

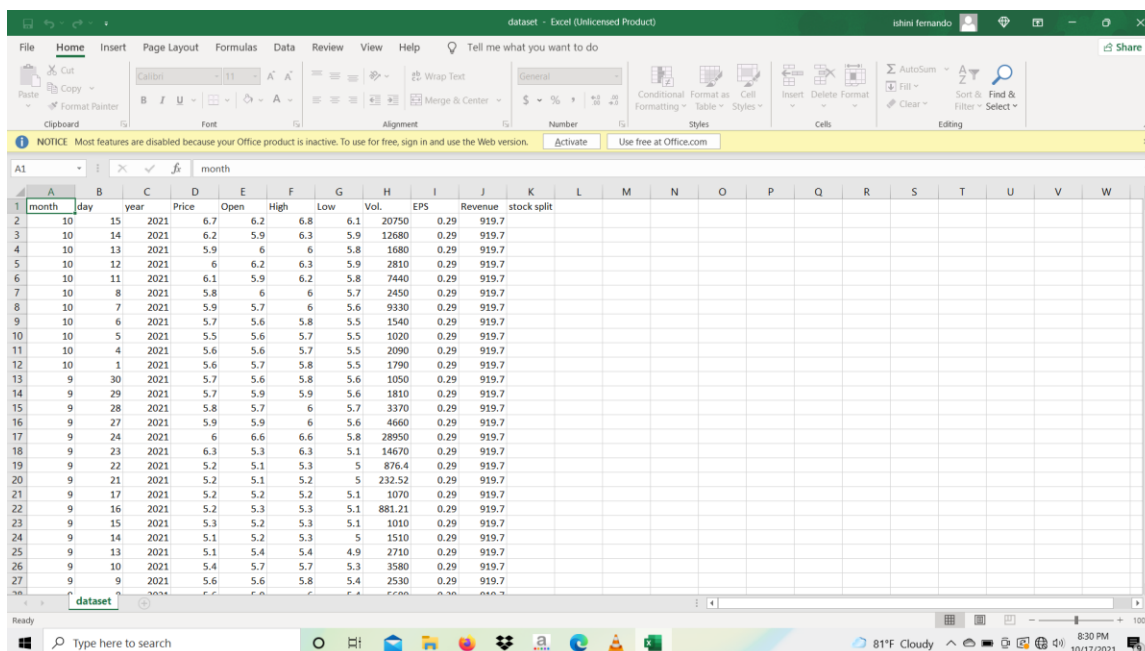
# ARTIFICIAL NEURAL NETWORKS

E/16/103

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## PREDICTING STOCK MARKET

This dataset was taken from investing.com. According to the internet stock prices differ on company management changes, profits, debt, politics and much more. But the dataset obtained here only contains the stock price data. Above mentioned factors aren't considered here because including them in the dataset is a tedious task.



