

## Stock Price Prediction Using LSTM

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### Abstract

Stock prediction is one of the most comprehensive. A researched and challenging breakdown involving a large number of academics and industry experts from many fields Economics, Business Administration, Arithmetic and Computer Science. It's difficult to make accurate stock market predictions. Nearly random behavior magnitude for stocks Time series. Millions of people are investing a lots of money on stock market everyday. Good stock price prediction model Help investors, managers and decision makers create correct and effective decisions. This article reviews research A supervised machine learning model in stock market forecasting. This study described how machine learning techniques are being supervised Applied to improve the accuracy of stock market forecasts. LSTM turned out to be the more useful technique in price prediction due to its higher accuracy.

**Keywords:** LSTM, Methodologies, Prediction, Stock Market.

### I. INTRODUCTION

A developing nation like India experiences rapid economic growth thanks in large part to the stock market. Therefore, the development of the US and other developing countries may

be influenced by stock market performance. A rising stock market would indicate strong economic growth for the nation. Economic development would slow considerably if

the stock market dropped. In other words, we can claim that stock market performance and national economic growth are closely correlated. Please respect the page restrictions for the conference.

## II. LITERATURE REVIEW

### Puzzling Out Emotions: A Deep Learning Approach to Multimodal Sentiment Analysis

Emotions influence human active and passive semantics. Interaction. Accurate analysis of these emotions is essential to ensuring meaningful communication. Man, In general, we express our emotions in different ways. to do so By encompassing these multiple dimensions of expression, this paper proposes his three layers of mood (mimicry, verbal, vocalization). An analysis system that applies the concept of deep learning. Therefore, in our experiment, we first examined separately the speaker's vocal qualities, facial expressions, and verbal feelings before mapping the data to do a full multimodal sentiment analysis.

Facial expression recognition and emotion classification system for sentiment analysis:

Vast amounts of data available to web users Along with the development of web technology. Resources available at The web is used by users, who also participate in donations Feedback and generate additional information. very essential for researching, analyzing and organizing their opinions, Feedback in an efficient way for better decision making. to do so Sentiment Analysis (SA) is used to find out the opinions of users. Work more effectively on a particular topic, product or problem. SA's primary purpose is to resolve SA-related issues. Opinions about products, movies, politics, ratings portals, etc. Sentiment analysis can be performed using different modalities Record text, images, audio and video. this paper Proposing a system that automatically recognizes faces Categorization of Expressions and Finale Emotions from Photos decision.

Deep Learning approach for text, image, and GIF multi- modal sentiment analysis

Social media users are increasingly using visuals these days His GIFs, videos, images and other media as powerful tools Express your feelings and emotions. Created a multimodal sentiment analysis tool for different types of tweets In Python calculating sentiment score not just base Earn GIFs and images, not just the text of the tweet Improves overall sentiment accuracy for tweets. for Use fine-tuned CNN for mood, text used VADER, apply both moods to GIF Facial expression analysis at each frame of the file.

### Automatic Annotation of Corpora For Emotion Recognition Through Facial Expressions Analysis

With the massive adoption of social networks, An unprecedented amount of user-generated content can be analyzed to determine people's opinions, Feelings on various topics. research made a lot However, efforts to define accurate algorithms for analyzing emotions conveyed through text often depend on their performance. Regarding the existence of large annotated datasets, its current

Scarcity is a big issue. Records represent a costly.

### Social Signal Processing for Evaluating Conversations Using Emotion Analysis and Sentiment Detection

Social signals are important for discovering strength of feelings and emotions that an individual expresses About facial expressions, gestures, idioms and intonation use. Continuous monitoring of customer satisfaction is one of them. A very important aspect in industries such as banking finance. Identify dissatisfied customers from large amounts of data Capturing during a conversation is a difficult task. In this We present a multimodal framework for analyzing customer satisfaction, specifically to

determine dissatisfaction Customers using image, voice, and text analytics.

### III. SYSTEM ANALYSIS

#### Existing System

Investing money in unpredictable, volatile and uncontrollable aspects is extremely risky. like a lottery Part of stock market trading is luck. Many people lost a lot of money on bad investments. decisions they made. recent stock investors At lending companies and American automakers, It used to be a fairly stable investment, Serious loss due to economic crisis. the investor Please understand and accept this risk as an integral part of your investment. But successful finances have attractive benefits investment. Making smart decisions can bring returns on your investments Significant capital gains, stability and security. by analyzing Stock market trends, investee companies By participating in and following an investment strategy, Success in the stock market. a lot of research has been done In various ways to analyze the stock market as a means Enable intelligent investment decisions. These “intelligent Decision making is paramount to investment success and can be examined in this experiment.

#### Disadvantages of Existing System:

Neural net- work is suffering from the black box problem ; it does not reveal the each variable ‘s significance weight. The problem of overtraining is another major problem with neural networks. The system may lose the ability to generalize if neural net- works fits the data too well Overtraining is a major problem. It usually happens for two main reason such as neural networks have too many nodes or too long training periods.

