IR@AIKTC-KRRC

A PROJECT REPORT

ON

"STOCK PREDICTION USING MACHINE LEARNING"

Submitted to

UNIVERSITY OF MUMBAI

In Partial Fulfilment of the Requirement for the Award of

BACHELOR'S DEGREE IN
COMPUTER ENGINEERING

BY

RAAFIL RIZWAN DESHMUKH	**17CO23**
HUZEFA MUNAF SURME	**17CO53**
SHAIKH TANVEER ALAM AKHTAR ALI	**16DCO79**

UNDER THE GUIDANCE OF
PROF. JAVED SHAIKH

DEPARTMENT OF COMPUTER ENGINEERING
Anjuman-I-Islam's Kalsekar Technical Campus
SCHOOL OF ENGINEERING & TECHNOLOGY
Plot No. 2 3, Sector - 16, Near Thana Naka,
Khandagaon, New Panvel - 410206

2020-2021

AFFILIATED TO

UNIVERSITY OF MUMBAI

ir.aiktclibrary.org

IR@AIKTC-KRRC

A PROJECT II REPORT
ON

"STOCK PREDICTION USING MACHINE LEARNING"

Submitted to
UNIVERSITY OF MUMBAI

In Partial Fulfilment of the Requirement for the Award of

BACHELOR'S DEGREE IN COMPUTER ENGINEERING

BY

RAAFIL RIZWAN DESHMUKH	**17CO23**
HUZEFA MUNAF SURME	**17CO53**
SHAIKH TANVEER ALAM AKHTAR ALI	**16DCO79**

UNDER THE GUIDANCE OF
PROF. JAVED SHAIKH

DEPARTMENT OF COMPUTER ENGINEERING
Anjuman-I-Islam's Kalsekar Technical Campus
SCHOOL OF ENGINEERING & TECHNOLOGY
Plot No. 2 3, Sector - 16, Near Thana Naka,
Khandagaon, New Panvel - 410206

2020-2021
AFFILIATED TO

UNIVERSITY OF MUMBAI

ir.aiktclibrary.org

IR@AIKTC-KRRC

Anjuman-i-Islam's Kalsekar Technical Campus

Department of Computer Engineering

SCHOOL OF ENGINEERING & TECHNOLOGY

Plot No. 2 3, Sector - 16, Near Thana Naka,

Khandagaon, New Panvel - 410206

CERTIFICATE

This is certify that the project entitled

"STOCK PREDICTION USING MACHINE LEARNING"

submitted by

RAAFIL RIZWAN DESHMUKH	**17CO23**
HUZEFA MUNAF SURME	**17CO53**
SHAIKH TANVEER ALAM AKHTAR ALI	**16DCO79**

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 Engineering) at ***Anjuman-I-Islam's Kalsekar Technical Campus, Navi Mumbai*** under the University of MUMBAI. This work is done during year 2020-2021, under our guidance.

Date: / /

(Prof. JAVED SHAIKH)
Project Supervisor

(Prof. JAVED SHAIKH)
Project Coordinator

(Prof. TABREZ KHAN)
HOD, Computer Department

DR. ABDUL RAZAK HONNUTAGI
Director

External Examiner

ir.aiktclibrary.org

IR@AIKTC-KRRC

Acknowledgements

I would like to take the opportunity to express my sincere thanks to my guide **Prof.Javed Shaikh**, Assistant Professor, Department of Computer Engineering, AIKTC, School of Engineering, Panvel for his invaluable support and guidance throughout my project research work. Without his kind guidance & support this was not possible.

I am grateful to him/her for his timely feedback which helped me track and schedule the process effectively. His/her time, ideas and encouragement that he gave is help me to complete my project efficiently.

We would like to express deepest appreciation towards **DR. ABDUL RAZAK HONNUTAGI**, Director, AIKTC, Navi Mumbai, **Prof. TABREZ KHAN**, Head of Department of Computer Engineering and **Prof. JAVED SHAIKH**, Project Coordinator whose invaluable guidance supported us in completing this project.

At last we must express our sincere heartfelt gratitude to all the staff members of Computer Engineering Department who helped me directly or indirectly during this course of work.

RAAFIL RIZWAN DESHMUKH
HUZEFA MUNAF SURME
SHAIKH TANVEER ALAM AKHTAR ALI

ir.aiktclibrary.org

IR@AIKTC-KRRC

Project I Approval for Bachelor of Engineering

This project entitled ***S̈tock Prediction Using Machine Learning¨*** by ***Raafil Deshmukh,Huzefa Surme,Shaikh Tanveer Alam*** is approved for the degree of ***Bachelor of Engineering in Department of Computer Engineering.***

Examiners

1. .....
2. .....

Supervisors

1. .....
2. .....

Chairman

.....

ir.aiktclibrary.org

IR@AIKTC-KRRC

Declaration

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Student Name: Raafil Deshmukh
Roll Number: 17CO23

Student Name: Huzefa Surme
Roll Number: 17CO53

Student Name: Shaikh Tanveer Alam
Roll Number: 16DCO79

ir.aiktclibrary.org

IR@AIKTC-KRRC

ABSTRACT

We analyse existing and new methods of stock market prediction. We take three different approaches at the problem: Fundamental analysis, Technical Analysis, and the application of Machine Learning. We find evidence in support of the weak form of the Efficient Market Hypothesis, that the historic price does not contain useful information but out of sample data may be predictive. We show that Fundamental Analysis and Machine Learning could be used to guide an investor's decisions. We demonstrate a common flaw in Technical Analysis methodology and show that it produces limited useful information.

In the finance world stock trading is one of the most important activities. Stock market predic-tion is an act of trying to determine the future value of a stock other financial instrument tradedon a financial exchange.The technical and fundamental or the time series analysis is used bythe most of the stockbrokers while making the stock predictions. The programming languageis used to predict the stock market using machine learning is Python. In our project we proposea Machine Learning (ML) approach that will be trained from the available stocks data and gainintelligence and then uses the acquired knowledge for an accurate prediction. In this contextstudy uses a machine learning technique called Support Vector Machine (SVM) or Long ShortTerm-Memory (LSTM) to predict stock prices.

Keywords: Mechine Learning, Data Mining, Training set, Training Data, Au-tomated System, pattern Recognition, Deep learning, Knowledgeextraction, Data preprocessing, knowledge extraction, Web mod-ule,Artificial Intelligence.

ir.aiktclibrary.org

IR@AIKTC-KRRC

Contents

Acknowledgement iii
Project I Approval for Bachelor of Engineering iv
Declaration v
Abstract vi
Table of Contents ix
List of Figures x

1 Introduction **2**
1.1 Purpose 2
1.2 Project Scope 3
1.3 Project Goals and Objectives 3
1.3.1 Goals 3
1.3.2 Objectives 3

2 Literature Survey **5**
2.1 Paper Title 1: Stock Market Prediction Using Machine Learning Algorithms K. Hiba Sadia, Aditya Sharma, Adarsh Paul, Sarmistha Padhi, Saurav Sanyal 5
2.1.1 Advantages of Paper 5
2.1.2 Disadvantages of Paper 5
2.1.3 How to overcome the problems mentioned in Paper 6
2.2 Paper Title 2 : Stock Market Prediction using Machine Learning Prof. S .P. Pimpalkar, Jenish Karia , Muskaan Khan, Satyam Anand, Tushar Mukherjee 7
2.2.1 Advantages of Paper 7
2.2.2 Disadvantages of Paper 7
2.2.3 How to overcome the problems mentioned in Paper 7
2.3 Paper Title 3: Automated Stock Price Prediction Using Machine Learning Mariam Moukalled Wassim El-Hajj Mohamad Jaber . . . 8
2.3.1 Advantages of Paper 8
2.3.2 Disadvantages of Paper 8
2.3.3 How to overcome the problems mentioned in Paper 8
2.4 Technical Review 9
2.4.1 Advantages of Technology 9

ir.aiktclibrary.org

IR@AIKTC-KRRC

2.4.2 Reasons to use this Technology 9

3 Project Planning **10**
3.1 Members and Capabilities 10
3.2 Roles and Responsibilities 10
3.3 Assumptions and Constraints 11
3.4 Project Management Approach 11
3.5 Ground Rules for the Project 11
3.6 Project Budget 11
3.7 Project Timeline 12

4 Software Requirements Specification **13**
4.1 Overall Description 13
4.1.1 Product Perspective 13
4.1.2 Product Features 13
4.1.3 User Classes and Characteristics 14
4.1.4 Operating Environment 14
4.1.5 Design and Implementation Constraints 14
4.2 System Features 15
4.2.1 System Feature 15
4.2.2 User Interfaces 15
4.2.3 Hardware Interfaces 15
4.2.4 Software Interfaces 16
4.3 Nonfunctional Requirements 17
4.3.1 Performance Requirements 17
4.3.2 Safety Requirements 17
4.3.3 Security Requirements 17

5 System Design **18**
5.1 System Requirements Definition 18
5.1.1 Functional requirements 18
5.1.2 System requirements (non-functional requirements) 22
5.2 System Architecture Design 22
5.3 Systems Integration 23
5.3.1 Class Diagram 23

6 Implementation **24**
6.1 Setting Up Data Set 24
6.2 TRAINING AND TESTING DATA 27
6.3 Visualisation Of Result 28
6.4 Adding Layers of LSTM 29
6.5 Expected Results of graphs 30

ir.aiktclibrary.org

IR@AIKTC-KRRC

7 System Testing **31**
7.1 Test Cases and Test Results 31
7.2 Sample of a Test Case 31
7.2.1 Software Quality Attributes 32

8 Screenshots of Project **33**
8.1 WEBSITE OF STOCK PREDICTION 33
8.2 PREDICTION SNAPSHOT 38

9 Conclusion and Future Scope **40**
9.1 Conclusion 40
9.2 Future Scope 40

References **41**

ir.aiktclibrary.org

IR@AIKTC-KRRC

List of Figures

5.1.2 USE CASE DIAGRAM 18
5.1.3 DFD LEVEL-0 19
5.1.4 DFD LEVEL-1 20
5.2 SYSTEM ARCHITECTURE 21
5.3.1 CLASS DIAGRAM 22
3.5 WEBSITE OF STOCK PREDICTION 31-35
3.5 PREDICTION SNAPSHOT 36-37

ir.aiktclibrary.org

IR@AIKTC-KRRC

List of Tables

3.1 Table of Capabilities 10
3.2 Table of Responsibilities 10

ir.aiktclibrary.org

IR@AIKTC-KRRC

Chapter 1

Introduction

Predicting the Stock Market has been the bane and goal of investors since its existence. Everyday billions of dollars are traded on the exchange, and behind each dollar is an investor hoping to profit in one way or another. Entire companies rise and fall daily based on the behaviour of the market. Should an investor be able to accurately predict market movements, it offers a tantalizing promises of wealth and influence. It is no wonder then that the Stock Market and its associated challenges find their way into the public imagination every time it misbehaves. The 2008 financial crisis was no different, as evidenced by the flood of films and documentaries based on the crash. If there was a common theme among those productions, it was that few people knew how the market worked or reacted. Perhaps a better understanding of stock market prediction might help in the case of similar events in the future.

1.1 Purpose

The title of our project is Stock Market Prediction, it is an online model to predict the stock prices of company.This project concerned about developing an online model that will be used for investers to invest smartly.
The stock market is basically an aggregation of various bPredicting the Stock Market has been the bane and goal of investors since its existence.
Everyday billions of dollars are traded on the exchange, and behind each dollar is an investor hoping to profit in one way or another.
Entire companies rise and fall daily based on the behaviour of the market.
Should an investor be able to accurately predict market movements, it offers a tantalizing promises of wealth and influence.
It is no wonder then that the Stock Market and its associated challenges find their way into the public imagination every time it misbehaves.
The 2008 financial crisis was no different, as evidenced by the flood of films and documentaries based on the crash.
If there was a common theme among those productions, it was that few people knew

ir.aiktclibrary.org

how the market worked or reacted.
Perhaps a better understanding of stock market prediction might help in the case of similar events in the future.uyers and sellers of stock.
A stock (also known as shares more commonly) in general represents ownership claims on business by a particular individual or a group of people.
To determine the future value of the stock market is known as a stock market prediction.
The prediction is expected to be robust, accurate and efficient.
The system must work according to the real-life scenarios and should be well suited to real.