| month | day | year | Price | Open | High | Low | Vol.   | EPS  | Revenue | stock split |
|-------|-----|------|-------|------|------|-----|--------|------|---------|-------------|
| 10    | 15  | 2021 | 6.7   | 6.2  | 6.8  | 6.1 | 20750  | 0.29 | 919.7   |             |
| 10    | 14  | 2021 | 6.2   | 5.9  | 6.3  | 5.9 | 12680  | 0.29 | 919.7   |             |
| 10    | 13  | 2021 | 5.9   | 6    | 6    | 5.8 | 1680   | 0.29 | 919.7   |             |
| 10    | 12  | 2021 | 6     | 6.2  | 6.3  | 5.9 | 2810   | 0.29 | 919.7   |             |
| 10    | 11  | 2021 | 6.1   | 5.9  | 6.2  | 5.8 | 7440   | 0.29 | 919.7   |             |
| 10    | 8   | 2021 | 5.8   | 6    | 6    | 5.7 | 2450   | 0.29 | 919.7   |             |
| 10    | 7   | 2021 | 5.9   | 5.7  | 6    | 5.6 | 9330   | 0.29 | 919.7   |             |
| 10    | 6   | 2021 | 5.7   | 5.6  | 5.8  | 5.5 | 1540   | 0.29 | 919.7   |             |
| 10    | 5   | 2021 | 5.5   | 5.6  | 5.7  | 5.5 | 1020   | 0.29 | 919.7   |             |
| 10    | 4   | 2021 | 5.6   | 5.6  | 5.7  | 5.5 | 2090   | 0.29 | 919.7   |             |
| 10    | 1   | 2021 | 5.6   | 5.7  | 5.8  | 5.5 | 1790   | 0.29 | 919.7   |             |
| 9     | 30  | 2021 | 5.7   | 5.6  | 5.8  | 5.6 | 1050   | 0.29 | 919.7   |             |
| 9     | 29  | 2021 | 5.7   | 5.9  | 5.9  | 5.6 | 1810   | 0.29 | 919.7   |             |
| 9     | 28  | 2021 | 5.8   | 5.7  | 6    | 5.7 | 3370   | 0.29 | 919.7   |             |
| 9     | 27  | 2021 | 5.9   | 5.9  | 6    | 5.6 | 4460   | 0.29 | 919.7   |             |
| 9     | 24  | 2021 | 6     | 6.6  | 6.6  | 5.8 | 28950  | 0.29 | 919.7   |             |
| 9     | 23  | 2021 | 6.3   | 5.3  | 6.3  | 5.1 | 14670  | 0.29 | 919.7   |             |
| 9     | 22  | 2021 | 5.2   | 5.1  | 5.3  | 5   | 876.4  | 0.29 | 919.7   |             |
| 9     | 21  | 2021 | 5.2   | 5.1  | 5.2  | 5   | 232.52 | 0.29 | 919.7   |             |
| 9     | 17  | 2021 | 5.2   | 5.2  | 5.2  | 5.1 | 1070   | 0.29 | 919.7   |             |
| 9     | 16  | 2021 | 5.2   | 5.3  | 5.3  | 5.1 | 881.21 | 0.29 | 919.7   |             |
| 9     | 15  | 2021 | 5.3   | 5.2  | 5.3  | 5.1 | 1010   | 0.29 | 919.7   |             |
| 9     | 14  | 2021 | 5.1   | 5.2  | 5.3  | 5   | 1510   | 0.29 | 919.7   |             |
| 9     | 13  | 2021 | 5.1   | 5.4  | 5.4  | 4.9 | 2710   | 0.29 | 919.7   |             |
| 9     | 10  | 2021 | 5.4   | 5.7  | 5.7  | 5.3 | 3580   | 0.29 | 919.7   |             |
| 9     | 9   | 2021 | 5.6   | 5.6  | 5.8  | 5.4 | 2530   | 0.29 | 919.7   |             |

Figure 1 : stock market dataset

Dataset is 5 x 2076 sized matrix which each vector contains price, open, high, low, volume.

2076 data points are taken from 2012 to 2021 Kotagala Plantation stock data. 70% of this data is used to train the neural network and 30% of the data is used as test data.

