**A PROJECT REPORT**

**on**

# "STOCK MARKET ANALYSIS"

**Submitted to**

## KIIT Deemed to be University

**In Partial Fulfilment of the Requirement for the Award of**

**BACHELOR'S DEGREE IN**
**INFORMATION TECHNOLOGY**

**BY**


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**UNDER THE GUIDANCE OF**
**DR. PRADEEP KUMAR MALLICK**

**SCHOOL OF COMPUTER ENGINEERING**

**KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**BHUBANESWAR, ODISHA - 751024**


**May 2023**

# KIIT Deemed to be University

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# CERTIFICATE

This is certify that the project entitled

"STOCK MARKET ANALYSIS"

submitted by

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is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor of Engineering (Computer Science & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work is done during year 2022-2023, under our guidance.

Date: / /

(Dr. Pradeep Kumar Mallick)
Project Guide

# Acknowledgements

We are profoundly grateful to Dr. Pradeep Kumar Mallick of **Affiliation** for his expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion. .....

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# ABSTRACT

Stock price prediction is a crucial task for investors, financial analysts, and market participants to make informed decisions in the highly dynamic and complex financial markets. With the proliferation of machine learning techniques and the availability of vast financial datasets, there has been growing interest in leveraging data-driven approaches for stock price prediction. In this paper, we present a comparative study of machine learning techniques and features for stock price prediction.

We explore various supervised machine learning algorithms, including linear regression, decision trees, support vector machines, and deep learning models, such as recurrent neural networks (RNN) and long short-term memory (LSTM) networks. We evaluate these models on a comprehensive dataset of historical stock price data, including stock prices, trading volumes, and other financial indicators. We also investigate the impact of different feature sets, including technical indicators, statistical measures, and sentiment analysis of news and social media, on the prediction performance of the models.

Our experiments reveal that deep learning models, such as RNN and LSTM, exhibit superior performance compared to traditional machine learning algorithms for stock price prediction. Additionally, we observe that incorporating technical indicators, such as moving averages and momentum indicators, as features significantly improves the prediction accuracy. Furthermore, sentiment analysis of news and social media data provides valuable insights into the impact of market sentiment on stock prices, leading to improved prediction performance.

Our findings contribute to the understanding of the effectiveness of machine learning techniques and feature sets for stock price prediction. Our comparative study provides insights into the strengths and limitations of different models and feature sets, offering guidance for practitioners and researchers in selecting appropriate techniques for stock price prediction. This research can serve as a foundation for further advancements in utilizing machine learning for stock price prediction and has practical implications for enhancing decision-making in the field of finance.

# Contents

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# Chapter 1

# Introduction

The stock market is an integral part of the global economy, and its performance has a significant impact on individual investors, businesses, and governments alike. As a result, understanding the stock market's trends, fluctuations, and predicting its future direction is of paramount importance to investors, financial analysts, and economists. This report aims to provide an in-depth analysis of the stock market, including its history, current state, and future prospects. Specifically, this report will explore the various techniques and tools used for stock market analysis and prediction, including fundamental analysis, technical analysis, and quantitative analysis, and their respective strengths and weaknesses. Ultimately, the goal of this report is to provide readers with a comprehensive understanding of the stock market and its trends to make informed investment decisions.

To predict the stock price for a particular stock and analyze its graph pattern we use Machine learning algorithms. We are predicting the stock prices using the machine learning algorithm to develop a model which forecasts the stock price effectively based on the current market trends. We have used LSTM recurrent neural networks to predict the stock prices accurately. We can find different types of stocks depending upon their trading pattern. One of them is Intraday trading, which is known to us by the term day trading. Intraday trading is that which means all positions are squared-off before the market closes then and there and there would be no possibility of changing the ownership after the day end. LSTM's are very important, as they are very powerful in sequence prediction problems because they could store previous or past information. This is very important in stock prediction as we need to store and read the previous stock information as well to forecast the stock prices accurately in the future.

# Chapter 2

# Basic Concepts/ Literature Review

It takes a variety of methods and strategies to accurately predict and analyse the stock market. The following fundamental ideas and literature evaluations can aid in comprehending this field:

1. Efficient Market Hypothesis (EMH): According to this generally accepted hypothesis, asset prices always represent all available information and that financial markets are efficient. This idea contends that any price changes are arbitrary and unpredictable, making it impossible to continuously outperform the market by forecasting stock prices.