1.2 Project Scope

The goal of this project is to predict a stock price of a company according to it's previous historical data. Stock Market Prediction is composed of main components: a company's historical data of stock which will help to analyse the current and previous changes of stock price.The above proposed model is easy to implement considering the available technology infrastructure. The model is simple, secure and scalable.The proposed model is based on serial communication. These model will help the investers to invest their money according to the predicted value, invester's may have less chances of loss and a very huge chance of making more profit.[2]

1.3 Project Goals and Objectives

1.3.1 Goals

Despite its prevalence, Stock Market prediction remains a secretive and empirical art. Few people, if any, are willing to share what successful strategies they have. A chief goal of this project is to add to the academic understanding of stock market prediction. The hope is that with a greater understanding of how the market moves, investors will be better equipped to prevent another financial crisis. The project will evaluate some existing strategies from a rigorous scientific perspective and provide a quantitative evaluation of new strategies.

1.3.2 Objectives

1.Financial:
Many people are interested in the financial market. And need guidance and accurate predictions to invest wisely . Investors are always looking for the accurate future results. Template sample paragraph.

2.Applications and News Channels:

There are many applications that try to predict the stocks but they do not give detailed information about the prediction. Thus with a successful model for stock prediction , we try to gain insight about market behavior over time , spotting trends that would otherwise not have been noticed.

The objective of this project is to show how machine learning can help improve the future prediction of Stocks.

IR@AIKTC-KRRC

Chapter 2

Literature Survey

2.1 Paper Title 1: Stock Market Prediction Using Machine Learning Algorithms K. Hiba Sadia, Aditya Sharma, Adarsh Paul, Sarmistha Padhi, Saurav Sanyal

The main objective of this paper is to find the best model to predict the value of the stock market. During the process Of considering various techniques and variables that must be taken into account, we found out that techniques like random forest, support vector machine were not exploited fully. In, this paper we are going to present and review a more feasible method to predict the stock movement with higher accuracy. The first thing we have taken into account is the dataset of the stock market prices from previous year. The dataset was pre-processed and tuned up for real analysis. Hence, our paper will also focus on data preprocessing of the raw dataset. Secondly, after preprocessing the data, we will review the use of random forest, support vector machine on the dataset and the outcomes it generates

2.1.1 Advantages of Paper

a. We are able to train the machine from the various data points from the past to make a future prediction.

b. The basic approach of the supervised learning model is to learn the patterns and relationships in the data from the training set and then reproduce them for the test data.

c. The tuned up dataframe allowed us to prepare the data for feature extraction.

2.1.2 Disadvantages of Paper

a. The existing system fails when there are rare outcomes or predictors, as the algorithm is based on bootstrap sampling.

b. The existence system reported highly predictive values, by selecting an appropriate time period for their experiment to obtain highly predictive scores.

ir.aiktclibrary.org

c. It doesnt focus on external events in the environment, like news events or social media.

2.1.3 How to overcome the problems mentioned in Paper

1. The input datasets will first be processed through the basic algorithms and the outputs from theses algorithms will be feeded to the meta-learner.
2. The meta-learner will perform the task of optimizing the outputs of the algorithms.
3. It itself is another more powerful algorithm which will improve the overall efficiency of the system.
4. The meta-learner upon anallysing all the outputs will produce the final prediction for the consumer.

2.2 Paper Title 2 : Stock Market Prediction using Machine Learning Prof. S .P. Pimpalkar, Jenish Karia , Muskaan Khan, Satyam Anand, Tushar Mukherjee

The coremotive of this project is to analysethe market and predict its performance using various machinelearning techniques. The predictive architecture will use various attributes as the input and will predictwhether the market value will be Positive or Negative. The various attributes that are used in the model include Oil rates, Foreign Exchange Rate, Interest rate, Gold and Silver rates, NEWS, twitter news feedand Pattern Matching. The different ML techniques including Support Vector Machine with regression (SVR) and Recurrent Neural Network are used. The algorithm SVRproduced the most efficient results among all.

2.2.1 Advantages of Paper

a. The meta-learner will perform the task of optimizing the outputs of the algorithms.

b. It itself is another more powerful algorithm which will improve the overall efficiency of the system.

2.2.2 Disadvantages of Paper

a. Accuracy would decrease when setting more levels of stock market movement.

b. These results indicate that the stock price is unpredictable when traditional classifier is used.

2.2.3 How to overcome the problems mentioned in Paper

a. The input datasets will first be processed through the basic algorithms and the outputs from theses algorithms will be feeded to the meta-learner.

b. The meta-learner will perform the task of optimizing the outputs of the algorithms.

c. It itself is another more powerful algorithm which will improve the overall efficiency of the system.

d. The meta-learner upon anallysing all the outputs will produce the final prediction for the consumer.

IR@AIKTC-KRRC

2.3 Paper Title 3: Automated Stock Price Prediction Using Machine Learning Mariam Moukalled Wassim El-Hajj Mohamad Jaber

We propose an automated trading system that integrates mathematical functions, machine learning, and other external factors such as new's sentiments for the purpose of achieving better stock prediction accuracy and issuing profitable trades.Particularly, we aim to determine the price or the trend of a certain stock for the coming end-of-day considering the first several trading hours of the day.

2.3.1 Advantages of Paper

a. Identified the best time interval for stock price prediction.

b. Identified the best news scenario and that each stock is affected differently by news.

c. ITEM 3

2.3.2 Disadvantages of Paper

a. The existence system reported highly predictive values, by selecting an appropriate time period for their experiment to obtain highly predictive scores.

b. It can predict the stock value of one company at a time.

2.3.3 How to overcome the problems mentioned in Paper

a. The main component of this system is the financial news articles collected from yahoo finance and represented as noun phrases; all the collected noun phrases are represented as vector of binary values indicating the presence or absence of a phrase in the article.

b. The second main component of this system is the stock price data collected in one minute time frame.

c. Then, the final major task after collecting the data and formalizing the inputs was building and training the AI model.

ir.aiktclibrary.org

2.4 Technical Review

learning tools represent key enablers for empowering material scientists and engineers to accelerate the development of novel materials, processes and techniques. One of the aims of using such approaches in the field of materials science is to achieve high-throughput identification and quantification of essential features along the process-structure-property-performance chain. In this contribution, machine learning and statistical learning approaches are reviewed in terms of their successful application to specific problems in the field of continuum materials mechanics. They are categorized with respect to their type of task designated to be either descriptive, predictive or prescriptive; thus to ultimately achieve identification, prediction or even optimization of essential characteristics. The respective choice of the most appropriate machine learning approach highly depends on the specific use-case, type of material, kind of data involved, spatial and temporal scales, formats, and desired knowledge gain as well as affordable computational costs.

2.4.1 Advantages of Technology

a. Machine Learning can review large volumes of data and discover specific trends and patterns that would not be apparent to humans.

b. With ML, you don't need to babysit your project every step of the way. Since it means giving machines the ability to learn, it lets them make predictions and also improve the algorithms on their own.

2.4.2 Reasons to use this Technology

a. To identify important insights in data, and prevent fraud.

b. Finding new energy sources. Analyzing minerals in the ground. Predicting refinery sensor failure. Streamlining oil distribution to make it more efficient and cost-effective.

Chapter 3

Project Planning

3.1 Members and Capabilities

Table 3.1: Table of Capabilities

SR. No	Name of Member	Capabilities
1	Raafil Deshmukh	Database, UI Design
2	Huzefa Surme	Back end, documnetation
3	Shaikh Tanveer ALam	Back end, documentation

Work Breakdown Structure

a. All of the members are equally important in developing the project.

b. We work on a different part of the project based on one's capability

c. Firstly we came up with documentation, And based on the documentation we set our goal and created a blueprint.

d. We then started going hands-on with the project to develop it according to the flow as decided earlier

3.2 Roles and Responsibilities

Table 3.2: Table of Responsibilities

SR. No	Name of Member	Role	Responsibilities
1	Raafil Deshmukh	Team Leader	UI Design
2	Huzefa Surme	Member	Back End
3	Shaikh Tanveer Alam	Member	Back End

3.3 Assumptions and Constraints

a. Stock analysis is a process followed by traders to evaluate and understand the value of a security or the stock market.

b. Stock analysis follows the idea that analysts can create methodologies to select stocks by studying past and present data.

c. Generally predictions of stocks helps stock agents to verify the stock prices.

d. User of this software will help him to buy the particular software at their best time.

3.4 Project Management Approach

a. Planning of project

b. Defining the scope of the project.

c. Estimation of time and It's management.

d. Creating Gantt Charts and properly assigning tasks to members

e. Reporting the progress of project with the guide.

3.5 Ground Rules for the Project

a. Properly planning and gathering relevant information is very important.

b. Developing a Blueprint of the project and work accordingly.

c. All the members should report to the guide whenever required

d. Setting up small goals every week.

e. Achieving the small goal within that span of time.

f. Keeping tracks of the progress towards project.

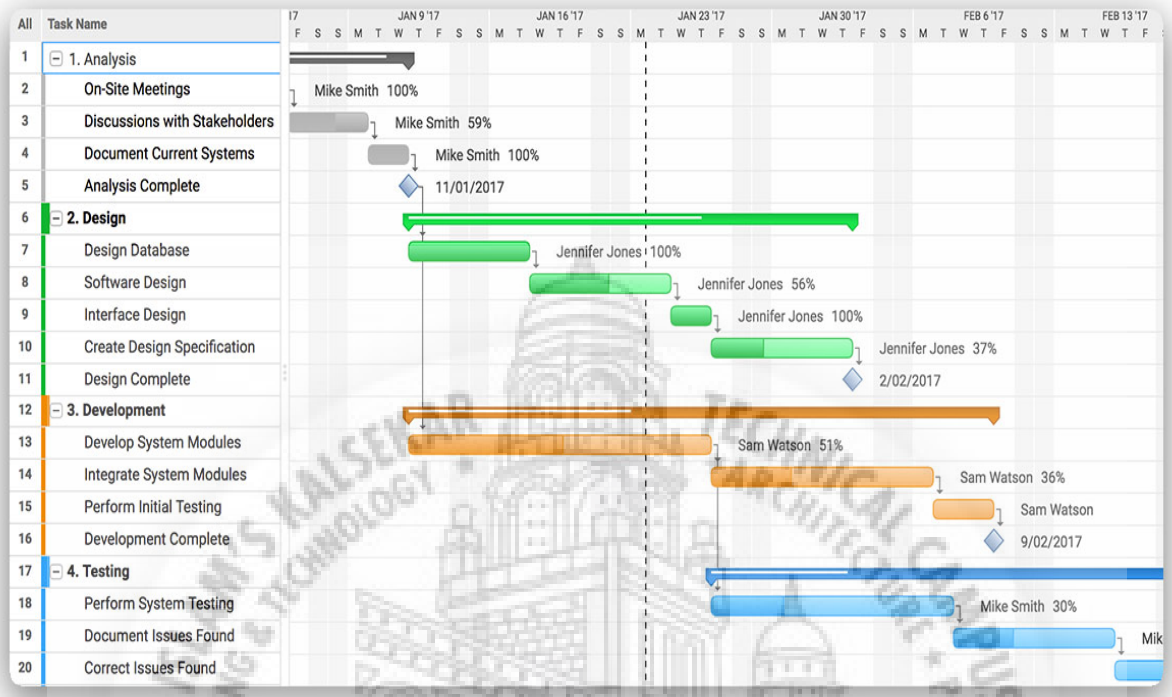
3.6 Project Budget

a. It is moderate project with high end technology.

b. Cost of the project is low and efficient.

c. Time-consuming as it is on latest technologies.

