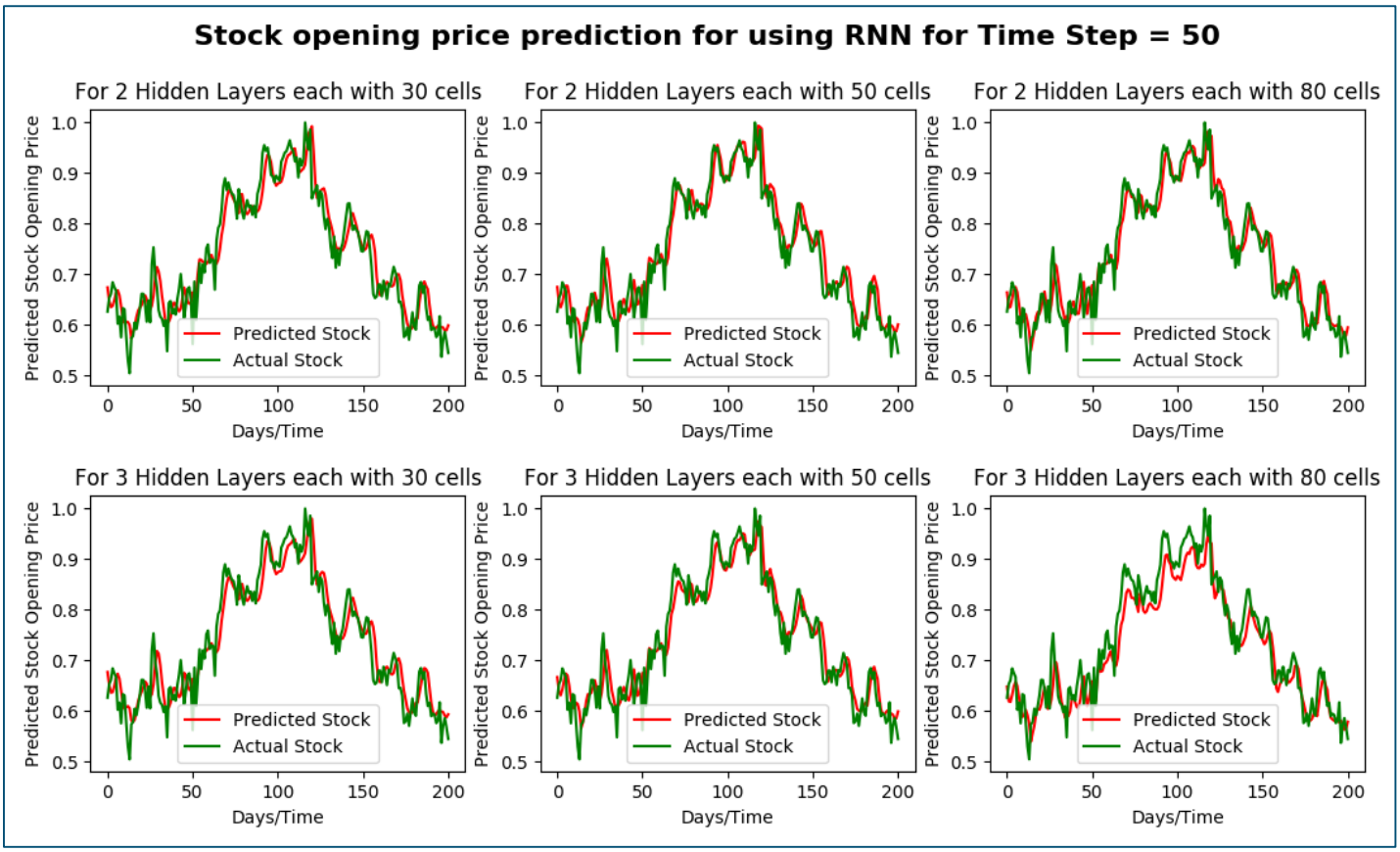
The following is an example of output graph depicting both actual stock prices and the predicted stock prices for time steps of 75 having 2 hidden layer of 50 cells each.