2. Technical Analysis: To spot patterns and trends in stock prices, technical analysis examines historical price and volume data. This method is predicated on the idea that market trends, such as price changes, have a propensity to recur throughout time and may be recognised in order to forecast future prices.

3. Fundamental Analysis: To ascertain the intrinsic worth of a company's shares, fundamental analysis examines financial and economic data. This method evaluates a company's financial health and future possibilities by taking into account a number of variables, including earnings, revenue, growth potential, and industry trends.

4. Artificial intelligence (AI) and machine learning algorithms have been extensively employed in recent years to study and forecast stock values. These methods entail using a significant amount of past data to train algorithms that can then forecast price changes in the future.

5. Sentiment Analysis: To ascertain public sentiment regarding a specific stock or company, sentiment analysis entails examining news articles, social media posts, and other data sources. This method can be applied to spot possible market trends and forecast future price changes.

Literature Review:

- "A Survey on Stock Market Prediction Using Machine Learning Techniques" by Prashant Kumar and Vikas Kumar: This paper provides a comprehensive review of machine learning techniques that have been used to predict stock prices.

- "Efficient Market Hypothesis: What Does the Literature Tell Us?" by Timothy Loughran: This paper provides an overview of the efficient market hypothesis and discusses the evidence for and against it.

- "A Survey of Technical Analysis Literature" by Jitendra Kumar and Himanshu Joshi: This paper provides a comprehensive review of the technical analysis literature, including the different techniques and strategies that have been used.

- "Fundamental Analysis and Stock Returns: Evidence from India" by S. Ram Kumar and N. Krishnamoorthy: This paper examines the relationship between fundamental analysis and stock returns in the Indian market.

- "Sentiment Analysis of Financial News Articles using Machine Learning Techniques" by Ahmed Abbasi and Hsinchun Chen: This paper provides a comprehensive review of sentiment analysis techniques that have been used to analyze financial news articles.

# Chapter 3

# Problem Statement / Requirement Specifications

To develop a machine learning model that can accurately predict stock prices based on historical market data and other relevant factors. The model should be able to identify trends, patterns, and anomalies in the data and provide insights into market behaviour. The goal is to help investors make informed investment decisions and manage risk by predicting future price movements and identifying potentially profitable opportunities. The project should also explore the use of sentiment analysis to gauge public opinion about specific stocks or companies and evaluate its impact on stock prices

## 3.1 Project Planning

The figure 3.1.1 below shows the basic steps for project planning and execution.

- First we collect input from the dataset and split it into training and testing sets.
- Next, we prepare the data. We choose a model and train our dataset.
- We deploy our model, and evaluate its performance by testing it.

Finally, we use our model on testing data to make predictions accurately

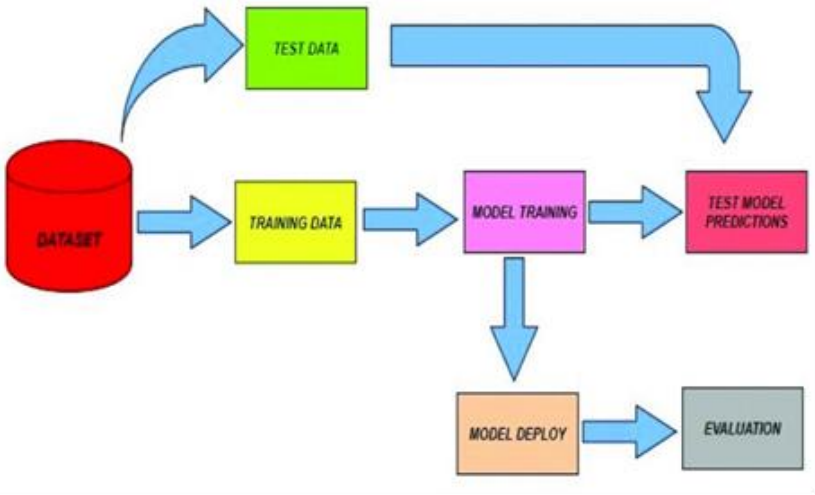



Figure 3.1.1: STEPS OF PROJECT PLANNING

## 3.2 Project Analysis

In this study, we forecast future stock prices based on historical data using machine learning methods, particularly LSTM (Long Short-Term Memory) neural networks. Gather historical stock price information as well as other economic data for the selected stocks from a variety of websites, such as Yahoo Finance.
Then we gathered information by preparing it for usage in the LSTM neural network and cleaning it. This can entail scaling the data, eliminating missing values, and dividing it into training and testing datasets.