3.7 Project Timeline



IR@AIKTC-KRRC

Chapter 4

Software Requirements Specification

4.1 Overall Description

4.1.1 Product Perspective

The stock market is basically an aggregation of various buyers and sellers of stock. A stock (also known as shares more commonly) in general represents ownership claims on business by a particular individual or a group of people. The attempt to determine the future value of the stock market is known as a stock market prediction. The prediction is expected to be robust, accurate and efficient. The system will be working according to the real-life scenarios and should be well suited to real-world settings. The system is also expected to take into account all the variables that might affect the stock's value and performance. There are various methods and ways of implementing the prediction system like Fundamental Analysis, Technical Analysis, Machine Learning, Market Mimicry, and Time series aspect structuring. With the advancement of the digital era, the prediction has moved up into the technological realm. The most prominent and promising technique involves the use of Artificial Neural Networks, Recurrent Neural Networks, that is basically the implementation of machine learning.slope of linear model applied on tick data of the respective hour, which gives an idea about the trend during the last hour

4.1.2 Product Features

a. Maximum price received during the selected hour.

b. Minimum price received during the selected hour.

c. Average price received during the selected hour.

d. Standard deviation of prices received during the selected hour

e. logarithmic difference between average prices of two consecutive hours.

ir.aiktclibrary.org

IR@AIKTC-KRRC

f. slope of linear model applied on tick data of the respective hour, which gives an idea about the trend during the last hour

4.1.3 User Classes and Characteristics

This project is a share market software.This can be used by normal people as well as by agents to identify the market high and low prices depend on the company they want to lookout.It is a good software for beginner to identify the market value as per it's choice.

4.1.4 Operating Environment

a. Jupyter Notebook

b. Python 3.0

c. LSTM

d. Pandas

e. Datasets

4.1.5 Design and Implementation Constraints

This system focuses one of the features at time. It is not able to provide two or more services at a time.At any instant only one of the services is accessible

ir.aiktclibrary.org

4.2 System Features

It is used to predict the stock price based on the company which we choose to be predicted. Using the previous data the software is used to predict the future prediction of a selected company. Data is coverted into graph to let us know what will be high and low price the stock can go for the particular day, month or year.

4.2.1 System Feature

Using the text data to get converted into graph form to easily identify the predicted stock of a company.

Description and Priority

Well it is the most important feature in our prediction software.
This helps in extraction of text from the background.
Our software read the previous data and do some operations with the data to identify the predicted price of a company stock.

Stimulus/Response Sequences

Stimulus:User choose the particular company stock. Responses:Software uses the training testing results to identify the further process. Responses:After testing training the data alogrithm is used to predict the data.

Functional Requirements

REQ-1: Covertion Of Text Data to Graph.
REQ-2: Training Testing the data.

4.2.2 User Interfaces

User Interface Design focuses on anticipating what users might need to do and ensuring that the interface has elements that are easy to access, understand, and use to facilitate those actions.

4.2.3 Hardware Interfaces

Depending on executing the system our hardware should be well maintained and able to execute the program in a well upgraded hardware.

4.2.4 Software Interfaces

LSTM models are powerful, especially for retaining a long-term memory, by design. in a pure machine learning interest. In my opinion, the model has observed certain patterns in the data, thus giving it the ability to correctly predict the stock movements most of the time.

4.3 Nonfunctional Requirements

4.3.1 Performance Requirements

Performance of overall system is very efficient and well optimize. From the time taken to capture and process it everything is well organized.While processing the stock price it will take time depending on the hardware we will be executing this on.

4.3.2 Safety Requirements

This system does not contain any critical data. Still it provide. The databases that are accessed are locally executed.In case of any updates in libraries used can lead to the failure in systems.

4.3.3 Security Requirements

All the libraries used are certified and standard. As it is a demo based program .After that is released.

IR@AIKTC-KRRC

Chapter 5

System Design

5.1 System Requirements Definition

System requirement definitions specify [1] what the system should do, its functionality and its essential and desirable system properties. The techniques applied to elicit and collect information in order to create system specifications and requirement definitions involve consultations, interviews, requirements workshop with customers and end users. The objective of the requirements definition phase is to derive the two types of requirement:

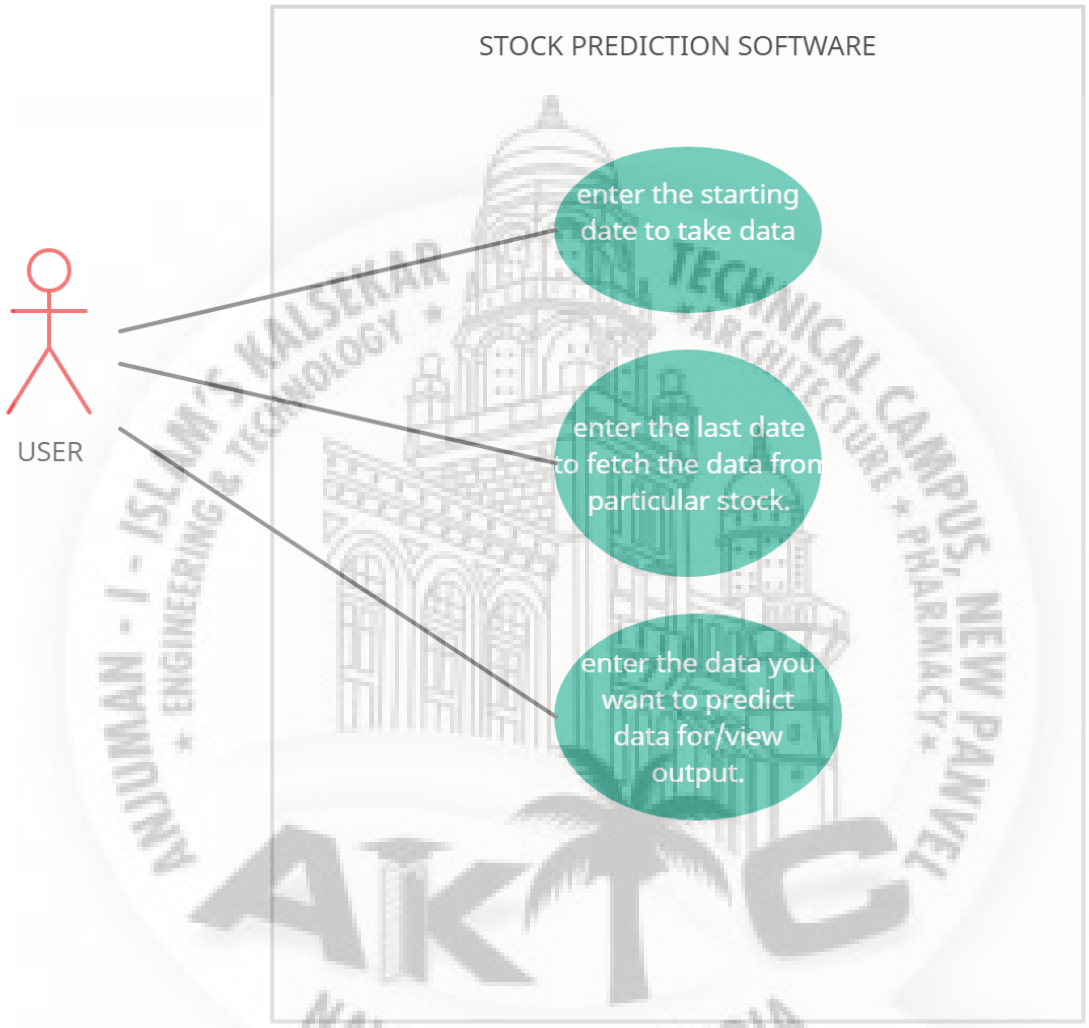
5.1.1 Functional requirements

They define the basic functions that the system must provide and focus on the needs and goals of the end users.

ir.aiktclibrary.org

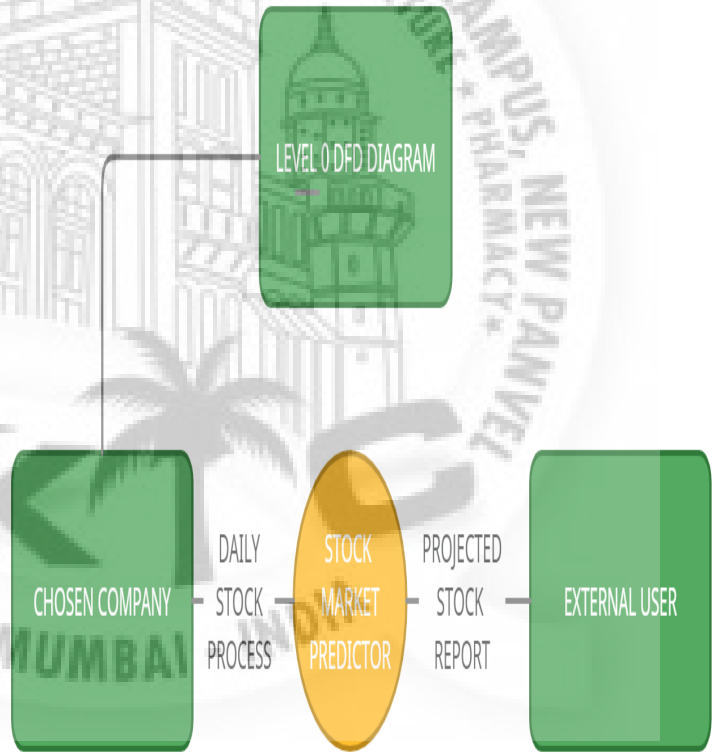
Use-case Diagram

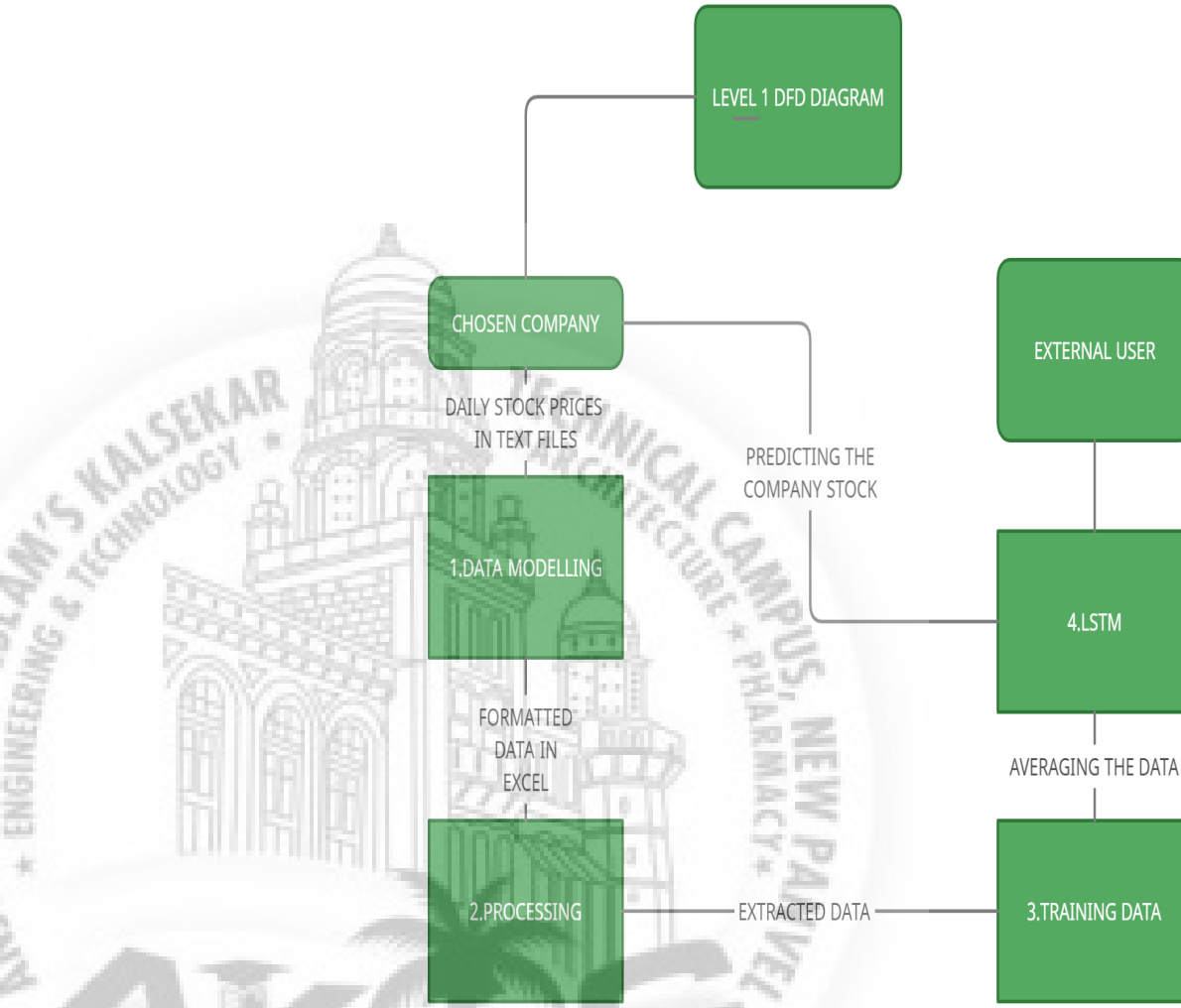
A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.In our system User will interact with use cases like Capture Image,Audio Input,Save text,Retrieve Text,Audio output.



