TSSM
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Deep learning

Shivam A. Kadam
BE-20 Computer

Assignment - 4

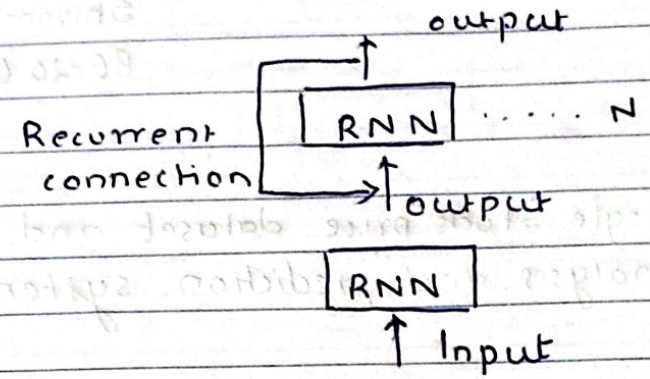
Title:- Use the Google stock price dataset and design a time series analysis and prediction system using RNN

Objective: Students should be able to classify the Google stock price dataset and should be able to design a time series analysis with the help of RNN

Prerequisite:-
1) Basic Concept of programing language
2) Concept of classification
3) Concept of Deep Neural Network

Theory:-

⇒ Its helpful to understand at least some of the basic before getting to implementation. At a high level, a recurrent neural network (RNN) processes sequences whether daily stock prices, sentences, or sensors measurement
⇒ One element at a time while retaining a memory (called a state) of what has come previously in the sequence
⇒ Recurrent means the output at the current time step becomes the input to the next step
⇒ The model considers not just the current input but what it remembers about the preceding eleme

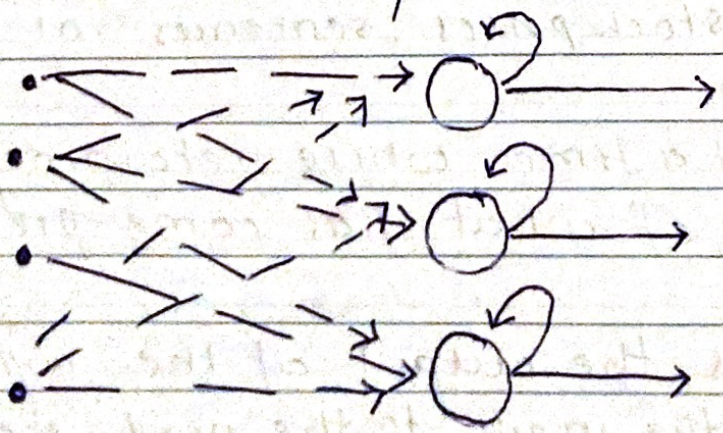


⇒ This memory allows the network to learn long-term dependencies in a sequence which means it can take entire context into account when making a prediction.

⇒ A RNN is designed to mimic the human way of processing sequencies we consider the entire sentence while forming a reiponse instead of words by themselves

⇒ Example: The concert was boring for the first 15 minutes while the band warmed up then was terribly exciting

⇒ However RNN can model a collection of records (i.e time collection) so that each pattern can be assumed to be dependent on previous ones

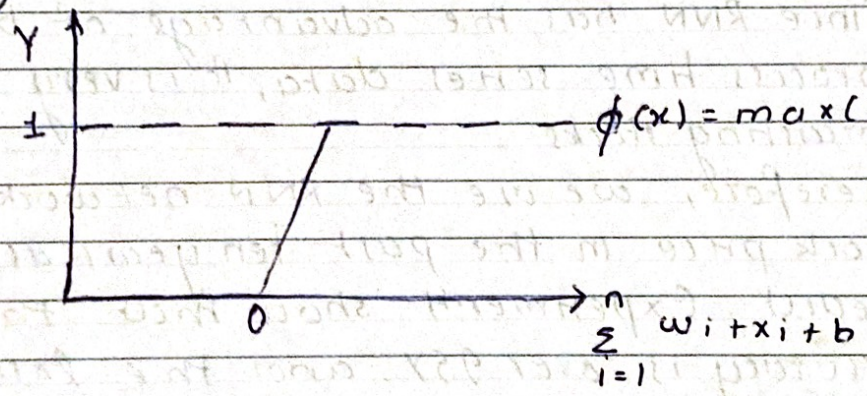


Recurrent Neural Network

⇒ The RNN are often used for sentiment analysis text mining, and image captioning. Recurrent Neural Networks also

⇒ Neural Network can address statistic problem like predicting the costs of stocks during a month or quarter

⇒ With the help of Relu (Rectified Linear Unit) is that the most generally used activation function. It gives an output of x if x is positive and zeros otherwise Relu is commonly used for hidden layers.

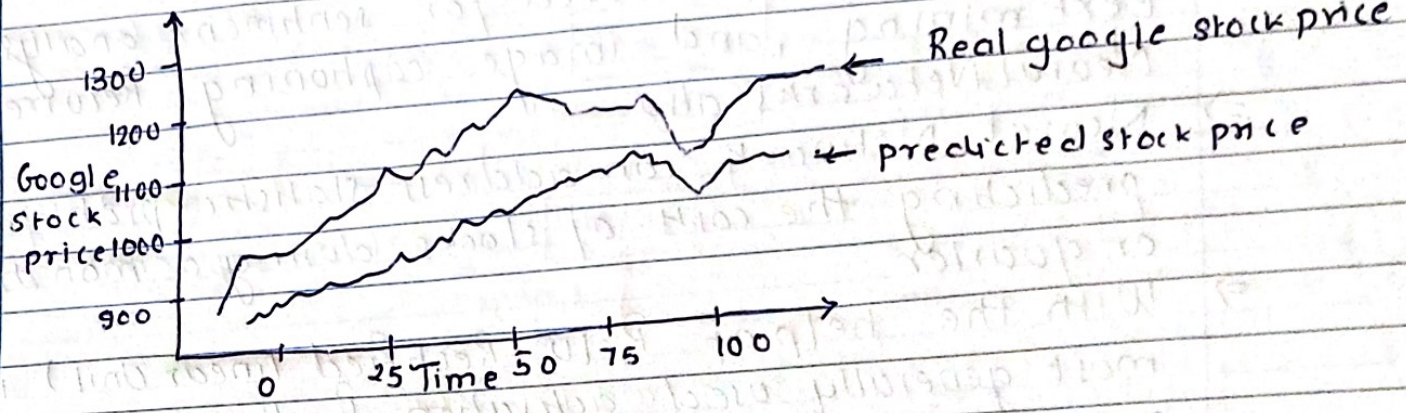


⇒ The state of the art algorithm for sequential data and are used by Apple's Siri and Google's voice search It is the first algorithm that remembers its input due to an internal memory

⇒ Due to an internal memory which makes it perfectly suited for machine learning problems that involves sequential data

⇒ Therefore they are the type of artificial neural network which uses sequential data or timeseries data.

⇒ However the difference between CNN and RNN is the ability to process temporal information



Google Stock price prediction

⇒ Since RNN has the advantage of being able to process time series data, it is very suitable for forcasting stocks

⇒ Therefore, we use the RNN network and use google stock price in the past ten years as dataset to predict. Experiments show that the prediction accuracy is over 95% and the loss close to 0.1% only

⇒ The "Google Trends" investor sentiment index applied to predict consumer sector outperformance also with the help of graph

Conclusion:

⇒

Therefore with the help of the Recurrent Neural Network theory and practical analysis using the Google stock prices dataset the time series analysis is implemented as well as predicted using RNN methodology