STOCK PREDICTIONS USING RECURRENT NEURAL NETWORKS

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ABSTRACT:

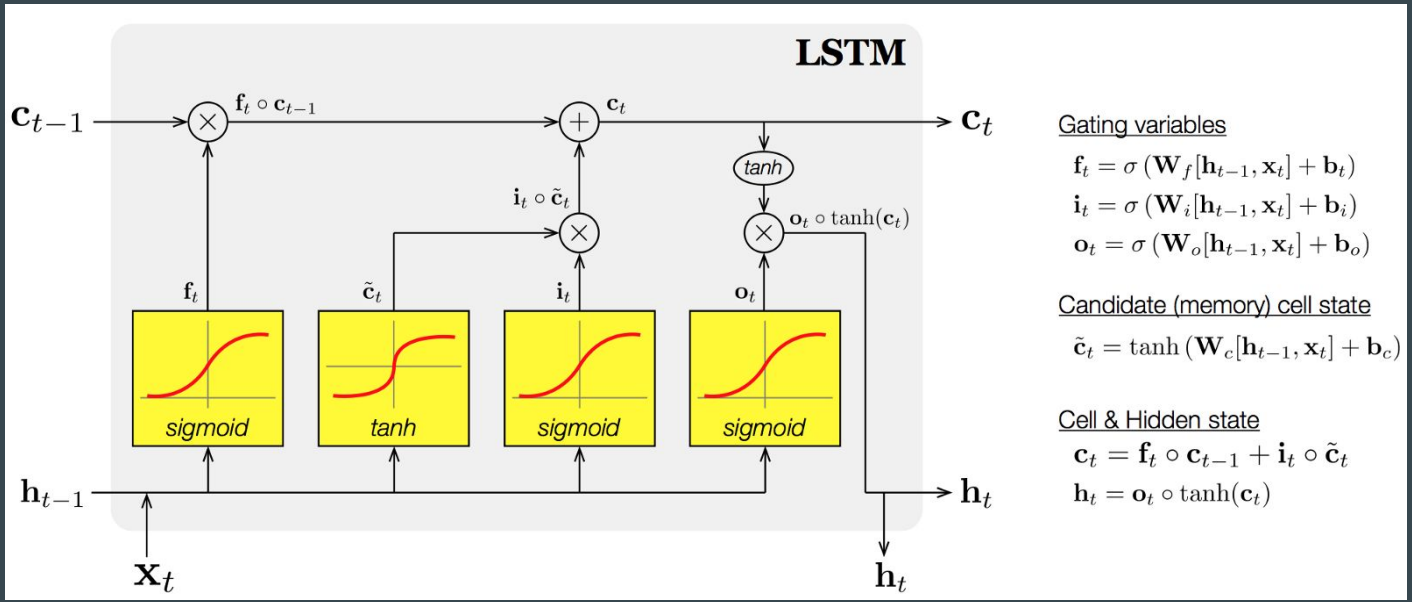
In today's economy, the stock market, often known as the equity market, has a significant impact. The rise or decline in the share price has a significant impact on the investor's profit. The present forecasting methods use both linear (AR, MA, ARIMA) and non-linear (ARCH, GARCH, Neural Networks) algorithms, however they are primarily used to predict stock index movement or price forecasting for a particular firm using the daily closing price. The method proposed is a model-independent method. We are employing deep learning architectures to find the hidden dynamics in the data, rather than fitting the data to a specific model. In this paper, we analyse the performance of three alternative deep learning architectures for price prediction of NSE listed businesses.

WORKING:

Recurrent Neural Networks, or RNNs, were designed to work with sequence prediction problems. In a recurrent neural network we store the output activations from one or more of the layers of the network. Often these are hidden later activations. Then, the next time we feed an input example to the network, we include the previously-stored outputs as additional inputs. You can think of the additional inputs as being concatenated to the end of the “normal” inputs to the previous layer. For example, if a hidden layer had 10 regular input nodes and 128 hidden nodes in the layer, then it would actually have 138 total inputs. Of course, the very first time you try to compute the output of the network you’ll need to fill in those extra 128 inputs with 0s or something. A Standard RNN uses a Vanishing Gradient Descent,Vanishing gradient problem is a difficulty found in training artificial neural networks with gradient-based learning methods and backpropagation. So we use LSTM Network.