Data-flow Diagram

A data-flow diagram is a way of representing a flow of a data of a process or a system. The DFD also provides information about the outputs and inputs of each entity and the process itself.Given below is Level 0 Level 1 and Level 2 DFD of system.



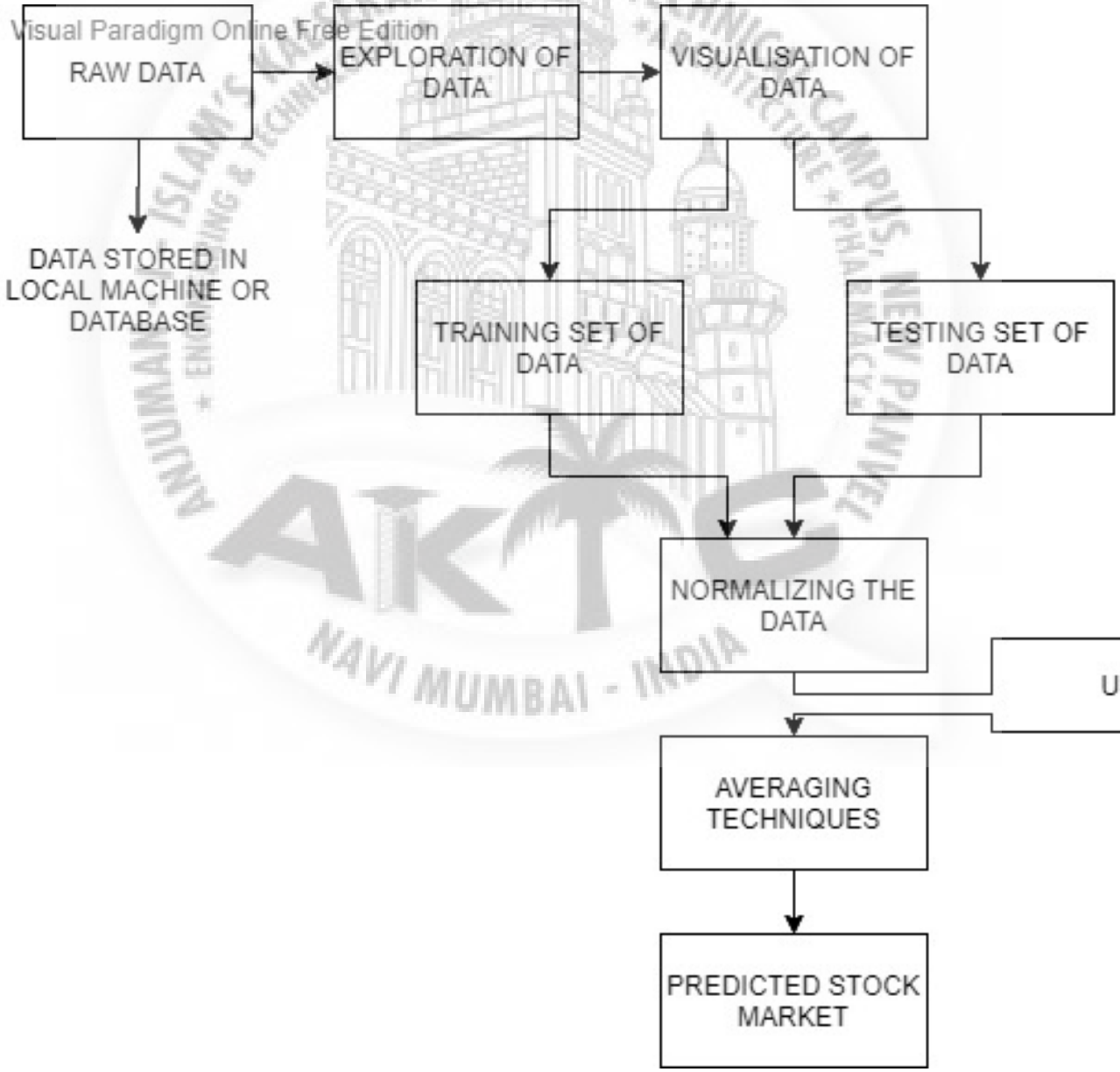

LEVEL 1 DFD DIAGRAM
CHOSEN COMPANY
EXTERNAL USER
DAILY STOCK PRICES
IN TEXT FILES
PREDICTING THE
COMPANY STOCK
1.DATA MODELLING
4.LSTM
FORMATTED
DATA IN
EXCEL
AVERAGING THE DATA
2.PROCESSING
EXTRACTED DATA
3.TRAINING DATA

5.1.2 System requirements (non-functional requirements)

These are non-functional system properties such as availability, performance and safety etc. They define functions of a system, services and operational constraints in detail.

5.2 System Architecture Design

A system architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.

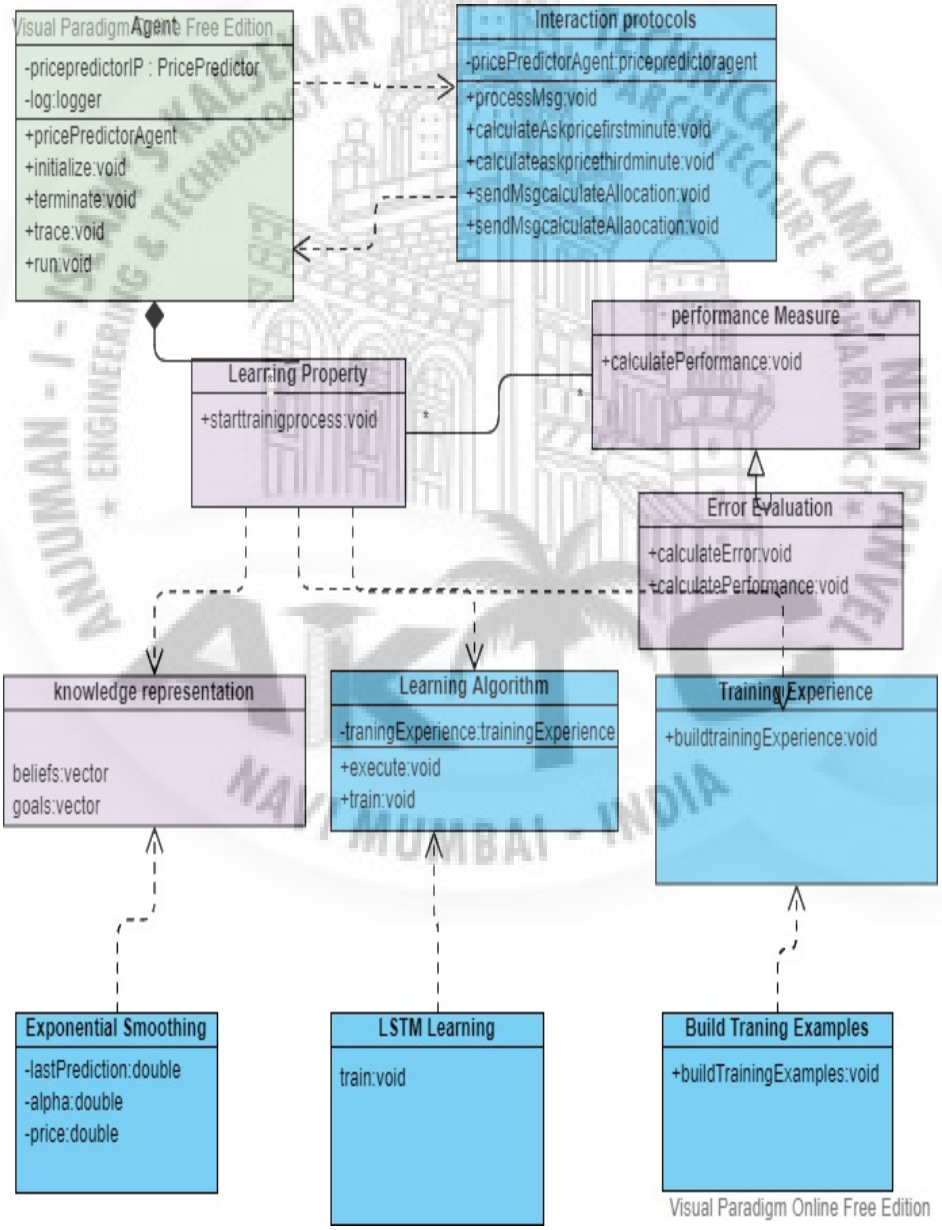


5.3 Systems Integration

System integration (SI) is an engineering process or phase concerned with joining different subsystems or components as one large system. It ensures that each integrated subsystem functions as required. SI is also used to add value to a system through new functionalities provided by connecting functions of different systems

5.3.1 Class Diagram

In software engineering, a class diagram in the Unified Modeling Language is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations, and the relationships among objects.



Chapter 6

Implementation

6.1 Setting Up Data Set

Deep learning is involved a lot in the modern quantitive financial field. There are many different neural networks can be applied to stock price prediction problems. The recurrent neural network, to be specific, the Long Short Term Memory(LSTM) network outperforms others architecture since it can take advantage of predicting time series (or sequentially) involved result with a specific configuration.

