
Software Requirements Specification

for

STOCK PRICE PREDICTOR

Version 1.0 approved

Prepared by Team Stonks

**MIHIR JAYAPRAKASH
MITUL JOBY
NAVYAE GOYAL
NOEL JACOB ABRAHAM**

**PES2UG20CS196
PES2UG20CS199
PES2UG20CS219
PES2UG20CS234**

PES University EC

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Revision History

Name	Date	Reason For Changes	Version

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Introduction

Product Name: Stock Price Predictor

Version: 1.0

This document goes through the specifications of both the front end and the back end of the product.

Purpose

The stock market is a collection of buyers and sellers of stocks/shares, which represent ownership claims on businesses. Investments are usually made with an investment strategy in mind.

The stock market is always fluctuating and is known for being volatile, dynamic, and nonlinear. Accurate stock price prediction is challenging because of multiple external factors such as socioeconomic conditions, inflation, exchange rates, politics unexpected events, a company's financial performance, and so on.

However, this also means that there's a lot of data to find patterns and make models and predictions. These models don't even need to reach high levels of accuracy because even 60% accuracy can deliver solid returns. Thus, with the help of ML techniques, one can detect stock market trends.

Intended Audience and Reading Suggestions

This product is aimed to predict trends in the stock market and make predictions. The entire idea of predicting stock prices is to gain significant profits for the users.

It is intended that the document may be read by developers, project managers, marketing staff, users, testers, and documentation writers.

The remainder of the document contains all descriptions of product functions with functionality and basic Interface requirements. Readers are expected to read the stated references for a greater technical understanding.

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Product Scope

This product aims to predict trends in the stock market and allow users to gain significant profits for such as predictions. The product hopes to support cross-platform as web-based clients and terminal clients.

The product shall analyze quantitative information that could identify trading signals and capture the movement patterns of the stock market.

The product hopes to be a relevant indicator for long-term investment. The fundamental analysis relies on both historical and present data to measure profits/losses.

References

Schwert, G.W., 1989. Why does stock market volatility change over time?. The journal of finance, 44(5), pp.1115-1153.

Yadav, A., Jha, C.K. and Sharan, A., 2020. Optimizing LSTM for time series prediction in Indian stock market. Procedia Computer Science, 167, pp.2091-2100.

Vanukuru, Kranthi. (2018). Stock Market Prediction Using Machine Learning. 10.13140/RG.2.2.12300.77448.

Overall Description

Product Perspective

Stock price analysis has been a critical area of research and is one of the top applications of machine learning. A stock market is a public market where you can buy and sell shares for publicly listed companies. The stocks, also known as equities, represent ownership in the company. The stock exchange is the mediator that allows the buying and selling of shares.

Stock market prediction using machine learning means the ability of the software to predict the future stock prices based on past events. It takes time series and based on patterns and trends; it predicts the future price of a particular stock of a particular company. This not only helps companies to raise capital but also helps in raising personal wealth.

Product Functions

Stock market prediction and analysis are some of the most difficult jobs to complete. There are numerous causes for this, including market volatility and a variety of other dependent and independent variables that influence the value of a certain stock in the market. These variables make it extremely difficult for any stock market expert to anticipate the rise and fall of the market with great precision.

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However, with the introduction of Machine Learning and its strong algorithms, the most recent market research and Stock Market Prediction advancements have begun to include such approaches in analyzing stock market data.

The main objective of this project is to do the following:

- Although predicting the stock market is difficult since it is volatile, however with the help of machine learning, it is possible to help investors to make better decisions
- It gives investors a new perspective into the current trends in the stock market
- It also gives investors a new perspective into patterns of the stock market based on historical data (long term data)
- It helps in correct prediction of a stock; a correct prediction of stocks can lead to huge profits for the seller and the broker. Frequently, it is brought out that prediction is chaotic rather than random, which means it can be predicted by carefully analyzing the history of respective stock market.

User Classes and Characteristics

Our target audience as mentioned above is for anyone and everyone that surfs through the internet, who are looking to gain profits from the predictions. There will also be an Admin class to manage the product who will have majority permissions.

Operating Environment

The product can operate in:

- Web Browser
- Command Line

The product is designed this way to make it accessible to almost anyone with the knowledge of surfing the internet.

Design and Implementation Constraints

- The limitation of this project is that it only considers the closing price of the stock and no other attributes such as opening price, high and low price and volume.
- The stock market is very volatile and it is hard to predict even with a very good machine learning algorithm.
- The stock market is very noisy and it might throw some unexpected results.

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2.6 Assumptions and Dependencies

- Training data is either collected from past stock values.
- All users have the basic knowledge of the stock market.
- It is assumed the system is equipped with a GNU.
- It is assumed that there won't be any major noises or anything extremely unpredictable.