#### Proposed System

Two versions of the prediction system will be implemented. One that uses the LSTM

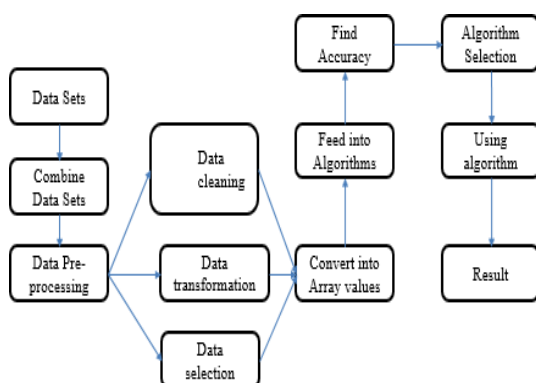
algorithm. The goal of the experiment is Compare the predictive power of machine learning algorithm. We test and evaluate both systems Use the same test data to determine prediction accuracy.

#### Advantages of Proposed System:

There is one ANN of successfully developed and widely used methods. It solves many prediction problems in various kinds of applications. It have been used to solve a numerous number of problems. It is a financial time series forecast and can predict prices about 90.

#### Long Term Short Term memory

Long Short-Term Memory (LSTM) networks are a type of recurrent neural network capable of learning order dependence in sequence prediction problems. This is a behavior required in complex problem domains like machine translation, speech recognition, and more. LSTMs are a complex area of deep learning. It can be hard to get your hands around what LSTMs are, and how terms like bidirectional and sequence- to- sequence relate to the field. In this post, you will get insight into LSTMs using the words of research scientists that developed the methods and applied them to new and important problems. There are few that are better at clearly and precisely articulating both the promise of LSTMs and how they work than the experts that developed them. We will explore key questions in the field of LSTMs using quotes from the experts, and if you’re interested, you will be able to dive into the original papers from which the quotes were taken.

**Fig.3.1. Architecture Diagram**

#### IV. METHODOLOGY STOCK DATA PREPROCESSING

Data preprocessing can be done by cleansing data, trans- forming data, and selecting data. Data cleaning: Add missing values, smooth noisy data, identify or remove outliers, and fix discrepancies. Data transformations can include smoothing, aggregation, generalization, and transformations that improve data quality.

#### BUILDING MODEL (USING LSTM)

Build an ML model that uses the LSTM algorithm to predict future stock prices. Long short-term memory (LSTM) is a deep learning architecture based on artificial recurrent neural networks (RNN). LSTM is a viable answer to sequence and time series problems. Long-short-term memory is a type of recurrent neural network. In RNN, the output of the last step is fed as input to the current step. LSTM was designed by Hochreiter Schmidhuber. The first part is called Forget Gate, the second part is called Input Gate, and the last part is called Output Gate. Like a simple RNN, an LSTM also has hidden states, where  $H(t-1)$  represents the hidden state at the previous timestamp and  $H_t$  is the hidden state at the current timestamp.

#### TRAINING CONSTRUTED PRIK MODEL

It consists of sample output data and a corresponding set of input data that influences the output. A trained model is used to run the

input data through the algorithm and associate the processed output with the sample output.

#### VISUALIZATION OF PREDICTED STOCK DATA.

Visualization lets you comprehend vast amounts of data ata glance and in a better way. It helps to understand the data better to measure its impact on the business and communicates the insight visually to internal and external audiences.

#### V. RESULT AND DISCUSSIONS

We show that LSTM has better prediction accuracy than ANN. The stock market is difficult to monitor, and trying to interpret movements and predict prices requires a lot of context. In ANN, each hidden node is a simple node with a single activation function, while in LSTM each node is a memory cell that can store context information. There- fore, LSTMs can track context-specific temporal dependencies between stock prices over time while making predictions, resulting in better performance. Analysis of the results also shows that the accuracy of both models increases as the dataset size increases. With more data, more patterns can be fleshed out by the model, and layer weights can be adjusted better.