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset_train = pd.read_csv('Google_Stock_Price_Train.csv')

training_set = dataset_train.iloc[:,1:2].values # data frame created. To make it
    numpy array(as they are the only mode of input in Keras), we add values()


# feature scaling begins
from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler(feature_range = (0,1))
# it is recommended to keep the original training set
training_set_scaled = sc.fit_transform(training_set)




X_train = []
y_train = []

for i in range(60, 1258):
    X_train.append(training_set_scaled[i-60:i, 0]) # hence we get the stock
        prices from day 0 to day 59 (prev 60). Output y_train will have the
        stock price of day 60, as the RNN will learn to predict.
    y_train.append(training_set_scaled[i, 0])
    # X_train and y_train are list..so we have to convert them in numpy array
X_train, y_train = np.array(X_train), np.array(y_train)


```

```
X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1)) # 1 for open google stock price

# Designing a stacked LSTM without dropout regularization
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.layers import Dropout
regressor = Sequential() # initializes the RNN
# adding layer 1 and dropout regularization
# LSTM(<number of cells>, <return sequences = True ; as we are building a stacked model>, <input shape = shape of the input in X_train>)
regressor.add(LSTM(units = 50, return_sequences = True, input_shape = (X_train.shape[1],1) )) # we will add an object of LSTM class
regressor.add(Dropout(0.2))
# adding new layers of LSTM with dropout regularization
regressor.add(LSTM(units = 50, return_sequences = True)) # we will add an object of LSTM class
regressor.add(Dropout(0.2))
regressor.add(LSTM(units = 50, return_sequences = True)) # we will add an object of LSTM class
regressor.add(Dropout(0.2))
regressor.add(LSTM(units = 50, return_sequences = False)) # we will add an object of LSTM class
regressor.add(Dropout(0.2))

# adding the output layer
# the output layer is fully connected to the output layer
regressor.add(Dense(units = 1))
# compiling
regressor.compile(optimizer = 'adam', loss = 'mean_squared_error')
# training
regressor.fit(X_train, y_train, epochs = 100, batch_size = 32 )

# save
from keras.models import model_from_json
model_json = regressor.to_json()
with open("model.json", "w") as json_file:
    json_file.write(model_json)
regressor.save_weights("model.h5")
print("Saved model to disk")

# get model
from keras.models import model_from_json
json_file = open('model.json', 'r')
loaded_model_json = json_file.read()
json_file.close()
loaded_model = model_from_json(loaded_model_json)
loaded_model.load_weights("model.h5")
print("Loaded model from disk")
loaded_model.compile(loss='mean_squared_error', optimizer='adam')
# loading over

# test set
dataset_test = pd.read_csv('Google_Stock_Price_Test.csv')
real_stock_price = dataset_test.iloc[:,1:2].values
dataset_total = pd.concat((dataset_train['Open'], dataset_test['Open']), axis = 0)
# at each day of financial day, we need the prices of prev 60 days
inputs = dataset_total[len(dataset_total) - len(dataset_test) - 60: ].values
inputs = inputs.reshape(-1,1)
```

```
inputs = sc.transform(inputs)
X_test = []
for i in range(60,80):
    X_test.append(inputs[i-60:i, 0])
X_test = np.array(X_test)
X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))
predicted_stock_price = loaded_model.predict(X_test)
# inverse the scaling on the prediction
predicted_stock_price = sc.inverse_transform(predicted_stock_price)

# visualizing the result
plt.plot(real_stock_price, color = 'red', label = 'Real Google Stock price')
plt.plot(predicted_stock_price, color = 'blue', label = 'Predicted Google Stock
    price')
plt.title('Google Stock Price Prediction')
plt.xlabel('Time')
plt.ylabel('Google Stock Price')
plt.legend()
plt.show()
```

6.2 TRAINING AND TESTING DATA

. It will be beneficial to normalize your training data before you feed data into your model. ”Having different features with widely different scales fed to your model will cause the network to weight the features not equally. This can cause a falsely prioritisation of some features over the others in the representation.

```
# Creating a data structure with and 1 output
X_train = []
y_train = []

for i in range(60, 1258):
    X_train.append(training_set_scaled[i-60:i, 0]) # hence we get the stock
        prices from day 0 to day 59 (prev 60). Output y_train will have the
        stock price of day 60, as the RNN will learn to predict.
    y_train.append(training_set_scaled[i, 0])
    # X_train and y_train are list..so we have to convert them in numpy array
X_train, y_train = np.array(X_train), np.array(y_train)


X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1)) # 1 for
    open google stock price
```

6.3 Visualisation Of Result

Here we will use keras to smoothly interact for building our :STM networks.

```
plt.plot(real_stock_price, color = 'red', label = 'Real Google Stock price')
plt.plot(predicted_stock_price, color = 'blue', label = 'Predicted Google Stock price')
plt.title('Google Stock Price Prediction')
plt.xlabel('Time')
plt.ylabel('Google Stock Price')
plt.legend()
plt.show()
```

6.4 Adding Layers of LSTM

```
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import LSTM
from keras.layers import Dropout
regressor = Sequential() # initializes the RNN

regressor.add(LSTM(units = 50, return_sequences = True, input_shape = (X_train.
    shape[1],1) )) # we will add an object of LSTM class
regressor.add(Dropout(0.2))

regressor.add(LSTM(units = 50, return_sequences = True))
regressor.add(Dropout(0.2))
regressor.add(LSTM(units = 50, return_sequences = True))
regressor.add(Dropout(0.2))
regressor.add(LSTM(units = 50, return_sequences = False))
regressor.add(Dropout(0.2))
```

6.5 Expected Results of graphs

Here we will be displaying our graph on our Website.