LSTM NETWORK (RNN) :

Recurrent neural networks were traditionally difficult to train. The Long Short-Term Memory, or LSTM, network is perhaps the most successful RNN because it overcomes the problems of training a recurrent network and in turn has been used on a wide range of applications.



Long short-term memory (LSTM) units (or blocks) are a building unit for layers of a recurrent neural network (RNN). A RNN composed of LSTM units is often called an LSTM network. A common LSTM unit is composed of a cell, an input gate, an output gate and a forget gate.

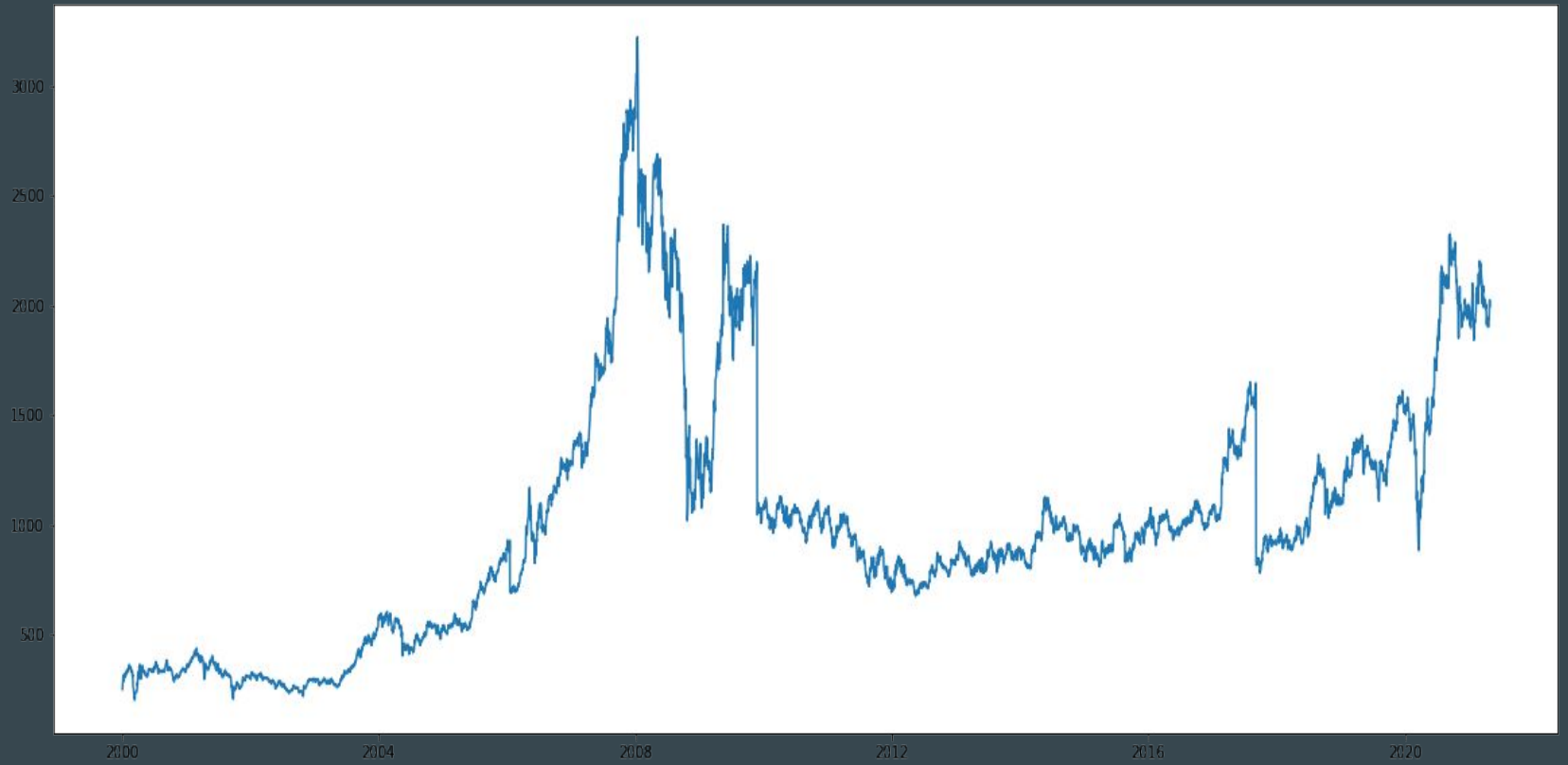
The cell is responsible for "remembering" values over arbitrary time intervals; hence the word "memory" in LSTM. Each of the three gates can be thought of as a "conventional" artificial neuron, as in a multi-layer (or feedforward) neural network: that is, they compute an activation (using an activation function) of a weighted sum.