## No Hidden Layer

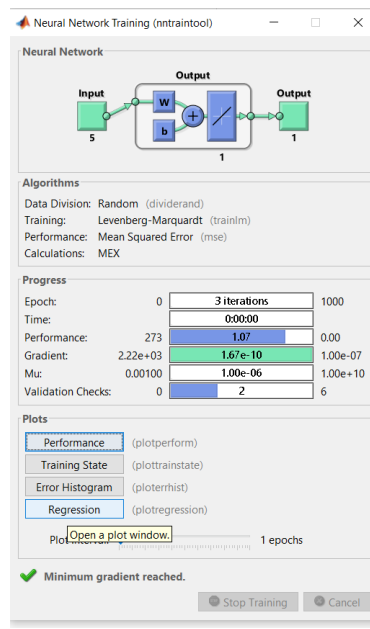


Figure 2 : Without Hidden Layer

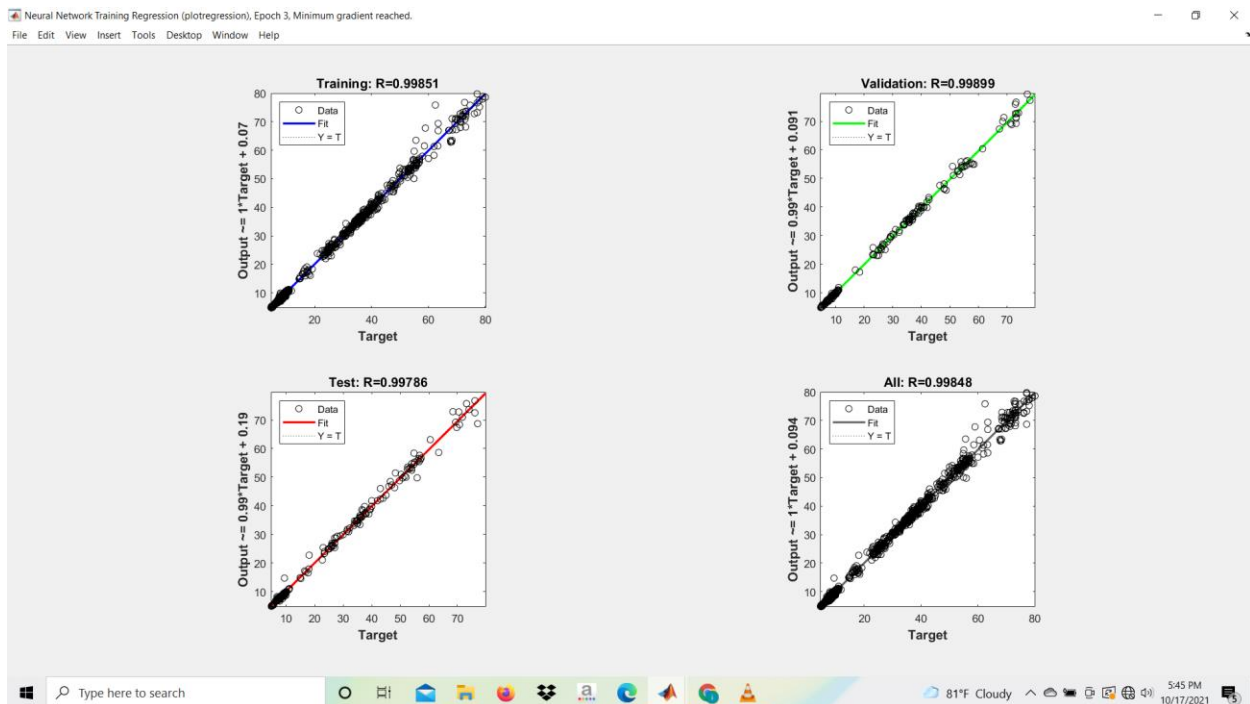


Figure 3 : Regression

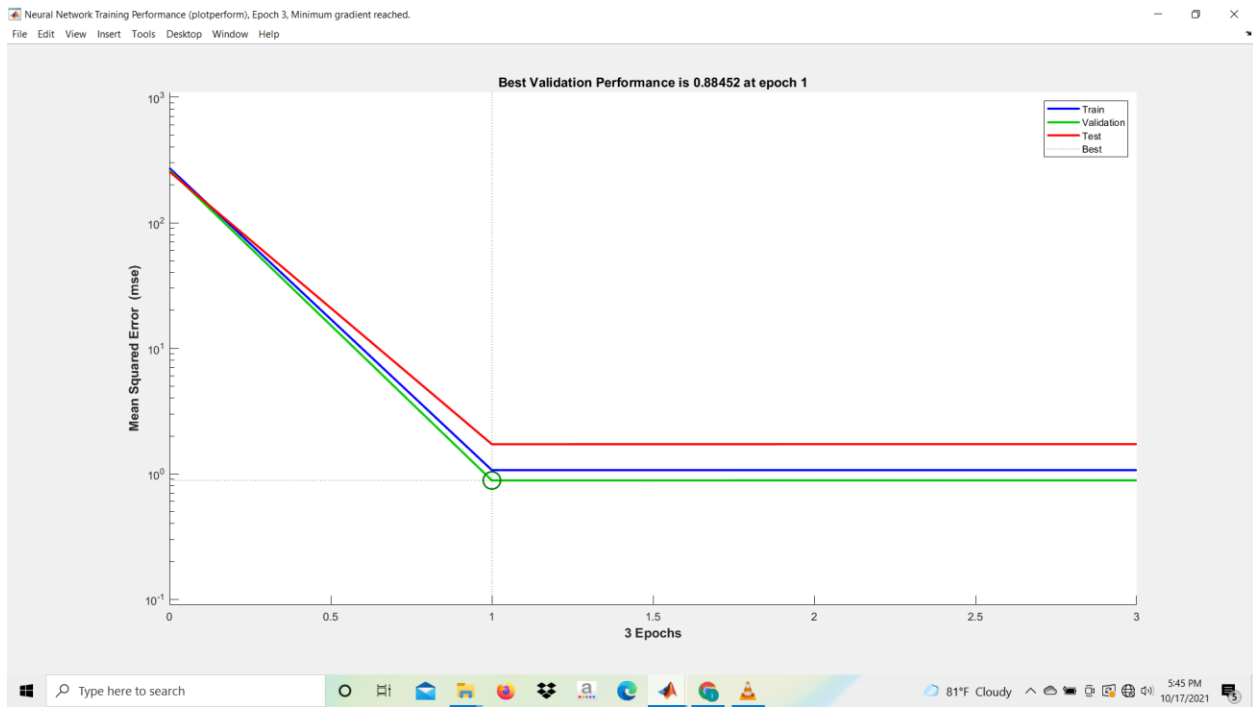


Figure 4:MSE for No hidden layer



Figure 5 : Plot of trained dataset output(red) vs the actual price values(blue) for a no layer

