Software Requirements Specification

for

Analysis of Financial Data using Machine Learning algorithms

Version 1.0

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# Introduction

## Purpose

This software is intended to be used by investors with less time and less knowledge of stock market. Through our project we are aiming to predict the stock market trends for a particular number of days. This includes getting current stock values, logging details of the stock rates, assist in buying of stocks and suggestions about a particular stock by predicting the approximate trend of the stock market based on the background of the company.

Before going into the details, some technical details regarding the stock-market are listed below

## Some Background Information

### Stock Market

The Stock Market is either a private or public market where stock or shares of the companies are sold or traded by shareholders.

There are many stock markets in India some of the major stock markets are NSE (National Stock Exchange), BSE (Bombay Stock Exchange) and MCX (Multi Commodity Exchange of India) for commodity exchange. There are also 21 RSEs (Regional Stock Exchanges) like Cochin Stock Exchange, Allahabad Stock Exchange, and Madras Stock Exchange etc.

### Stock

A stock share, a legal document from the company or simply referred as ‘stock certificates’, will

entitle you to be a co-owner of that company. Stock are also called as equity, shares etc. A

company issues stocks in-order to raise a required amount of capital.

There are different types of shares as well, they are:

* Equity shares are standard shares with no special rights or restrictions. They have the potential to give the highest financial gains, but also have the highest risk. Ordinary shareholders are the last to be paid if the company is wound up.
* Preference shares typically carry a right that gives the holder preferential treatment when annual dividends are distributed to shareholders. Shares in this category have a fixed value, which means that a shareholder would not benefit from an increase in the business’ profits. However, usually they have rights to their dividend ahead of ordinary shareholders if the business is in trouble. Also, when a business is wound up, they get preference over equity shareholders in the process of repay of the par or nominal value of shares.
* Cumulative preference shares give holders the right that, if a dividend cannot be paid one year, it will be carried forward to successive years. Dividends on cumulative preference shares must be paid, despite the earning levels of the business.
* Redeemable preference shares come with an agreement that the company can buy them back at a future date - this can be at a fixed date or at the choice of the business. A company cannot issue only redeemable shares.

### Share Transactions

The General Public cannot buy or sell shares directly, but they have to do so through some share brokers or through some sub-brokers. The share-brokers are registered in the SEBI (Securities and Exchange Board of India). These sub-brokers carryout their client’s buying or selling stocks. For this they charge a brokerage of up to 5% of the transaction.

Share transaction can be done in 2 ways; through physical shares or share certificates or by using Demat (dematerialized) shares. In Demat shares; we use a soft copy of the share to trade. Here also some physical processing is required, but this provides many advantages in storing and allows the shareholder to sell any amount of stock at a time.

## Intended Audience and Reading Suggestions

This document is intended for developers, project managers, marketing staff, users, testers and documentation writers. This document consists of problem statement, project scope, project’s perspective, design and implementation constraints and other functional and non-functional requirements. The document is suggested to be read sequentially from the problem statement towards the end of the document with a minimal knowledge of how the stock market works.

## Project Scope

In this section the scope of the project we are designing is mentioned. Here we list the major

inclinations of our project and what area it gives importance and what area of stock market

dealing it is not associated with.

### Focuses on Equity Shares

There are a lot of methods of investing money in a stock market; through equity shares, preference shares, mutual funds etc. But our intended project is exclusively for equity shares, its processing and transaction. This is due to the fact that, most of the volume traded stock is of equity nature. Moreover, Equity share is the one focused by many Stock-brokers.

### Centered on BSE and NSE

We are planning to use the 2 biggest stock exchanges in India; they are NSE (National Stock

Exchange) and BSE (Bombay Stock Exchange). And the indices used here are the BSE sensitive

Index (Sensex) and National Stock Exchange Fifty (Nifty). The Regional Stock Exchanges are

out of the scope of our project. We decided this, as majority of equity share transactions occur in

NSE and BSE and also those two are mostly covered by all stock-brokers.

### Market indications cannot be perfect

The brokers working in firms are expected to give advice and suggestions to the client who uses their trading service. Our tool is providing more accurate prediction to the people with less time and less knowledge who want to invest in stock market.

## References

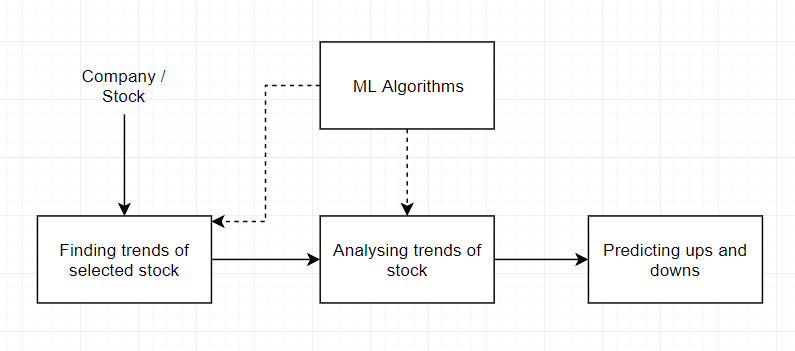
Sadhya khali thev - Dhore

# Overall Description

## Project Perspective

The project’s aim is to predict the inclines and declines in the stock market for upcoming days. So our model analyzes company’s stock data based on various relevant technical factors and then predicts the trend of the stock for the selected duration.

