# Q1. Why have we chosen the LSTM to predict the stock?

Answer: Long Short Term Memory networks – usually just called "LSTMs" – are a special kind of RNN, capable of learning long-term dependencies. Stock prediction is all about finding insight from the historical stock data. LSTM helps us get some sense from the dataset as it can remember past results and use them to get the current state output.
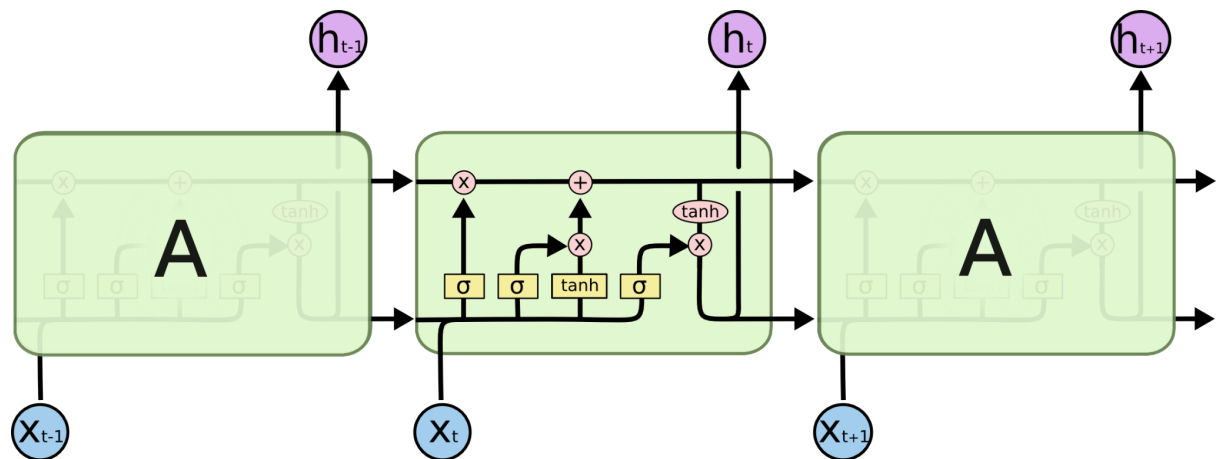
Note 1: The LSTM is based on a single variable(the prediction), that is Close.