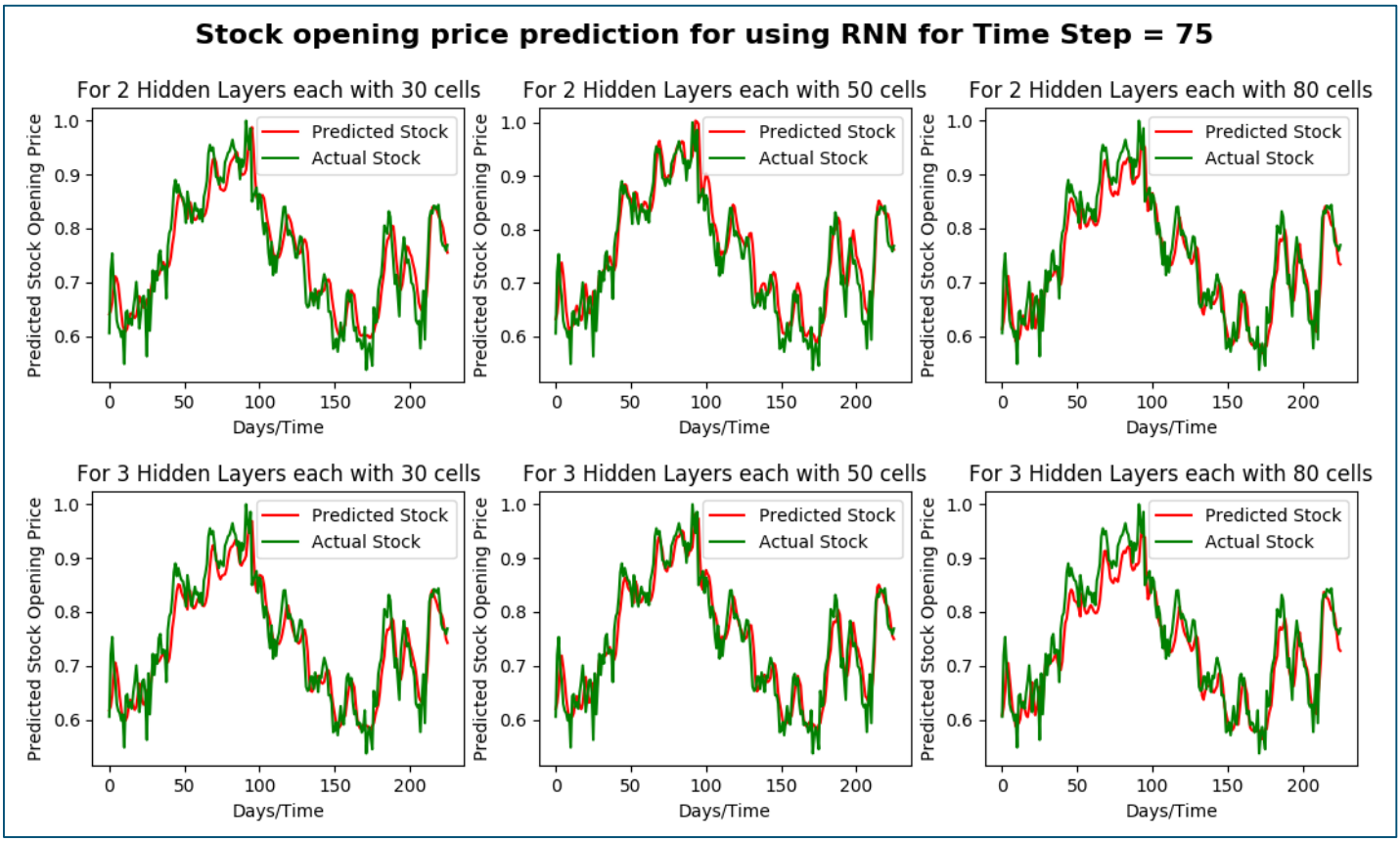


Below are the outputs generated for all 18 cases of

Hidden Layer	: [2,3]
No. of cells in hidden layer	: [30,50,80]
Time Steps	: [20,50,75]
Epoch	: 200
Batch Size	: 35
Optimizer	: Adam


Stock opening price prediction for using RNN for Time Step = 20
For 2 Hidden Layers each with 30 cells
For 2 Hidden Layers each with 50 cells
For 2 Hidden Layers each with 80 cells
For 3 Hidden Layers each with 30 cells
For 3 Hidden Layers each with 50 cells
For 3 Hidden Layers each with 80 cells
Predicted Stock
Actual Stock
Predicted Stock Opening Price
Days/Time


Stock opening price prediction for using RNN for Time Step = 50
For 2 Hidden Layers each with 30 cells
For 2 Hidden Layers each with 50 cells
For 2 Hidden Layers each with 80 cells
For 3 Hidden Layers each with 30 cells
For 3 Hidden Layers each with 50 cells
For 3 Hidden Layers each with 80 cells
Predicted Stock
Actual Stock
Predicted Stock Opening Price
Days/Time


Stock opening price prediction for using RNN for Time Step = 75
For 2 Hidden Layers each with 30 cells
For 2 Hidden Layers each with 50 cells
For 2 Hidden Layers each with 80 cells
For 3 Hidden Layers each with 30 cells
For 3 Hidden Layers each with 50 cells
For 3 Hidden Layers each with 80 cells
Predicted Stock
Actual Stock
Predicted Stock Opening Price
Days/Time