1. Model Training: To forecast future stock values, train an LSTM neural network using the preprocessed training data. Recurrent neural networks function well with time series data, such as stock prices, and the LSTM neural network is one of these.

2. Model Evaluation: Using the preprocessed test data, assess how well the trained model performed. Calculating performance metrics like root mean squared error (RMSE), mean absolute error (MAE), or mean absolute percentage error (MAPE) may be part of the evaluation.

3. Model Deployment: Use real-time data to deploy the trained LSTM neural network to forecast future stock prices. Setting up a web application or API that enables users to enter stock ticker symbols and receive real-time forecasts of future stock prices may be required to do this.

Overall, the stock market prediction and analysis using LSTM project is a difficult but rewarding project that calls for expertise in time series analysis, machine learning algorithms, and data pretreatment methods. It might offer insightful information about future stock values and assist investors in making wise investing choices.

## 3.3 System Design

### 3.3.1 Design Constraints

Software- Jupyter Notebook (a web-based interactive computing platform.)
Dataset- yahoo Finance API streamed data using stock ticker .

### 3.3.2 Block Diagram

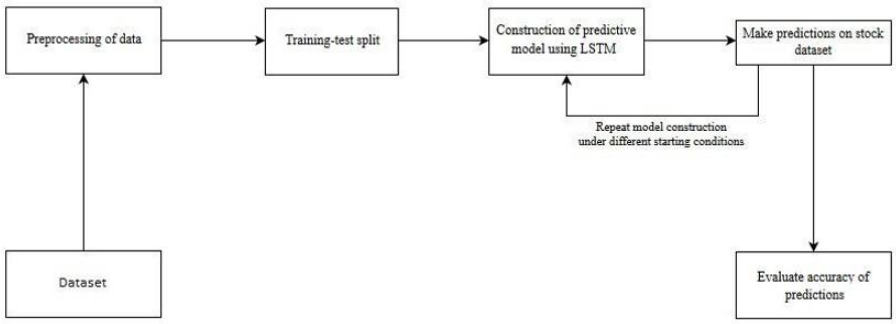



Figure 3.3.1 System architecture /Block Diagram

The above figure shows the basic system architecture of the project. First dataset is taken and preprocessed. Then splitting of the preprocessed data into training test sets takes place. After this construction of predictive modelling using LSTM model done in order to make predictions. This processed is repeated for constructing different models under different conditions. Then the accuracy of the predictions made in the previous steps takes place.

# Chapter 4

# Implementation

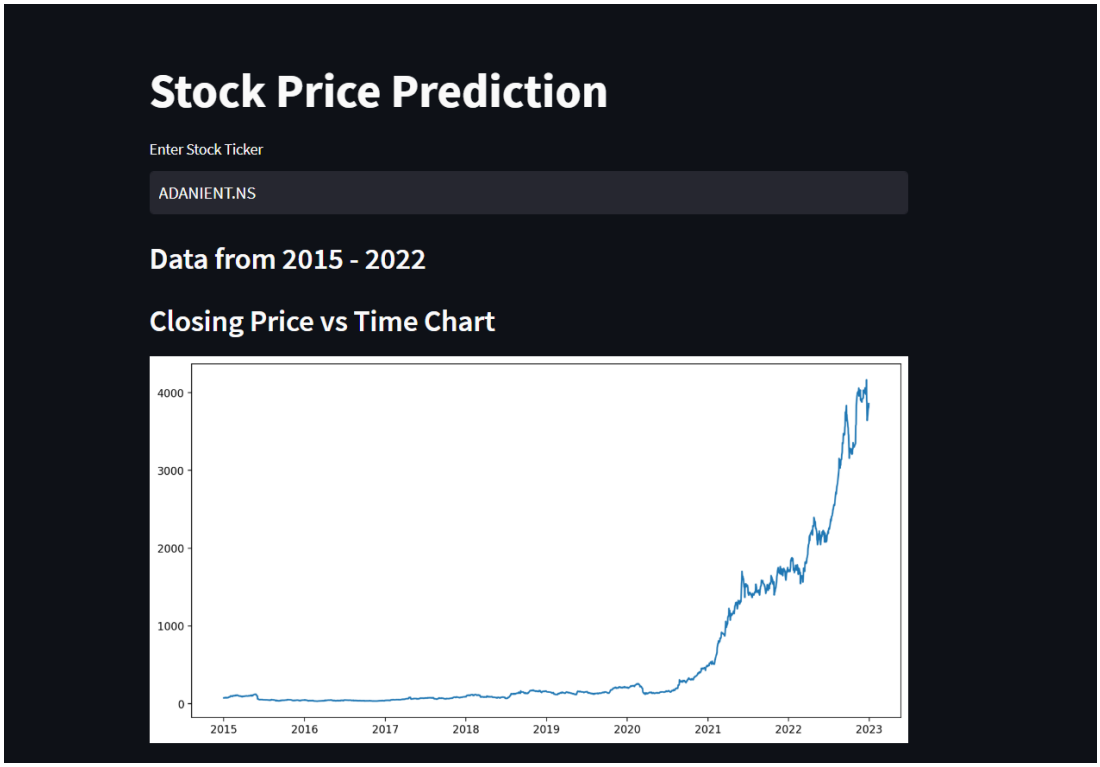
We used the LSTM model for implementing the stock market prediction on the any share dataset.