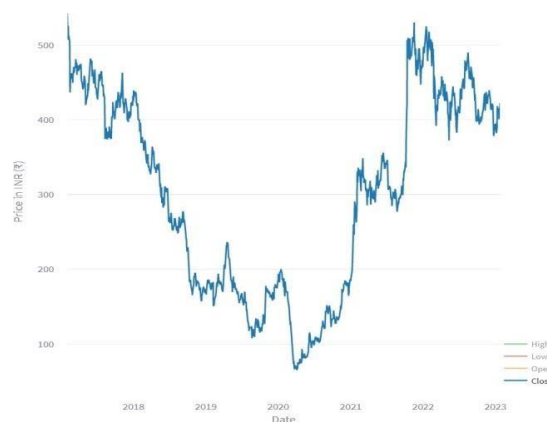
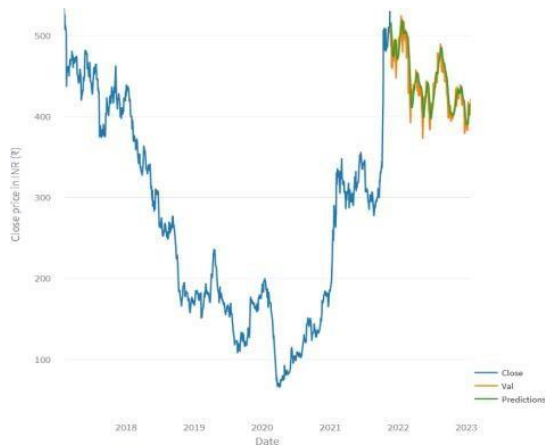
**Fig. 5.1. Live Data**

Fig 5.1 shows the graphical representation of the live datasets taken from online and Fig 5.2

has the predicted value range in addition to Fig 5.1. As you can see testing data and predicted data are almost similar in graph and it indicates that our prediction gives more accurate data as output.

**Fig.5.2. Predicted Range**



## Reference

- [1]. Alhassan1 J. K. and Sanjay Misra(2011),Using a weightless neural network to forecast stock prices: A case study of Nigerian stock exchange, Scientific Research and Essays Vol. 6 (14), pp. 2934- 2940, Available online at <http://www.academicjournals.org/SRE>
- [2]. An-Sing Chen, Mark T. Leung and Hazem Daouk (2003), Application of neural networks to an emerging financial market: forecasting and trading the Taiwan Stock Index,Computers Operations Research 901–923.
- [3]. B. Manjul, S.S.V.N. Sarma, R. Lakshman Naik and G. Shruthi, “Stock Prediction using Neural Network,” International Journal Of Advanced Engineering Sciences and Technologies (IJAEST) Vol No. 10, No. 1, Pp 013 –018,2011.
- [4]. Darwin, “The expression of the emotions in man and animals”, 1872.
- [5]. H. W. Ridelhuber and p. Flood, ‘Policy Review: CVSA is a Valid Law Enforcement Tool’. [Online]. Available:<https://www.cvsa1.com>. [Accessed: 17-Aug-2018].
- [6]. Liza Brown, ‘8 Best Software to Extract Audio from Video’. [Online]. Available: <https://filmora.wondershare.com/screenrecorder/best-software-to-extract-audio-from-video.html>. [Accessed: 17-Aug-2018].
- [7]. Morin and Amy, ”8 Biggest myths about lying according to the best human lie detector in the world”, October 28, 2015.
- [8]. Liza Brown, ‘8 Best Software to Extract Audio from Video’. [Online]. Available:<https://filmora.wondershare.com/screen-recorder/best-software-to-extract-audio-from-video.html>. [Accessed: 17- Aug-2018].
- [9]. M. Pantie and L. J. M. Rothkrantz, “Automatic analysis of facial expressions: the state of the art”, IEEE Trans. On Pattern Analysis and Machine Intelligence, vol. 22, no. 12, pp. 1424-1445, 2000.
- [10]. P. Ekman andW.V. Friesen, “Facial action coding system (FACS)”, Consulting Psychologists Press, 1978.
- [11]. P. Ekman, “Emotion in the human faces”, Cambridge University Press, 1982.
- [12]. Peter Adebayo Idowu, Chris Osakwe, Aderonke Anthonia Kayode, Emmanuel RotimiAdagunodo (2012), Prediction of Stock Market in Nigeria Using Artificial 65 Neural Network, I.J. Intelligent Systems and Applications, 11, 68-74.
- [13]. P. Sinha, “Object recognition via image invariance a case study”, Investigative

Ophthalmology and Visual Science, vol. 35, pp. 1735-1740, 1994.

- [14]. Sheng-Hsun Hsu and JJ Po-An Hsieh, “A Two-Stage Architecture For Stock Price For Recasting By Integrating Self-Organizing Map and Support Vector Regression, Expert Systems with Applications,” Vol36, No 4, Pp 7947-7951.2008.
- [15]. T. Sakai, M. Nagao, and S. Fujibayashi, “Line extraction and pattern recognition in a photograph”, Pattern Recognition, vol. 1, pp. 233-248, 1969.
- [16].www.raymond.cc, ‘5 Ways to Extract Video Frames and Save to Images’. [Online]. Available: <https://www.raymond.cc/blog/extract-video-frames-to-images-using-vlc-media-player/>. [Accessed: 17-Aug-2018].
- [17]. Yi-Hsien Wang, “Nonlinear Neural Network Forecasting Model for Stock Index X Option Price: Hybrid GJR–GARCH Approach,” Expert Systems with ApplicationsVol36.