For example, a user having less knowledge for investing in stock market can make use of this project for investing in stocks which will help to gain benefits in the specified time interval.



## Project Features

This project has the following features:

* Client Registration
* Displaying the trend of the stock selected
* Showing the most profitable stock currently
* Showing the current stock rates
* Give the statistical data on a particular stock
* Predict the inclines and declines in the stock market

## User Classes and Characteristics

<Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the most important user classes for this product from those who are less important to satisfy.>

## Operating Environment

We are planning to use any python IDE (eg. PyCharm, Spider) and python language for implementing machine learning algorithms and the design of the project. For front-end and back-end we are planning to use bootstrap and php with MySQL respectively. Thus, any OS is suitable for the development of this kind of project (Here we are using Windows 10).

## Design and Implementation Constraints

In this project the user is required to login and select a company name, on the basis of which the respective comma separated value (csv) file will be feeded to the machine learning algorithms and the results are generated for the user selected duration.

## Assumptions and Dependencies

The stocks data we fetch is assumed to be from a reliable and true source which is correct and collected in the absence of economic crisis.

# External Interface Requirements

## User Interfaces

This project requires a monitor with large enough pixel size in order to display the graph. The input units are standard QWERTY keyboard and mouse. No additional input or output hardware

is mandatory.

## Software Interfaces

This project requires python IDE, any server supporting php, text-editor for web development, machine learning libraries, python mathematical libraries like pandas, numpy and graph plotting libraries like matplotlib, mysql database.

## Communications Interfaces

This project requires an internet connection with sufficient speed to get the current stock values.

The stock index values are obtained periodically and when transactions are made. Thus, in order

to complete the transactions quickly an internet connection with broadband or near broadband

speed is mandatory.

# System Features

<This template illustrates organizing the functional requirements for the product by system features, the major services provided by the product. You may prefer to organize this section by use case, mode of operation, user class, object class, functional hierarchy, or combinations of these, whatever makes the most logical sense for your product.>

## Collecting Information and displaying results

4.1.1 Description and Priority

This process is of highest priority. In this phase user can view the recent trends in the stock market like what is the rate of the stock, what is its highest value and movement of the stock. Also, user can give company name as input.

4.1.2 Stimulus/Response Sequences

After selecting the company name in the input box and clicking the submit button, the following information is displayed:

* Current stock information of the company
* Trend of the selected stock
* Statistical information of the company
* Predicted values for the company’s stock

4.1.3 Functional Requirements

The functional requirements of this phase includes the following:

REQ-1: A company name should be selected

REQ-2: A specific interval should be selected or else a default 10-day trend is shown

## Displaying best rising stock

4.1.1 Description and Priority

This is the process of medium priority. In this phase user will get to know which company is performing better at the moment and which is predicted to perform better. This prediction will help user to invest in stock market or buy stocks wisely in the specified time interval.

4.1.2 Stimulus/Response Sequences

This feature is invoked automatically.

4.1.3 Functional Requirements

The functional requirements of this phase includes the following:

REQ-1: The API should give the current stock prices of every company considered

REQ-2: The inclines and declines of every company’s stock rates should be already predicted

## Stock rate analysis

4.1.1 Description and Priority

This is the process of highest priority. In this phase the company name entered by the user is used as an input to fetch the respective company’s data which is then fed to the machine learning algorithms. The output generated by these algorithms is the prediction of the inclines and declines in the stock selected for a time interval specified by the user.

4.1.2 Stimulus/Response Sequences

This feature is invoked automatically when the user submits the query which has a company name which is used to fetch the csv file from the server. This csv file is fed to the ML algorithm which then outputs the result.

4.1.3 Functional Requirements

The functional requirements of this phase includes the following:

REQ-1: csv file must be present on the server

REQ-2: csv file must be fed to the machine learning algorithm

REQ-3: various technical parameters are calculated on the basis of the fetched dataset

# Other Nonfunctional Requirements

## Performance Requirements

For better performance of the project, faster predicting ML algorithm is required. Moreover, the trend analysis will start after the current stock values are fetched at real-time.

## Safety Requirements

All the information related to the companies is stored. So, for the prediction, each and every factor is important and there should be no data loss while modifications. Also, the database should be used in such a manner so as to maintaining the data integrity.

## Security Requirements

In the databases sensitive information related to stocks are stored which can only be edited by the database administrator. Thus, the information in the databases needs to be protected from unauthorized intrusions and modifications.

## Software Quality Attributes

This project is reusable and can be extended to other exchanges or to other kinds of stocks and softwares.

# Other Requirements

Appendix A: Glossary

ML: Machine Learning

Appendix B: Analysis Models

For feature extraction genetic algorithm is used.

Appendix C: To Be Determined List

Strongly correlated technical factors are yet to be determined so that the predictions can be more accurate.