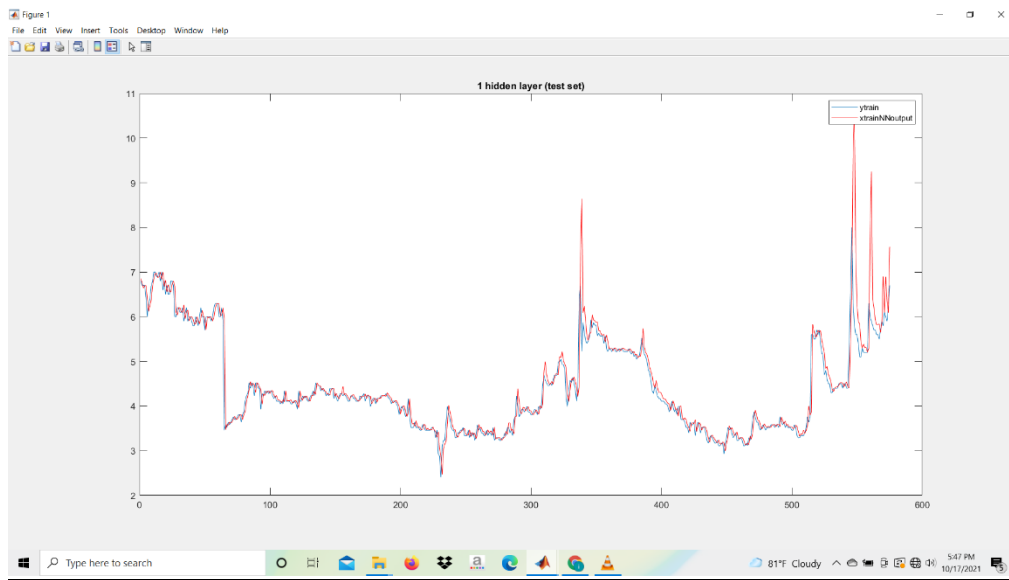


Figure 6 : Trained output(red) vs actual price values for test dataset

## 1 Hidden layer 10 neurons

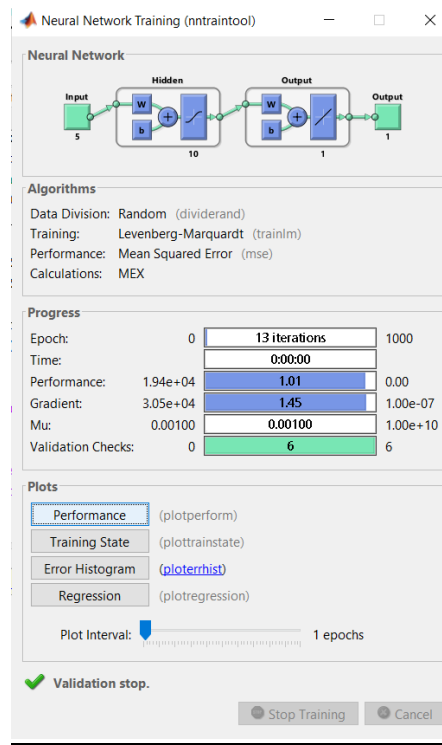


Figure 7 : Single Hidden Layer with 10 neurons