```
ratio = -1
  it = 0
  dt = 0
  n = len(predicted_stock_price)
  for i in range(n):
      for j in range(i + 1, n):
          if ((predicted_stock_price[j] / predicted_stock_price[i]) > ratio):
              ratio = predicted_stock_price[j] / predicted_stock_price[i]
              it = i
              dt = j
  ratio=int(ratio*10000)
  site = Main.objects.get(pk=2)
  showstock = Stock.objects.filter(name=word)
  return render(request, 'front/stock_detail.html', {'site': site, 'showstock'
     : showstock, 'df':df, 'ratio':ratio, 'it':it, 'dt':dt})
```

IR@AIKTC-KRRC

Chapter 7

System Testing

System testing is a level of software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements

7.1 Test Cases and Test Results

Test ID	Test Case Title	Test Condition	System Behavior	Expected Result
T01	choose company	company chosen	analysing database	company selected
T02	select open and close date	dates to get selected	analysing database	dates selected
T03	prediction result	analysing result	analysing database	graph prediction

7.2 Sample of a Test Case

Title: Predicted Result – User enters a particular company stock.
Description: A user should be able to successfully able to collect information regarding the company stock.

*Assumption:*A user is handy to use the software.

Test Steps:

1. Navigate to our Stock website
2. In the 'company stock' field, enter the company name of for which you want to buy the stock.
3. Click the 'Next' button.

ir.aiktclibrary.org

4. Enter the open and close date of the company which you want
5. Click predict.

Expected Result: A page displaying the graphical image of the predicted result should load, showing any new message at the top of the page.

Actual Result: Graph with predicted result is being displayed.

Write here description
upload the image of result

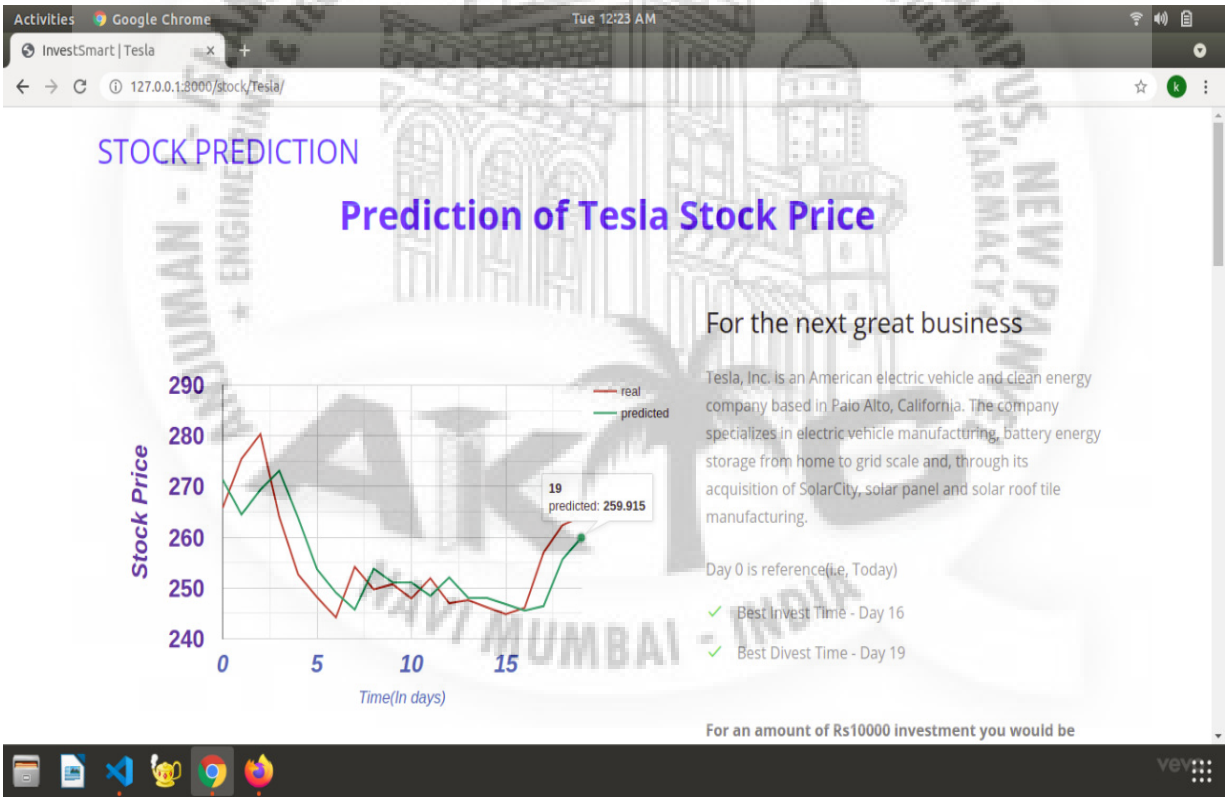
7.2.1 Software Quality Attributes

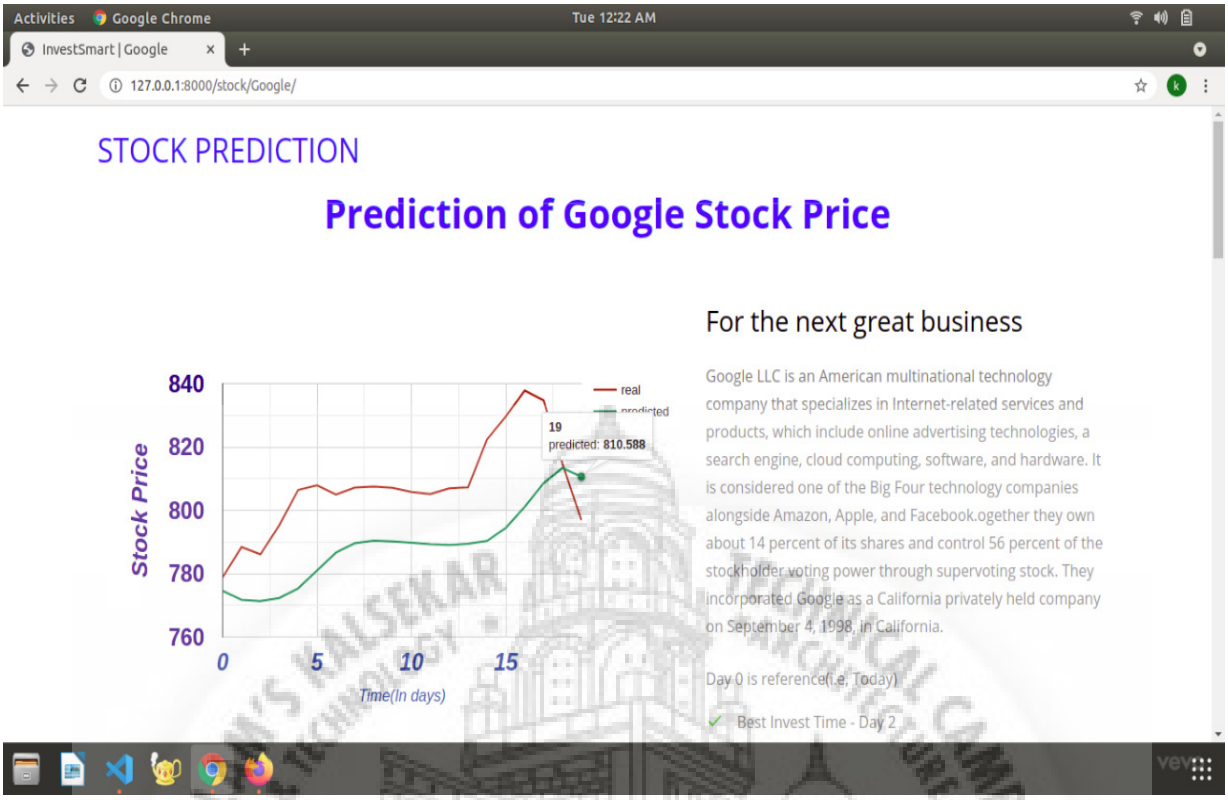
Availability-1 : The system shall be available to users all the time.
Availability-2 : The system shall always have something to function and always pop up error messages in case of component failure.
Efficiency-1 : The system shall generate the predicted price with an accuracy.
Efficiency-2 : The system shall provide the right tools to support all its features.

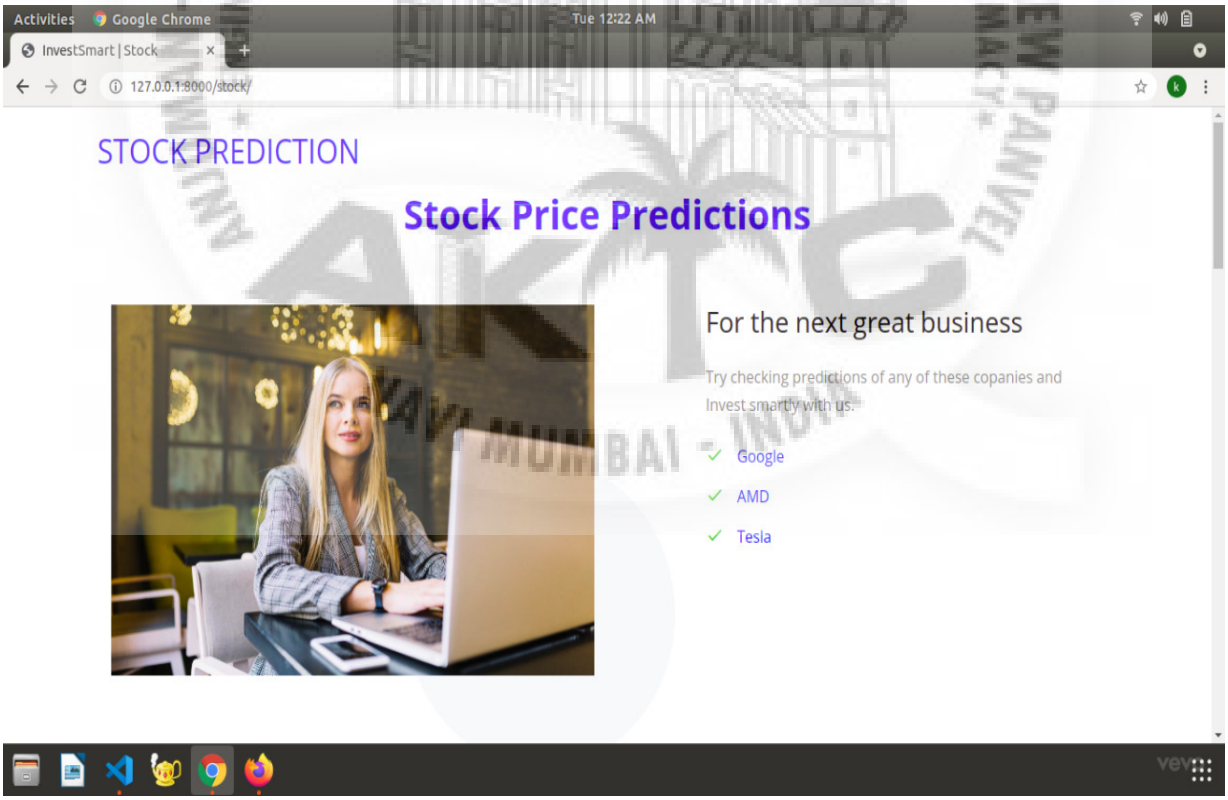
Chapter 8

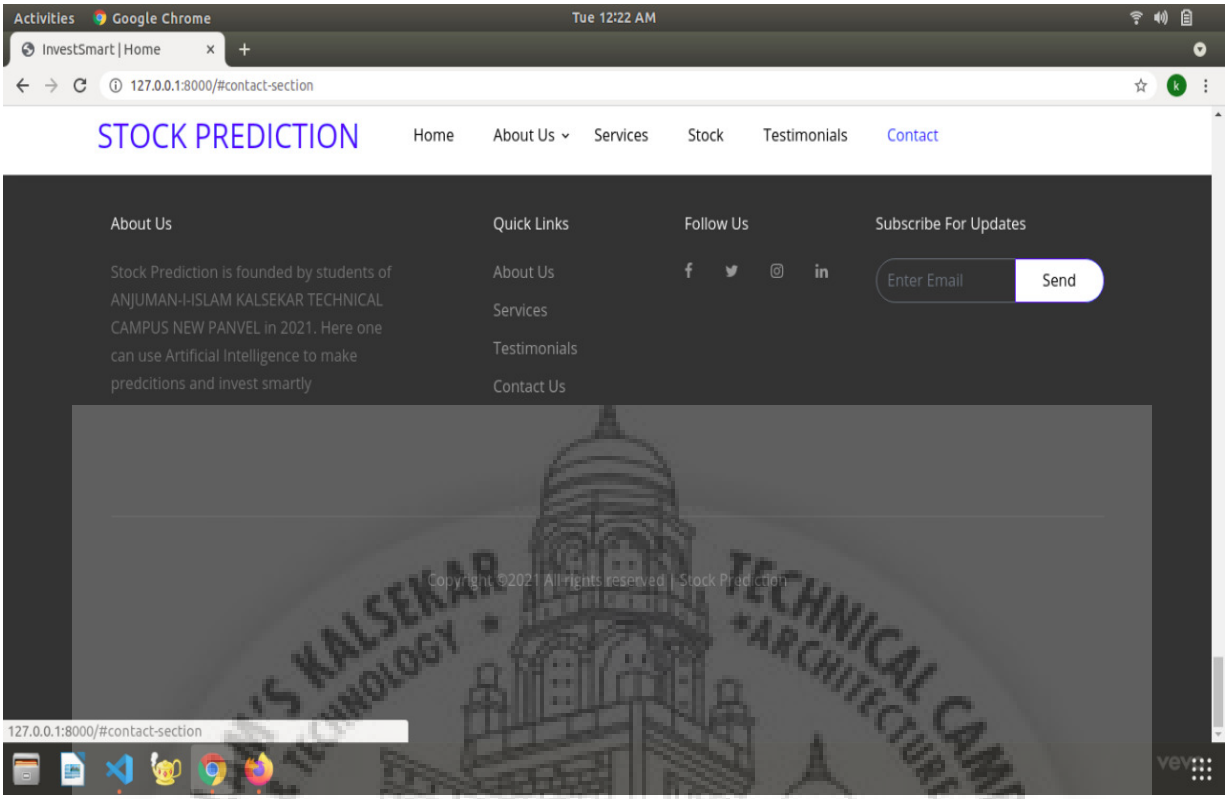
Screenshots of Project

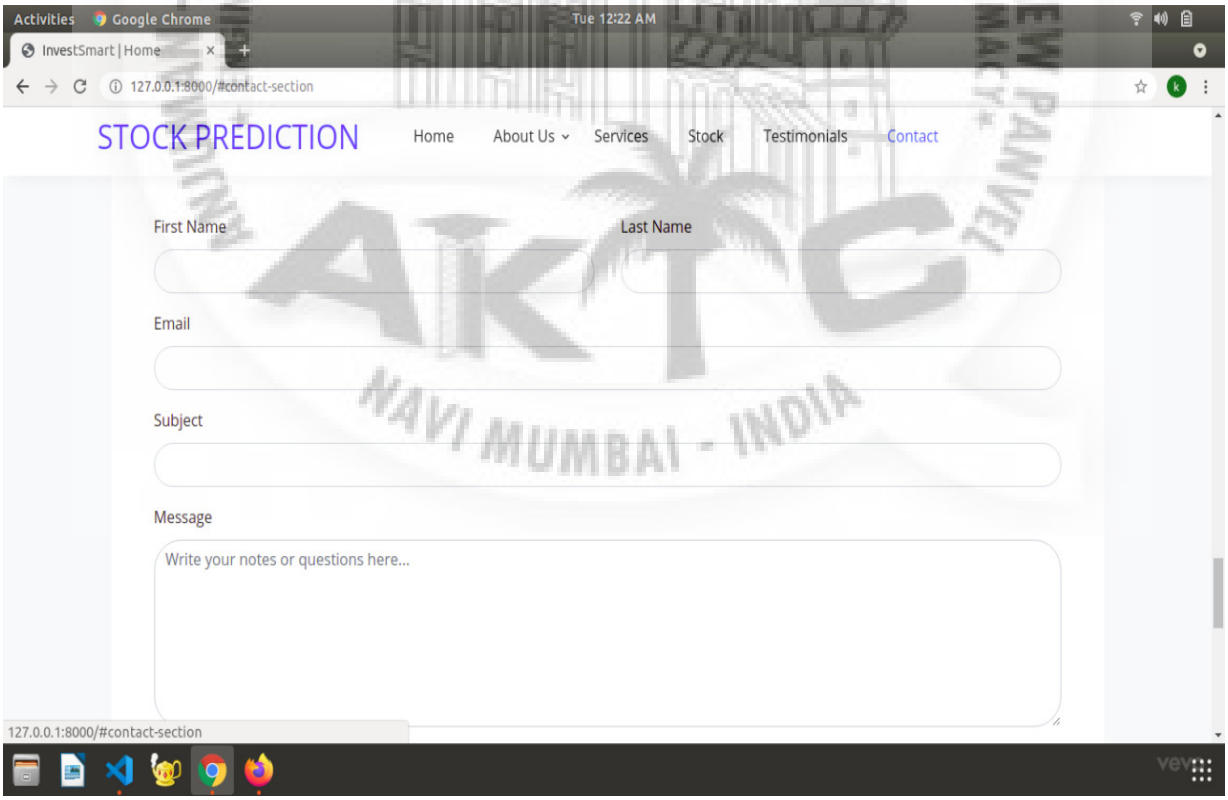
8.1 WEBSITE OF STOCK PREDICTION

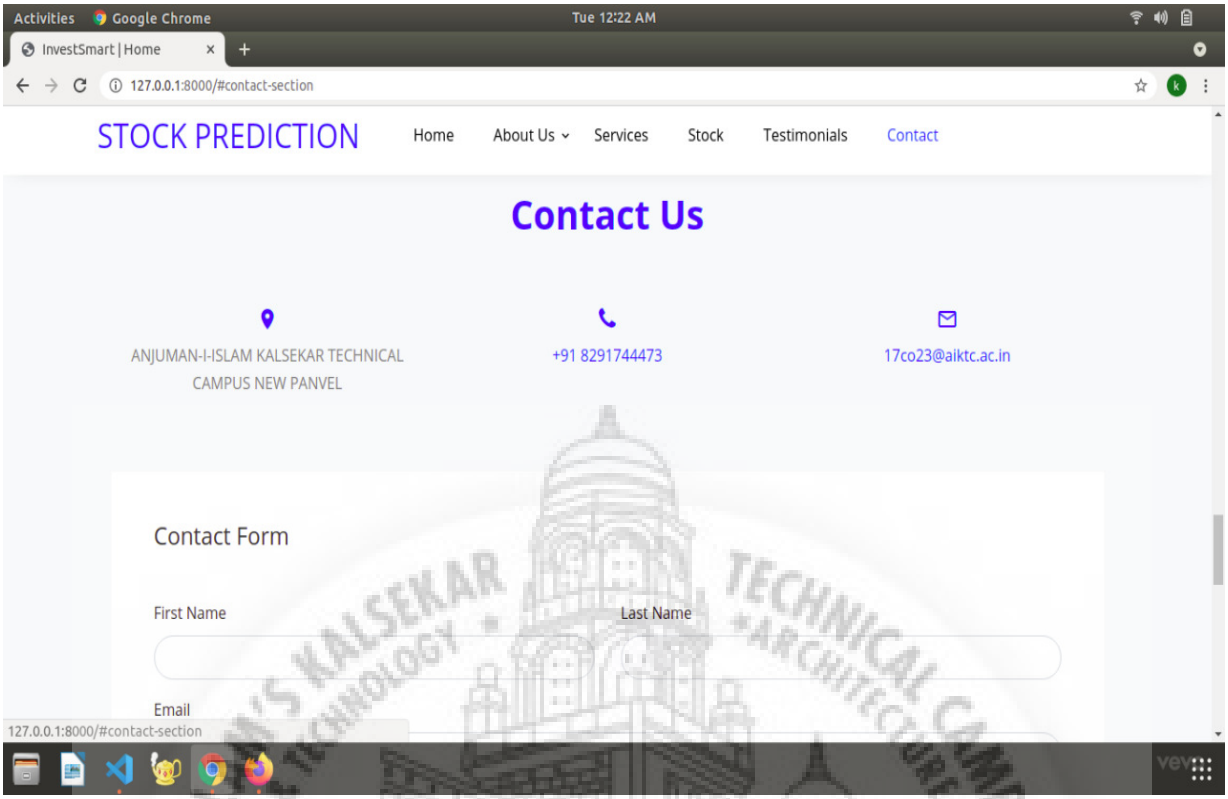


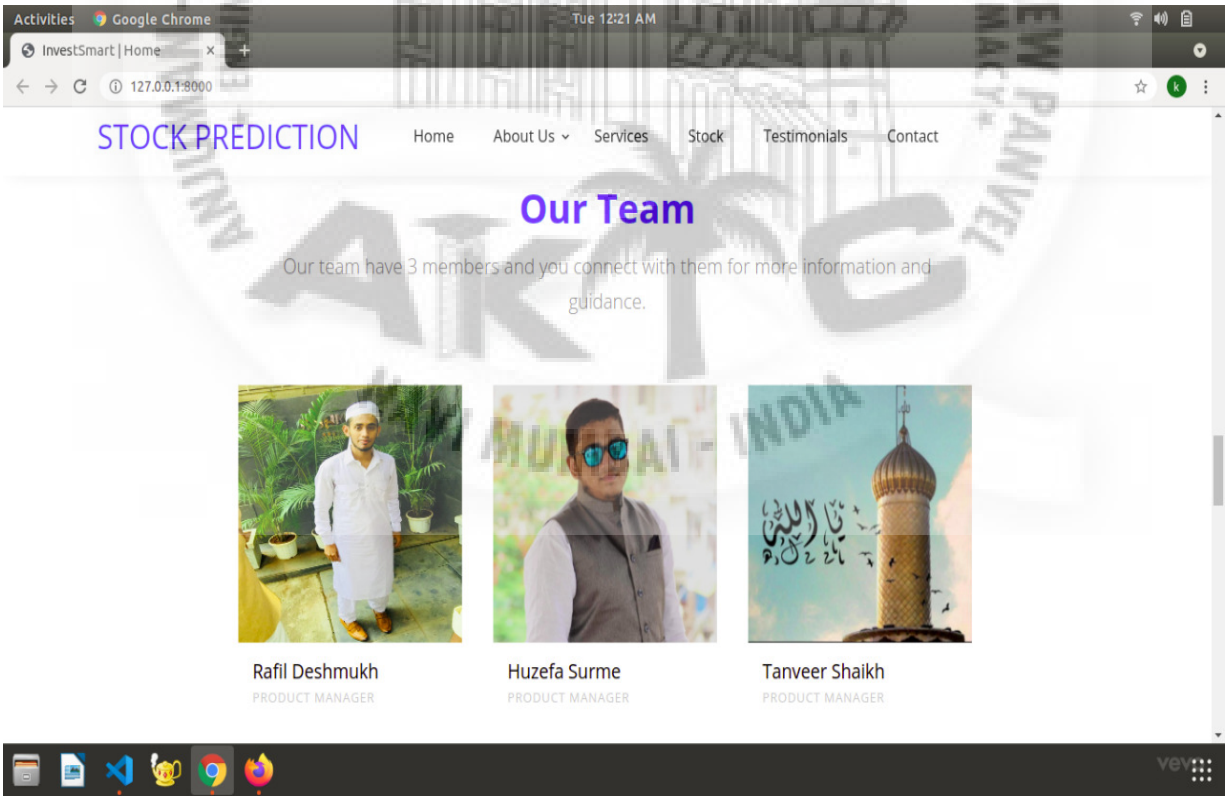

Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Google
127.0.0.1:8000/stock/Google/
STOCK PREDICTION
Prediction of Google Stock Price
Stock Price
840
820
800
780
760
0
5
10
15
Time(In days)
real
19
predicted: 810.588
For the next great business
Google LLC is an American multinational technology company that specializes in Internet-related services and products, which include online advertising technologies, a search engine, cloud computing, software, and hardware. It is considered one of the Big Four technology companies alongside Amazon, Apple, and Facebook.ogether they own about 14 percent of its shares and control 56 percent of the stockholder voting power through supervoting stock. They incorporated Google as a California privately held company on September 4, 1998, in California.
Day 0 is reference(i.e, Today)
Best Invest Time - Day 2

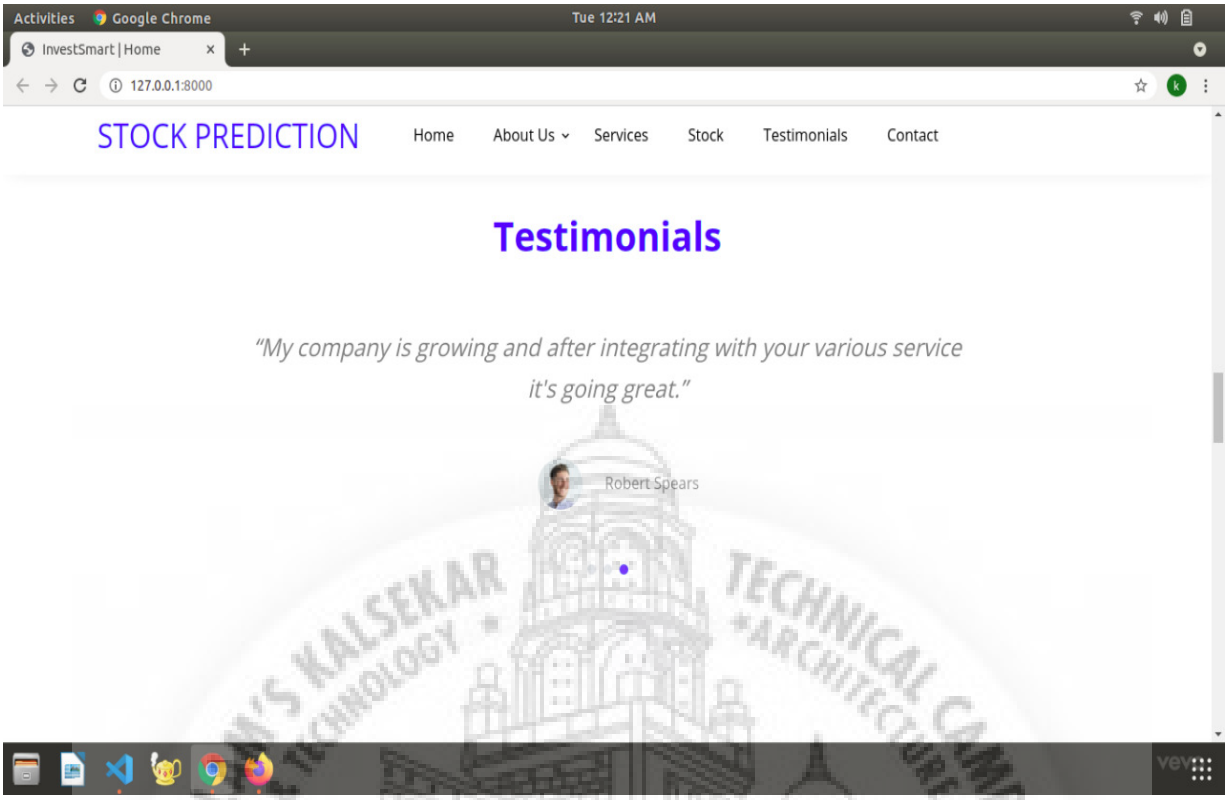

Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Stock
127.0.0.1:8000/stock/
STOCK PREDICTION
Stock Price Predictions
For the next great business
Try checking predictions of any of these copanies and Invest smartly with us:
Google
AMD
Tesla

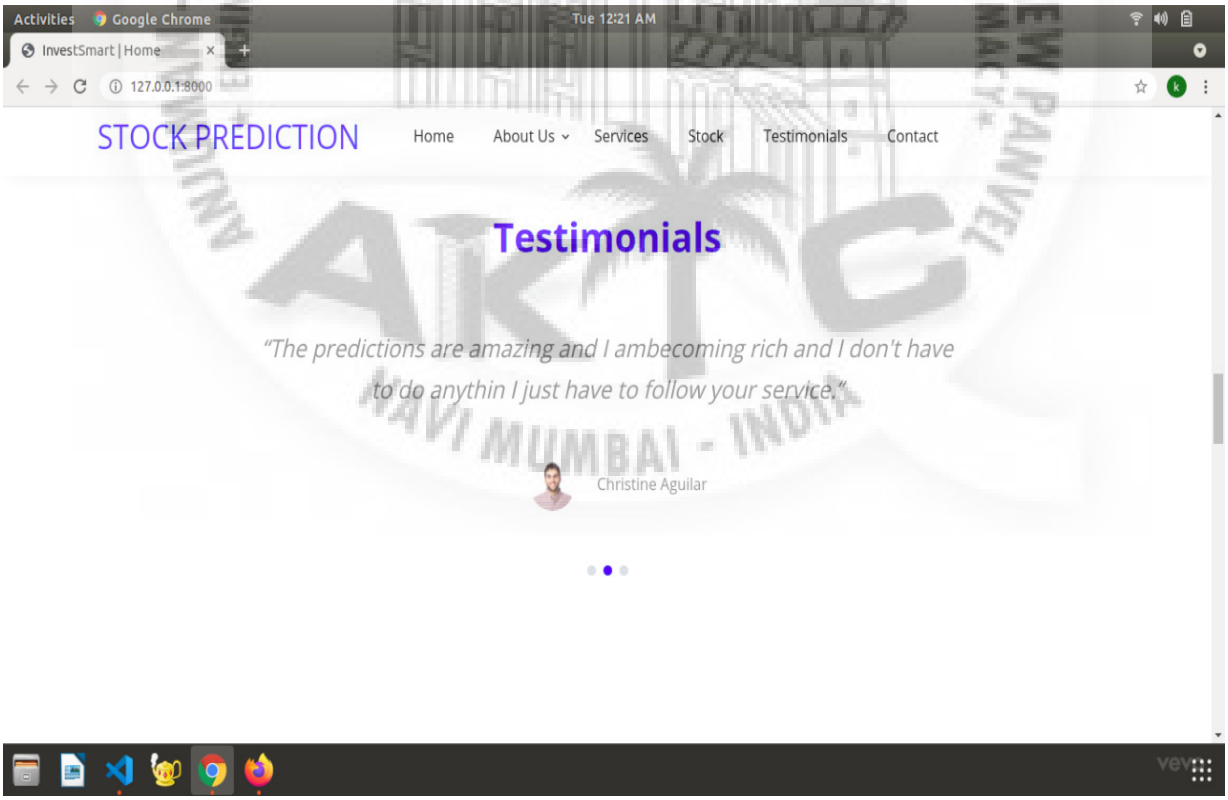

Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Home
127.0.0.1:8000/#contact-section
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
About Us
Stock Prediction is founded by students of ANJUMAN-I-ISLAM KALSEKAR TECHNICAL CAMPUS NEW PANVEL in 2021. Here one can use Artificial Intelligence to make predcitions and invest smartly
Quick Links
About Us
Services
Testimonials
Contact Us
Follow Us
Subscribe For Updates
Enter Email
Send
Copyright ©2021 All rights reserved | Stock Prediction
127.0.0.1:8000/#contact-section


Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Home
127.0.0.1:8000/#contact-section
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
First Name
Last Name
Email
Subject
Message
Write your notes or questions here...
127.0.0.1:8000/#contact-section

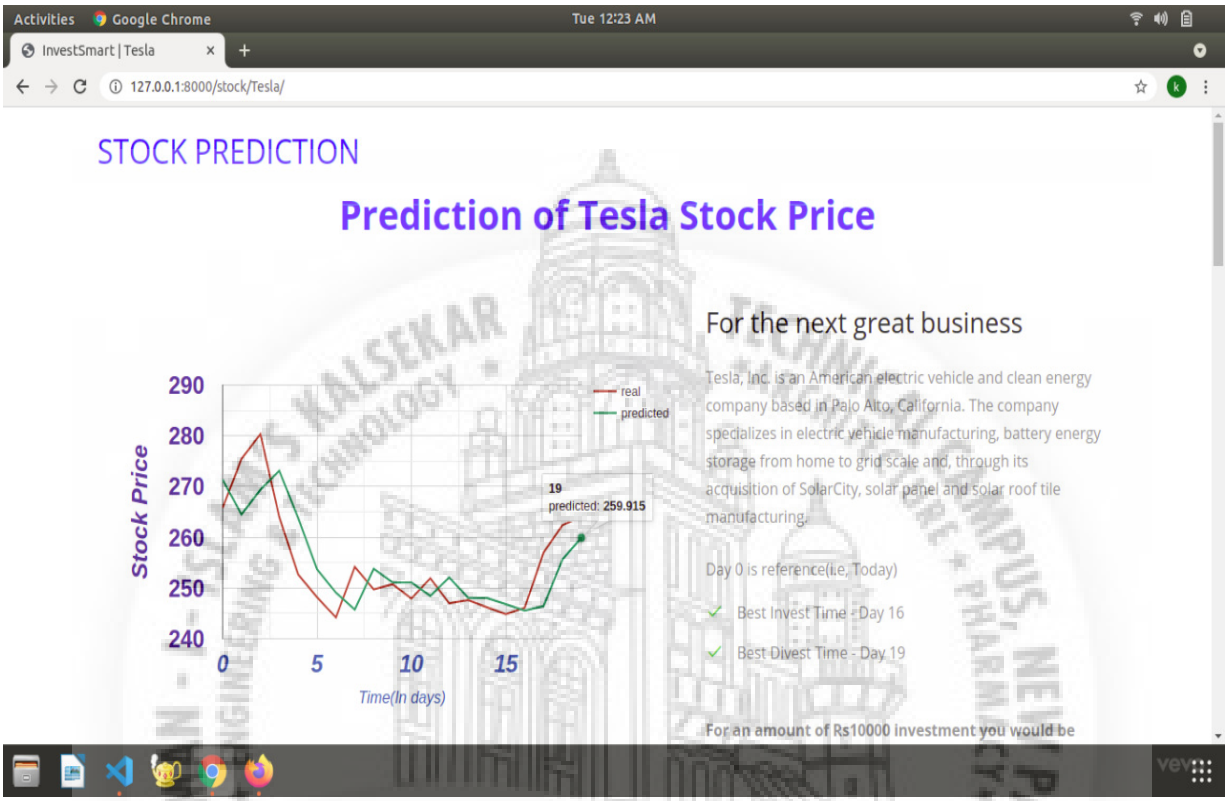

Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Home
127.0.0.1:8000/#contact-section
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
Contact Us
ANJUMAN-I-ISLAM KALSEKAR TECHNICAL CAMPUS NEW PANVEL
+91 8291744473
17co23@aiktc.ac.in
Contact Form
First Name
Last Name
Email
127.0.0.1:8000/#contact-section

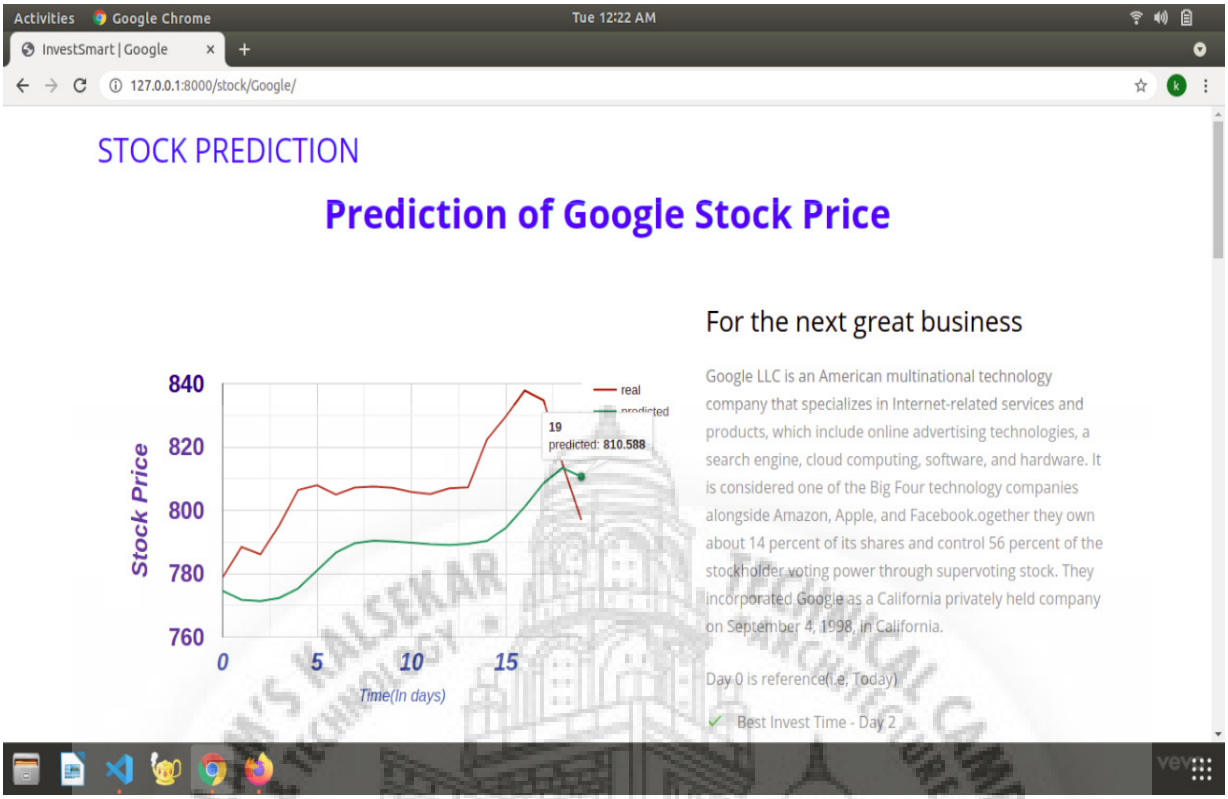

Activities
Google Chrome
Tue 12:21 AM
InvestSmart | Home
127.0.0.1:8000
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
Our Team
Our team have 3 members and you connect with them for more information and guidance.
Rafil Deshmukh
PRODUCT MANAGER
Huzefa Surme
PRODUCT MANAGER
Tanveer Shaikh
PRODUCT MANAGER


Activities
Google Chrome
Tue 12:21 AM
InvestSmart | Home
127.0.0.1:8000
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
Testimonials
"My company is growing and after integrating with your various service it's going great."
Robert Spears


Activities
Google Chrome
Tue 12:21 AM
InvestSmart | Home
127.0.0.1:8000
STOCK PREDICTION
Home
About Us
Services
Stock
Testimonials
Contact
Testimonials
"The predictions are amazing and I ambecoming rich and I don't have to do anythin I just have to follow your service."
Christine Aguilar

8.2 PREDICTION SNAPSHOT




Activities
Google Chrome
Tue 12:22 AM
InvestSmart | Google
127.0.0.1:8000/stock/Google/
STOCK PREDICTION
Prediction of Google Stock Price
Stock Price
840
820
800
780
760
0
5
10
15
Time(In days)
real
19
predicted: 810.588
For the next great business
Google LLC is an American multinational technology company that specializes in Internet-related services and products, which include online advertising technologies, a search engine, cloud computing, software, and hardware. It is considered one of the Big Four technology companies alongside Amazon, Apple, and Facebook.ogether they own about 14 percent of its shares and control 56 percent of the stockholder voting power through supervoting stock. They incorporated Google as a California privately held company on September 4, 1998, in California.
Day 0 is reference(i.e, Today)
Best Invest Time - Day 2

IR@AIKTC-KRRC

Chapter 9

Conclusion and Future Scope

9.1 Conclusion

By measuring the accuracy of the different algorithms, we found that the most suitable algorithm for predicting the market price of a stock based on various data points from the historical data is the LSTM .