## 4.1 Methodology OR Proposal

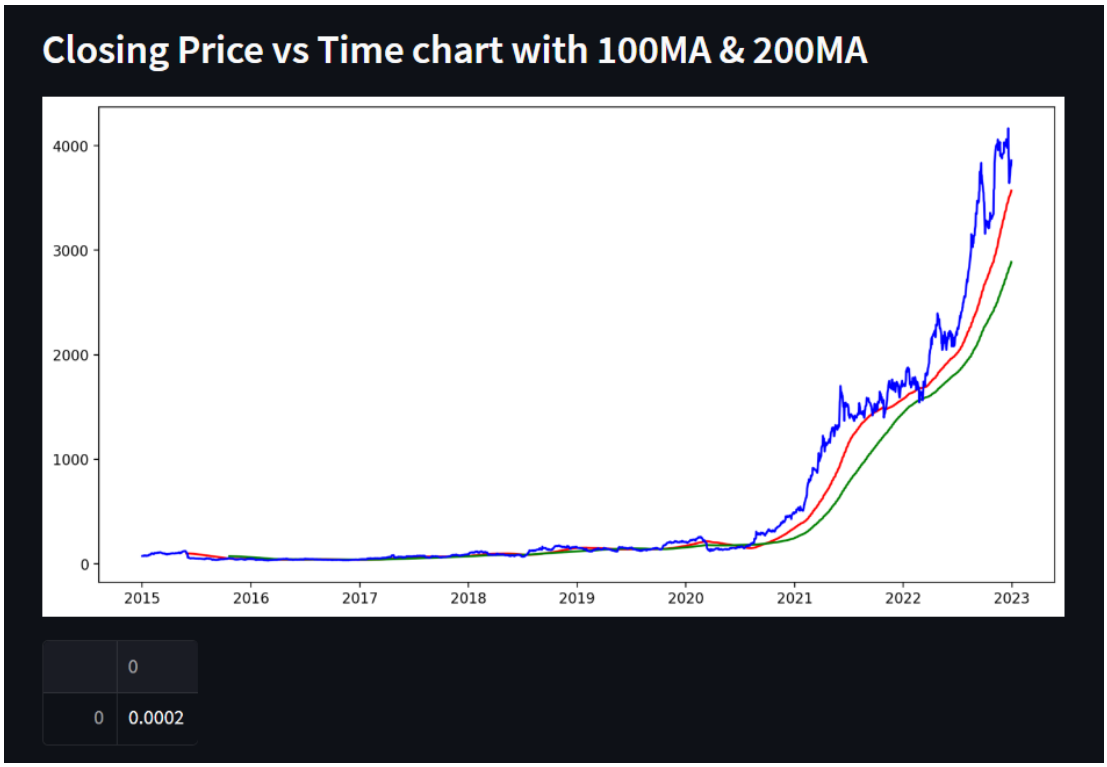
With the help of historical data, this project will attempt to anticipate stock values and then implement the model as a user-friendly online application. To accomplish this, we preprocessed and collected the stock price data using the yfinance module API. The LSTM (Long Short-Term Memory) model, which is best suited to handle time-series data like stock prices, was then created and trained. We have employed the Adam optimisation algorithm, early halting, and dropout regularisation to prevent overfitting in the LSTM model, which consists of two layers with 64 hidden units each. In order to make sure the model works well on fresh, untested data, we then verified it using the testing data and the RMSE and MAE measures.
Users can input a stock ticker symbol and retrieve the expected prices for that stock using the user-friendly interface of the deployed web application, which leverages Streamlit to deliver this functionality. In order to give visualisations of the expected stock prices, Plotly has also been integrated into Streamlit.
In order to preserve the deployed LSTM model's accuracy over time, we track its performance and update it as required. This project is a useful resource for scholars who are interested in researching stock market patterns as well as for investors who want to buy and sell stocks in an informed manner.