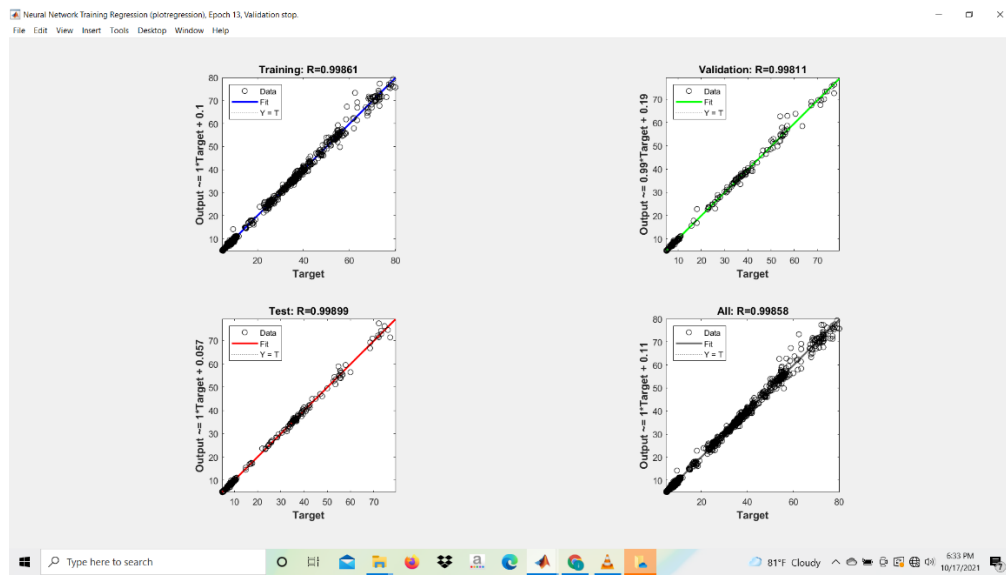


Figure 8 :Regression

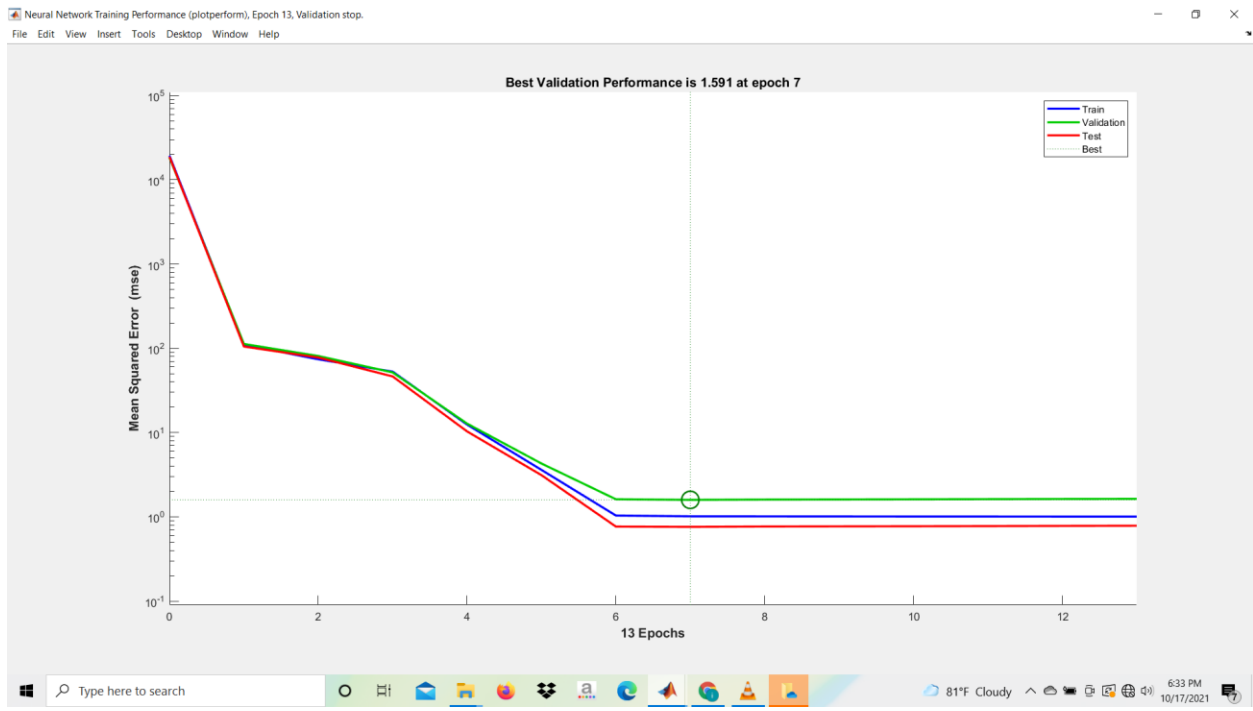


Figure 9 : MSE



Figure 10 : ANN model output vs actual values for the training dataset

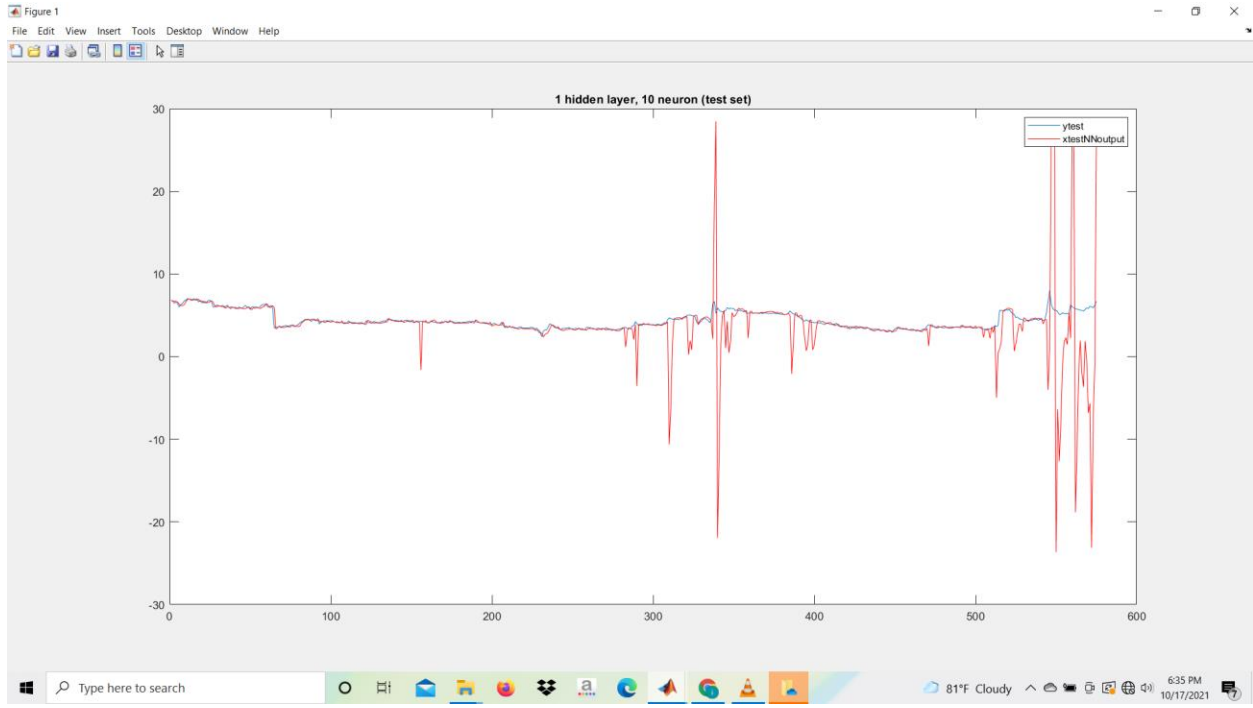


Figure 11 : ANN model output data(red) vs Actual Values(blue) for test dataset

Results obtained earlier was more closer to the actual value. With a single hidden layer with 10 neurons it seems to be the NN is overfitting.