Note 2: Cell no.9, the output contains the plot of the entire historical data.
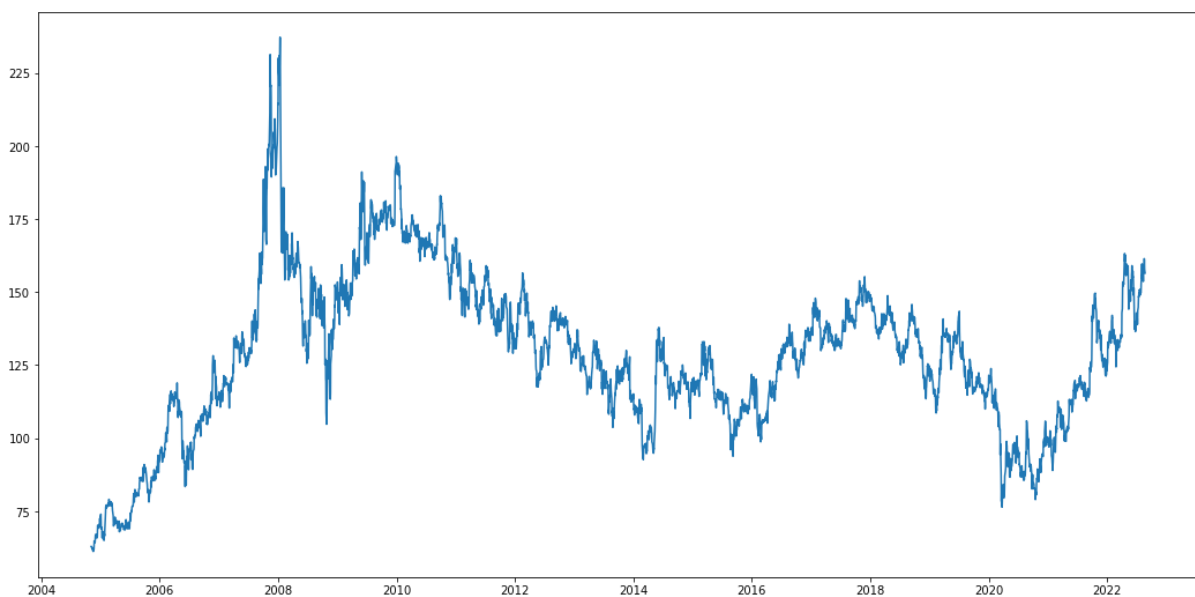
Note 3: `df_to_windowed_df` function is updating the dataframe by inserting new columns like Target date, Target-3, Target-2, Target-1 and Target.
Here, 'Target-3', column stores the Closing price of stock 3 days before the Target date.
Similarly, Target-2, stores the Closing price of stock 2 days before the Target date.
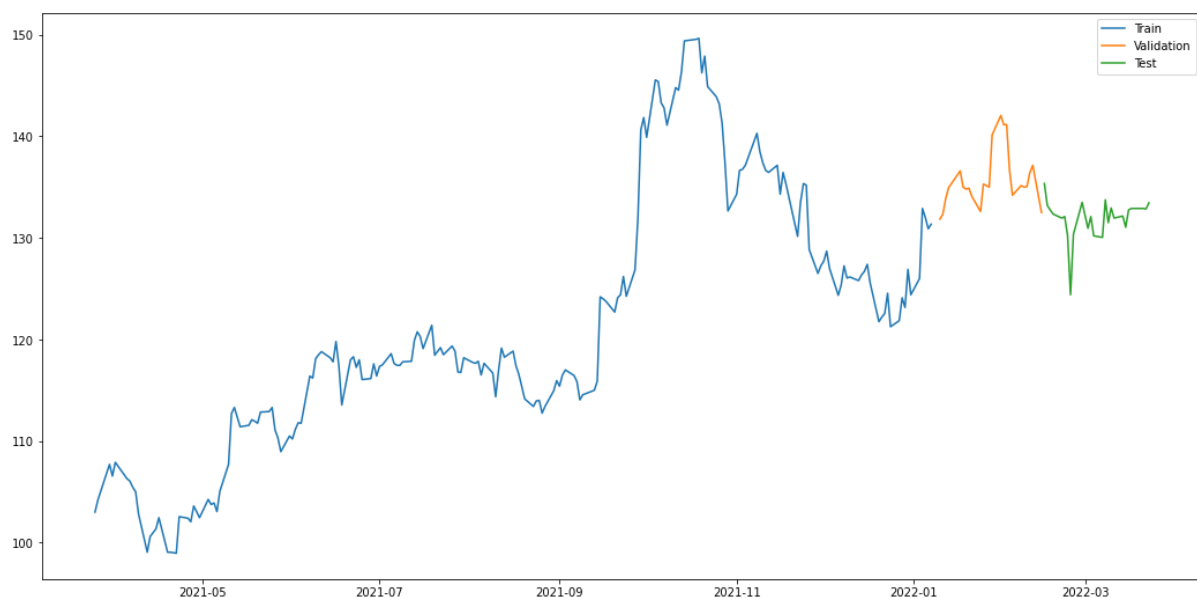And Target-1, stores the Closing price of the stock of previous day.