Intuitively, they can be thought as regulators of the flow of values that goes through the connections of the LSTM; hence the denotation "gate". There are connections between these gates and the cell.

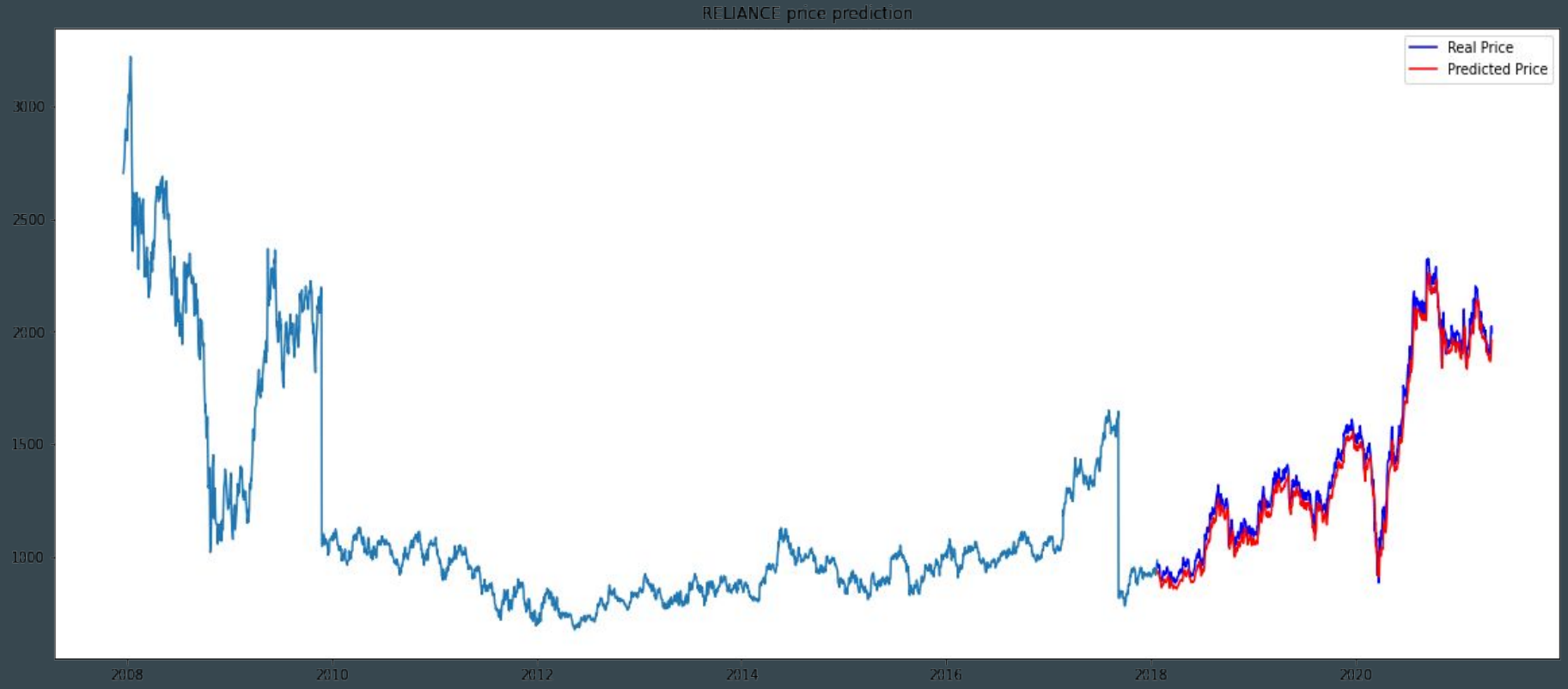
LSTMs solve the problem using a unique additive gradient structure that includes direct access to the forget gate’s activations, enabling the network to encourage desired behaviour from the error gradient using frequent gates update on every time step of the learning process.