## 2 Hidden layer with 1 neurons each



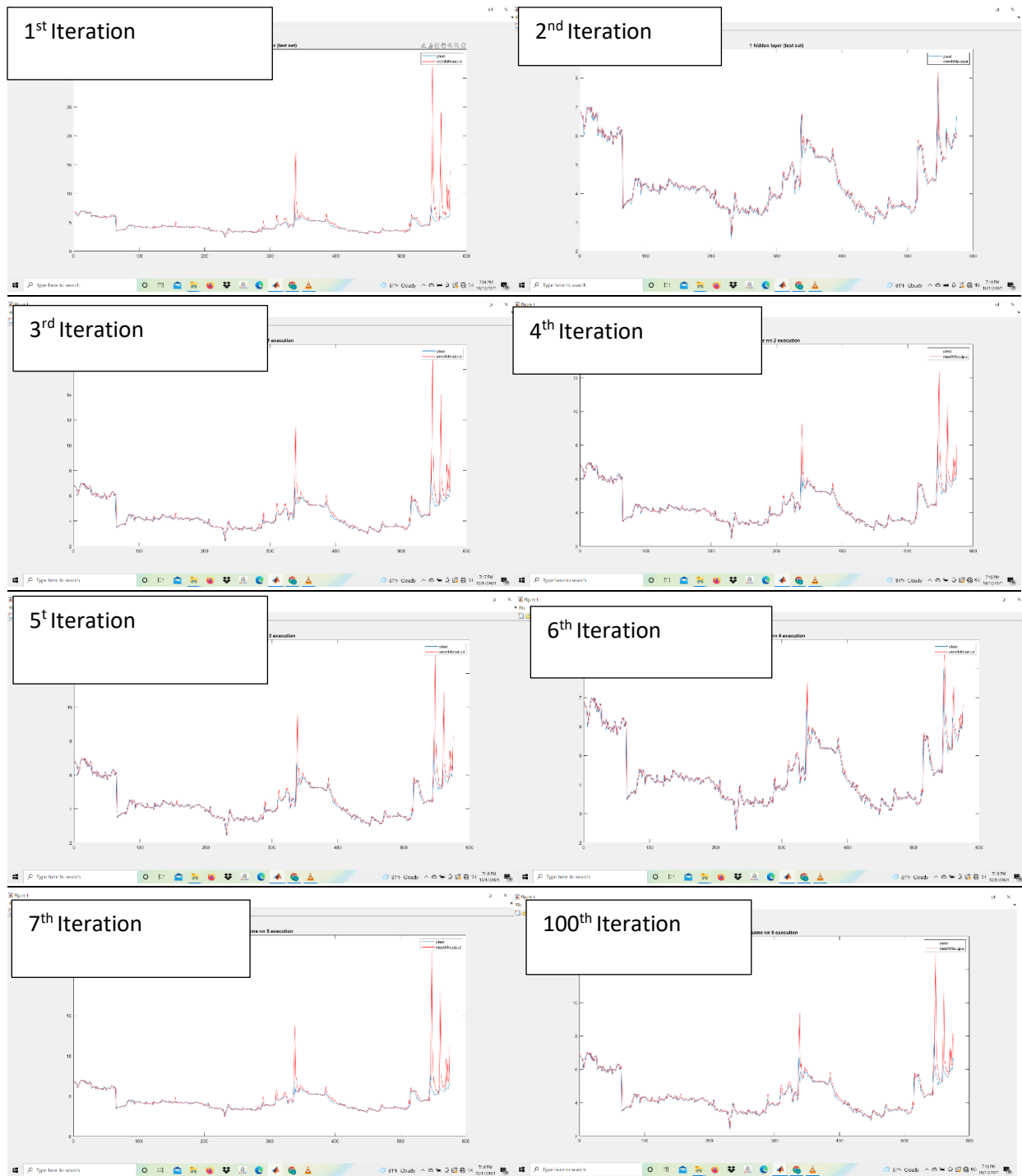
Figure 12 : ANN model output (red) vs actual values (blue) for the training dataset



Figure 13 : ANN model output data (red) vs Actual Values (blue) for test dataset



## Observation



**Figure 14 : Plots obtained by the predicted data vs real values for different iterations of same NN**

2<sup>nd</sup> , 4<sup>th</sup> , 6<sup>th</sup> plots are more close to the final output.

Conclusion : By training the weights few iterations ,Initial weight matrix is the tuned weights fro the previous iterations. Weight matrix gets more sharp after each iteration.