The algorithm will be a great asset for brokers and investors for investing money in the stock market since it is trained on a huge collection of historical data and has been chosen after being tested on a sample data.The project demonstrates the machine learning model to predict the stock value with more accuracy as compared to previously implemented machine learning models.

9.2 Future Scope

Future scope of this project will involve adding more parameters and factors like the financial ratios, multiple instances, etc. The more the parameters are taken into account more will be the accuracy. The algorithms can also be applied for analyzing the contents of public comments and thus determine patterns/relationships between the customer and the corporate employee. The use of traditional algorithms and data mining techniques can also help predict the corporations performance structure as a whole.

ir.aiktclibrary.org

- Adding up whole company stocks.
- Designing a system to buy and sell the particular stocks.
- Providing agent services for new customers to help them in investing their stocks.

References

[1] *Stock Market Prediction Using Machine Learning Algorithms*; K. Hiba Sadia, Aditya Sharma, Adarrsh Paul, SarmisthaPadhi, Saurav Sanyal,International Journal of Engineering and Advanced Technology (IJEAT), April 2019.

[2] *Stock Market Prediction using Machine Learning*; Prof. S .P. Pimpalkar, Jenish Karia, Muskaan Khan, Satyam Anand, Tushar Mukherjee,International Journal of Advance Engineering and Research Development,Dec 2017.
bibitema3*Stock Market Analysis: A Review and Taxonomy of Prediction Techniques*,Dev Shah, Haruna Isah * and Farhana Zulkernine,International Journal Of Financial Studies,May 2019.

[3] Quantopian. *https://www.quantopian.com/.*.

[4] Investopedia.com. *http://www.investopedia.com/terms/s/slippage.asp.*

[5] Quandl *https://www.quandl.com/.*

[6] Online Stock Trading Guide. *Head and shoulders pattern*

[7] Stephen O'Grady. The redmonk programming language rankings *http://redmonk.com/sograd y/2015/01/14/language-rankings-1-15/*

[8] Stock market forecasting using machine learning algorithms *Shunrong Shen, Haomiao Jiang, and Tongda Zhang,2012*

[9] Security analysis *Benjamin Graham, David Le Fevre Dodd, and Sidney Cottle, McGraw-Hill New York, 1934.*

IR@AIKTC-KRRC

[10] Predicting direction of stock price index movement using artificial neural networks and support vector machines *Yakup Kara, Melek Acar Boyacioglu, and Ömer Kaan Baykan, 2011*

[11] Gain–loss asymmetry for emerging stock markets. Physica A: Statistical Mechanics and its Applications. *Krzysztof Karpio, Magdalena A Załuska-Kotur, and Arkadiusz Orłowski. 2007*

[12] A study of cross-validation and bootstrap for accuracy estimation and model selection. *Ron Kohavi, 1995.*

[13] A random walk down Wall Street: including a life-cycle guide to personal investing. *Burton Gordon Malkiel, 1999.*

[14] Introduction to information retrieval, volume 1. *Christopher D Manning, Prabhakar Raghavan, and Hinrich Schütze, 2008.*

[15] Naive trading rules in financial markets and wienerkolmogorov prediction theory: a study of" technical analysis". *Salih N Neftci, 1991.*

[16] The snowball: Warren Buffett and the business of life. Random House LLC. *Alice Schroeder, 2008*

[17] How rewarding is technical analysis? evidence from singapore stock market. *Wing-Keung Wong, Meher Manzur, and Boon-Kiat Chew, 2003.*

[18] EM-DAT the international disaster database. *http://www.emdat.be/database.*

ir.aiktclibrary.org