## 4.2 Result Analysis OR Screenshots

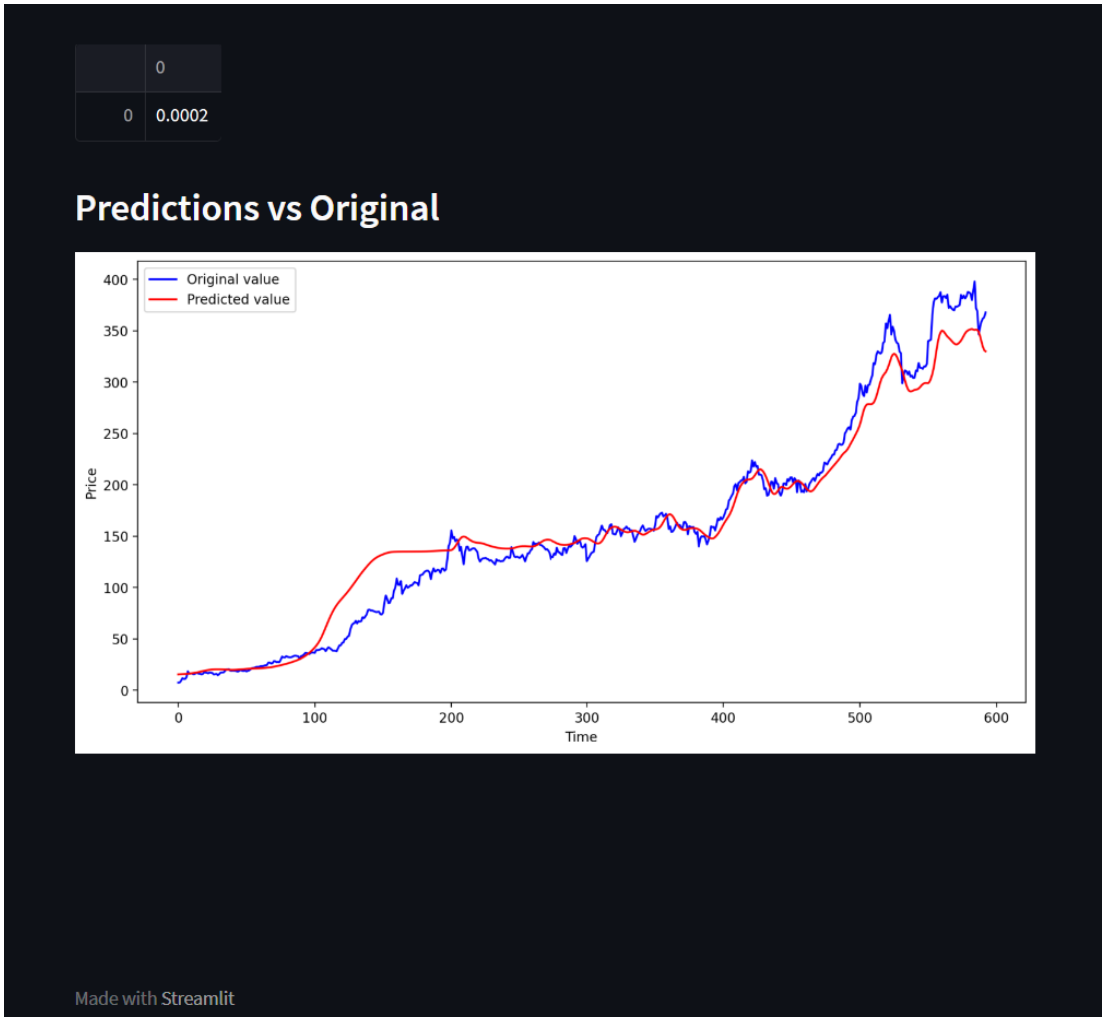
In the following section we shall describe our results and findings pertaining to the model implemented for stock market analysis:




The graph above represents the variation in closing price with time from 2010-2022 for Adani group.