RESULT:

RELIANCE Stock Dataset (2000-2021):



OUTPUT USING MEAN SQUARED LOGARITHMIC ERROR:



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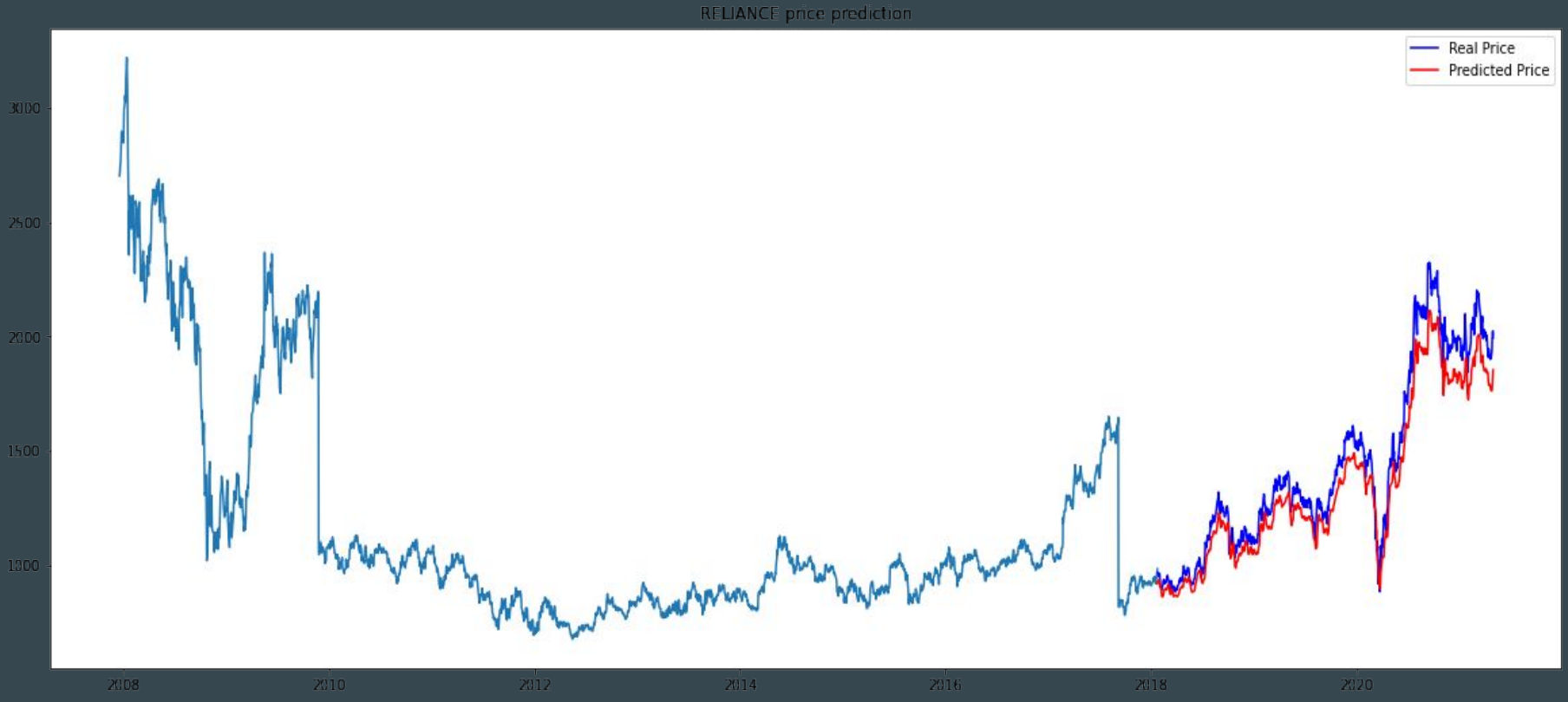

THANK YOU!