Note 4: For the model, we have partitioned the dataset into three parts, Training, Validation, and Testing section.
Training section consists of 80% of the data.
Validation part contains the data present in between 80 and 90%
For testing we will use the rest of the data.

Note 5: For training the model, we are using LSTM algorithm.
We are using the Sequential model, Adam optimizers, and fixing the learning rate to 0.001.
After running the model for 100 times(epoch = 100), our model results,

```
Epoch 100/100
7/7 [==============================] - 0s 9ms/step - loss: 7.1725 - mean_absolute_error: 2.0481 - val_loss: 3.8439 - val_mean_absolute_error: 1.3567
```

Note 6: If we plot the Training Observations and Training Predictions, we will observe that our model is performing well for training dataset.


Note 7: If we plot the Validation Observations and Validation Predictions, we will observe that our model is performing well for Validation dataset too, it is able to predict the high peak and random low peak.
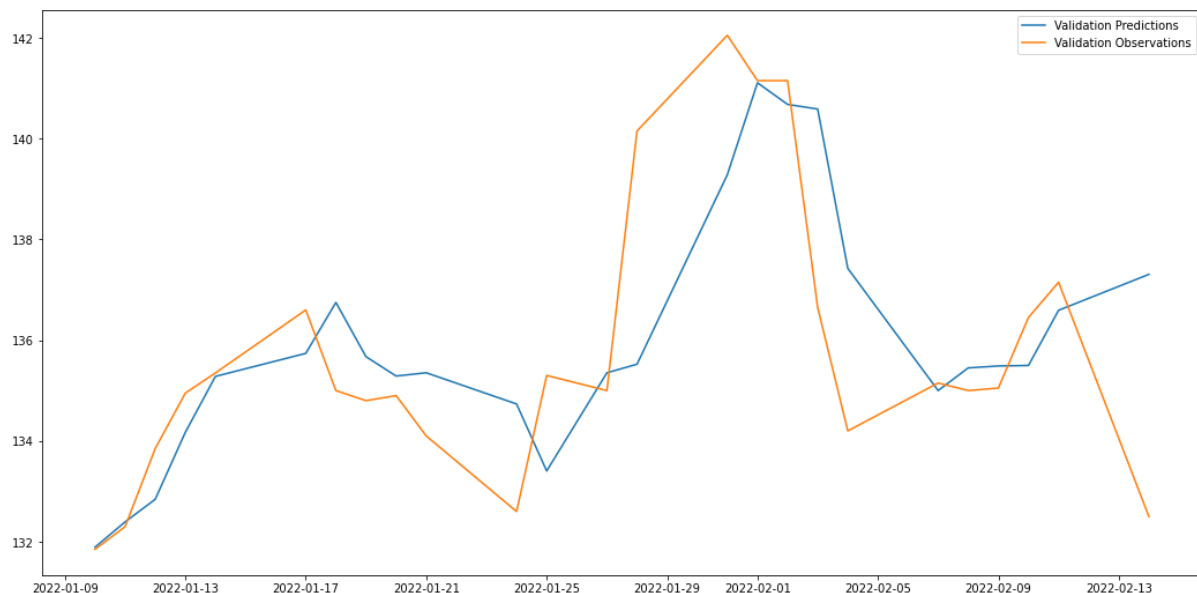
Note 8: If we plot the Testing Predictions and testing Observation, we will see that our model is judging the up and downs in the stock price quiet well.
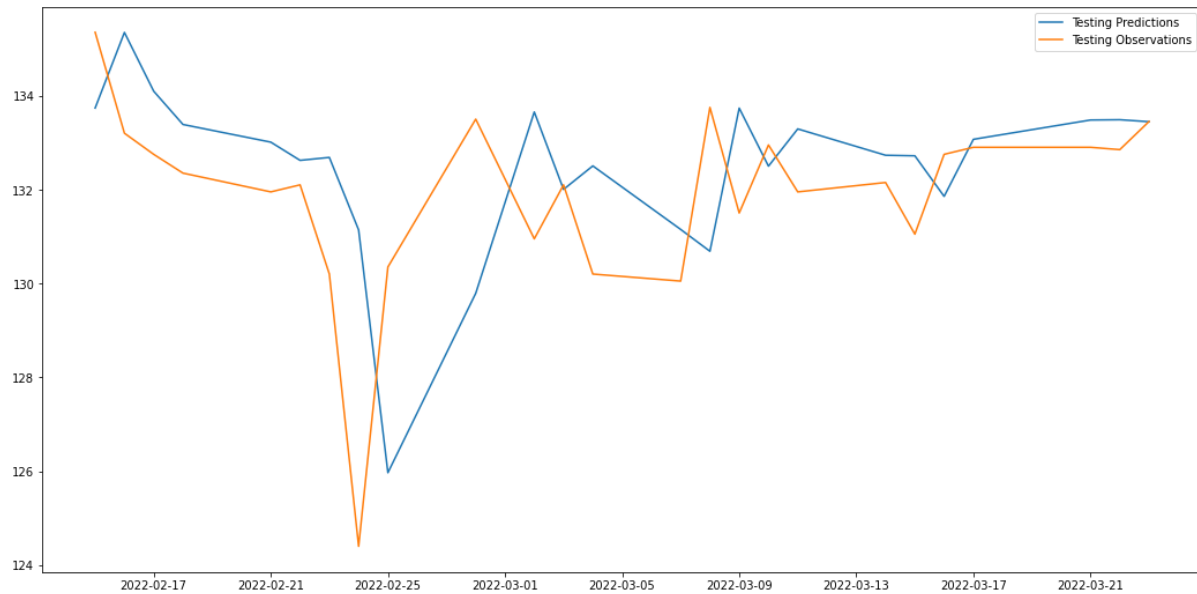
Note 9: We want to visualize the whole prediction and observation in a single plot.
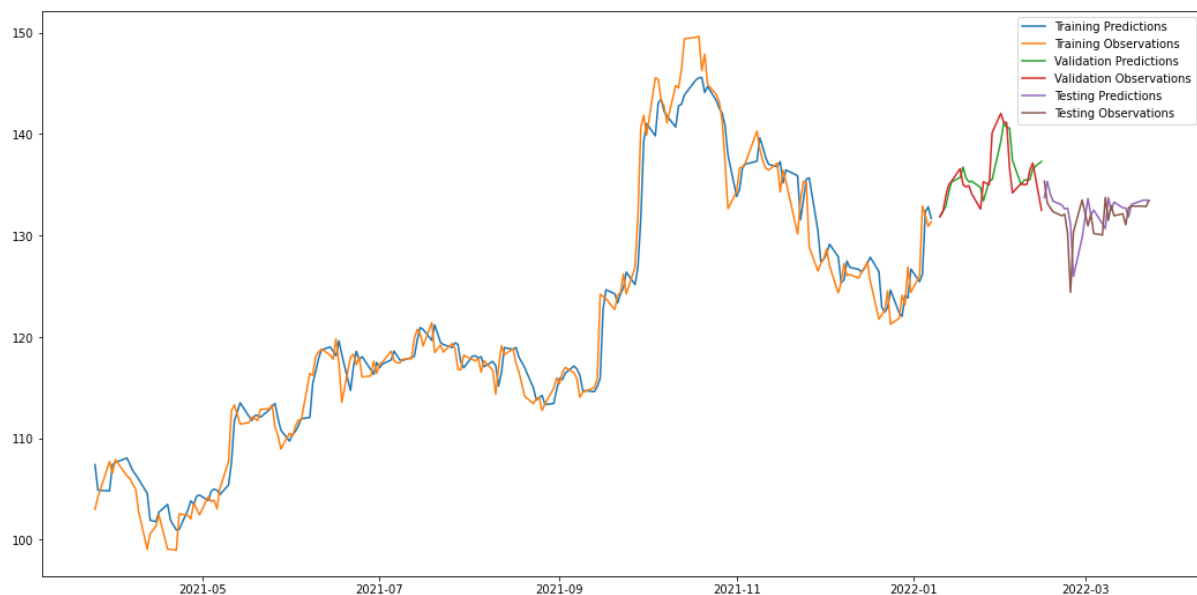
And, it looks like our model is performing well for this dataset of NTPC.NS stock.

Note 10: It's time for the prediction. To predict the future stock price, we will use the concept of recursion. This will help us to predict the stock price recursively. And if we plot the prediction and Observation with the recursive prediction, the plot will look like this,

Dataset Link: https://finance.yahoo.com/