The red and green line in this figure represent the 100MA and 200MA respectively




Predicted values by our model visually represented using Plotly integrated into streamlit

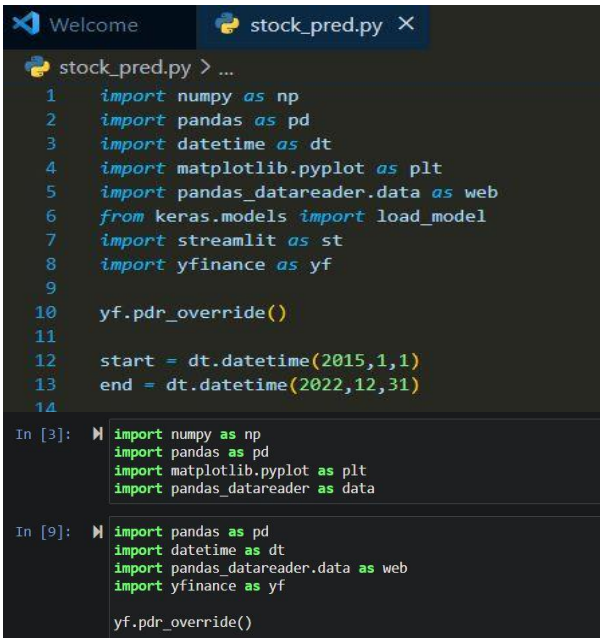
# Chapter 5

# Standards Adopted

## 5.1 Design Standards

Few coding standards that we have followed are-

- Used Python programming language, which is convenient for our codeimplementation.
- We have maintained clean, maintainable and high quality code.
- We used modules such:
    - Numpy
    - Pandas
    - Matplotlib
    - Keras
    - Streamlit
    - Yfinance



## 5.2 Coding Standards:

We support following coding standards, which are compilations of best practises, regulations, and guidelines. We adhere to a number of coding standards during the development process, including:

1. Write code in as few lines as possible to make it easier to read and less difficult.
2. Using proper naming conventions to improve the readability and maintainability of the code.
3. Paragraphing code blocks inside the same section to make the code easier to understand and navigate.
4. Clearly defining the code between control structures' beginning and end points and using indentation to identify those points.
5. Steer clear of lengthy functions and, preferably, only have one function per activity.

```
In [45]: from keras.layers import Dense,Dropout, LSTM
         from keras.models import Sequential

In [49]: model = Sequential()
         model.add(LSTM(units = 50, activation = 'relu', return_sequences = True, input_shape = (x_train.shape[1], 1)))
         model.add(Dropout(0.2))

         model.add(LSTM(units = 60, activation = 'relu', return_sequences = True))
         model.add(Dropout(0.3))

         model.add(LSTM(units = 80, activation = 'relu', return_sequences = True))
         model.add(Dropout(0.4))

         model.add(LSTM(units = 120, activation = 'relu'))
         model.add(Dropout(0.5))

         model.add(Dense(units = 1))
```

LSTM implementation

```
In [35]: from sklearn.preprocessing import MinMaxScaler
         scaler = MinMaxScaler(feature_range=(0,1))

In [38]: data_training_array = scaler.fit_transform(data_training)
         data_training_array
         data_training_array.shape

    Out[38]: (2205, 1)

In [43]: x_train = []
         y_train = []

         for i in range(100, data_training_array.shape[0]):
             x_train.append(data_training_array[i-100:i])
             y_train.append(data_training_array[i, 0])

         x_train, y_train = np.array(x_train), np.array(y_train)
```

Training the model

# Chapter 6

# Conclusion and Future Scope

## 6.1 Conclusion

A potent LSTM-based algorithm that we have developed can accurately forecast the closing stock prices of any institution. Using the yfinance module API, we gather and preprocess historical stock price data before creating an LSTM model with the proper hyperparameters, such as the number of layers and hidden units.

Our model can handle time-series data and forecast stock values based on historical patterns. We have employed a number of metrics, including Mean Absolute Error (MAE) and Root Mean Square Error (RMSE), to assess the effectiveness of our model.

Given the complexity of the stock market and the accuracy of our model, which was tested across different datasets, was above 73%. Our method offers a useful tool for both scholars interested in studying stock market patterns and investors who want to make educated judgements about buying and selling stocks.

Additionally, using Streamlit, we created a user-friendly web application where users can enter a stock ticker symbol and get the expected close stock prices. This program is flexible enough to be easily modified to forecast the stock values of any institution, making it useful for investors and scholars. Overall, our method has shown that LSTM-based models are effective at forecasting stock prices, and we think that there's tremendous room for further research and advancement in this area.

## 6.2 Future Scope

We can eventually expand the capabilities of our application to incorporate cryptocurrency trading in addition to stock price prediction. Investors are getting more and more interested in cryptocurrencies like Bitcoin, Ethereum, and Litecoin, but forecasting their prices can be just as difficult as forecasting stock prices. By including cryptocurrency trading in our platform, we can give investors a more complete tool to help them choose their investments.

Additionally, we can use sentiment analysis methods to raise the precision of our forecasts. The goal of sentiment analysis is to ascertain the general attitude towards a certain stock or cryptocurrency by examining news articles, social media posts, and other information sources. We can make predictions that are more accurate by including sentiment analysis into our model, which takes into account both the sentiment of the market right now and historical trends.

Additionally, we can use Flutter to create an iOS and Android cross-platform mobile application. With the help of this software, users may get real-time stock and cryptocurrency price predictions, facilitating on-the-go monitoring of investments and informed decision-making for investors. In order to increase the use of the application for users, we can also add features like real-time news and notifications, portfolio tracking, and customised investment advice.

Overall, this project has a huge future scope and has a lot of room for additional research and development. We can give investors a powerful tool to help them make informed investing decisions and maximise their returns by integrating cutting-edge technology like sentiment analysis and creating a mobile application.

## REFERENCES


[1] Stock Price Prediction Using LSTM on Indian Share Market by Achyut Ghosh, Soumik Bose1, Giridhar Maji, Narayan C. Debnath, Soumya Sen

[2] S. Selvin, R. Vinayakumar, E. A. Gopalkrishnan, V. K. Menon and K. P. Soman - Stock price prediction using LSTM, RNN and CNN-sliding window model - 2017.

[3] Murtaza Roondiwala, Harshal Patel, Shraddha Varma, "Predicting Stock Prices Using LSTM" in Undergraduate Engineering Students, Department of Information Technology, Mumbai University, 2015.

[4] Xiongwen Pang, Yanqiang Zhou, Pan Wang, Weiwei Lin, "An innovative neural network approach for stock market prediction", 2018

[5] Ishita Parmar, Navanshu Agarwal, Sheirsh Saxena, Ridam Arora, Shikhin Gupta, Himanshu Dhiman, Lokesh Chouhan Department of Computer Science and Engineering National Institute of Technology, Hamirpur – 177005, INDIA - Stock Market Prediction Using Machine Learning.

[6] Pranav Bhat Electronics and Telecommunication Department, Maharashtra Institute of Technology, Pune. Savitribai Phule Pune University - A Machine Learning Model for Stock Market Prediction.

[7] Anurag Sinha Department of computer science, Student, Amity University Jharkhand Ranchi, Jharkhand (India), 834001 - Stock Market Prediction Using Machine Learning.

[8] V Kranthi Sai Reddy Student, ECM, Sreenidhi Institute of Science and Technology, Hyderabad, India - Stock Market Prediction Using Machine Learning.

# INDIVIDUAL CONTRIBUTION REPORT:

## STOCK MARKET ANALYSIS

ABHIJNAN SEN
2006001

**Abstract:**The aim of this project is to design and train a machine learning model to predict stock market values. The team members have divided the tasks among themselves, with Tarundeep focusing on model design and training, Raunaq on data preprocessing, Suyash on collecting data, and Abhijnan on building an interface for the output and displaying all the visualization elements.

**Individual contribution and findings:** The web application which is hosted locally on our machine, is made using streamlit module and uses yahoo finance(yfinance) module to call the yfinance API. The results are plotted using matplotlib module where we visualize the closing price with time chart taking 100 rolling moving average values and 200 rolling moving average values. The final result is displayed by comparing the predicted and original values and plotting a

**Individual contribution to project report preparation:** I have made the Project Planning and System Design part of the report.

**Individual contribution for project presentation and demonstration:** I have presented the system architecture component of the project presentation while also explaining the complete data flow in the model processing and visulization elements.

Full Signature of Supervisor: ……

Full signature of the student: ……..

# INDIVIDUAL CONTRIBUTION REPORT:

## STOCK MARKET ANALYSIS

RAUNAQ GHOSHAL
2006035

**Abstract:** The aim of this project is to design and train a machine learning model to predict stock market values. The team members have divided the tasks among themselves, with Tarundeep focusing on model design and training, Raunaq on data preprocessing, Suyash on collecting data, and Abhijnan on building an interface for the output and displaying all the visualization elements..

### Individual contribution and findings:

The next step is to preprocess the data to obtain the desired output from the dataset fetched from yahoo finance. The data is split into two components - training(70%) and testing (30%). The data is then normalized using Min Max normalization method which is imported from sklearn preprocessing module. The final data is transformed and stored as numpy arrays and the model is saved with .h5 datatype which is later than tested using the testing dataset, using which we can plot a graphical representation of (predicted values - original values) and compare the accuracy of our model.

**Individual contribution to project report preparation:** I have written the Implementation portion of the report, which includes methodology and result analysis.

**Individual contribution for project presentation and demonstration:** Explained the literature survey part of the project and why we chose LSTM as our fundamental algorithm.

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Full Signature of Supervisor: ……

Full signature of the student: ……..

# INDIVIDUAL CONTRIBUTION REPORT:

## STOCK MARKET ANALYSIS

TARUNDEEP SINGH
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**Abstract:** The aim of this project is to design and train a machine learning model to predict stock market values. The team members have divided the tasks among themselves, with Tarundeep focusing on model design and training, Raunaq on data preprocessing, Suyash on collecting data, and Abhijnan on building an interface for the output and displaying all the visualization elements.

**Individual contribution and findings** Model design and training.
After the completion of the MinMax Scaler function which scales up the data values acccording to the given range of (0,1) we import keras.layers and keras.models. The `keras.layers` module and `keras.models` module are part of the Keras library, which is a popular deep learning framework for building and training neural networks. The `Dense`, `Dropout`, and `LSTM` classes are used to define layers in a neural network, while the `Sequential` class is used to create a linear stack of layers. The LSTM function statement creates an LSTM layer with 50 units (neurons), a ReLU activation function, and a return_sequences argument set to True.In Keras, compile() is a method that is used to configure the training process of a machine learning model. It takes several arguments, including an optimizer and a loss function. The optimizer='adam' specifies that the Adam optimizer should be used during training. Adam is a popular optimization algorithm that is commonly used to train neural networks. The loss function is used to specify the loss function used by out model to test the error rate.

**Individual contribution to project report preparation:** I have written the conclusion and future scope in the report

**Individual contribution for project presentation and demonstration:** Explained the model implementation and methodologies for the project.

Full Signature of Supervisor: ……

Full signature of the student: ……..

# INDIVIDUAL CONTRIBUTION REPORT:

## STOCK MARKET ANALYSIS

SUYASH PRATEEK
2006402

**Abstract:** The aim of this project is to design and train a machine learning model to predict stock market values. The team members have divided the tasks among themselves, with Tarundeep focusing on model design and training, Raunaq on data preprocessing, Suyash on collecting data, and Abhijnan on building an interface for the output and displaying all the visualization elements.

**Individual contribution and findings:** Our application takes the user input of the stock ticker values and we store the ticker stringer as user_input and pass the user_input as an argument of web.get_data_yahoo along with the datetime values of start and end which we have chosen the start date as 1st January, 2015 and end date date as 31st December, 2022.

**Individual contribution to project report preparation:** I have written the introduction and literature review of the report.

**Individual contribution for project presentation and demonstration:** Showed the demo of the project using game and hand gestures.

Full Signature of Supervisor: ……

Full signature of the student: ……..