External Interface Requirements

User Interfaces

The user will be able to select the stock on the home screen that they want to predict using our product, upon the selection another page opens showing the projected graph inferred using the stock's past trends. Simple buttons like selection and enter are going to be used. Error messages show if not enough data is available on the stock or the wrong stock name is entered.

Software Interfaces

We use python to code the network model, which will be running on a server. We will be using various libraries such as:

- Math
- Pandas_datareader
- NumPy
- Pandas
- Sklearn.preprocessing
- Keras.models
- Keras.layers
- Matplotlib.pyplot

We plan on using JavaScript for the web browser clients.

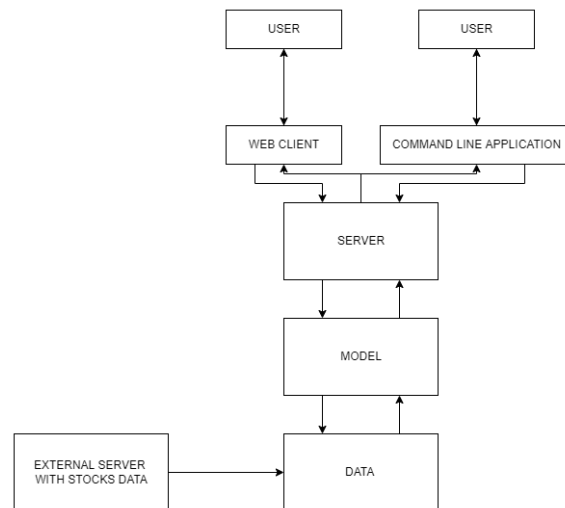
Communications Interfaces

Consists of a webpage which allows the user to access the predictions and will be using HTTP. The product will require an FTP connection as all computations will happen on a server. A command prompt, and a Python IDE downloaded version 3.8 above for development. set up of a working monitor for display and keyboard for user input. No cross-platform implementation.

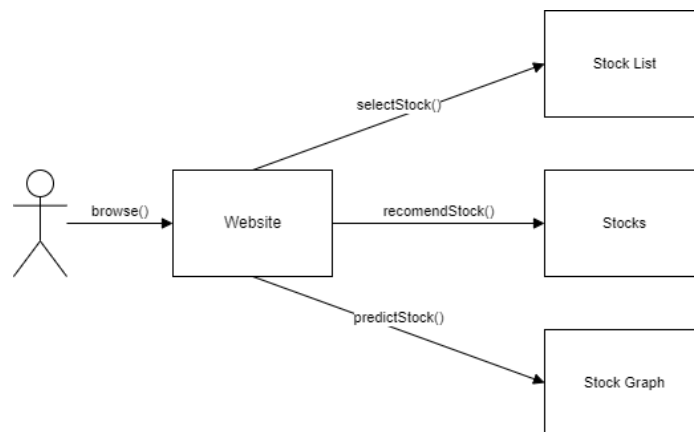
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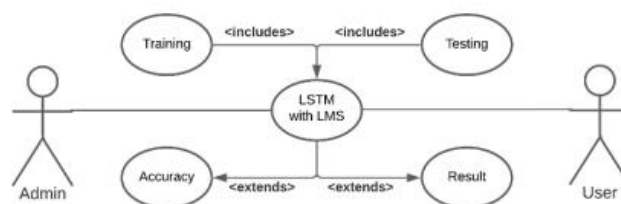
Analysis Model



UML Diagrams



Website



LSTM Model Predictor

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System Features

5.1.1 Description and Priority

System is implemented using python language

- Data is first scraped and then put into a data frame
- The data is then scaled to normalize it using MinMaxScaler()
- Create the training dataset
- Train the dataset
- Get the models predicted value
- The data is then plotted

5.1.2 Stimulus/Response Sequences

- User enters the stock to be predicted
- The algorithm looks for past trends
- Our product displays the projected graph

5.1.3 Functional Requirements

FR1: Landing page- The user should be on a responsive and professional looking landing page. The website should be responsive and mobile compatible.

FR2: Login Page- The user should be able to login and only authorized users should be able to predict the price

FR3: Choosing stock- The user should be able to choose the stock they want to predict from the list given

FR4: Prediction page- The software must perform pre-processing on input for model training, such as checking for missing data values. It uses LSTM. It analyses the input data by generating the closing stock price that is most likely to occur.

FR5: Past Prediction page- The software stores user's predictions with stock along with the date it was predicted along with the 5 days predicted value and the then module's RMSE or accuracy value.

Other Non-functional Requirements

Performance Requirements

NFR1: It is expected that the time taken to analyze the stock market does not exceed an appropriate time limit.

NFR2: The system is expected to give results within an acceptable error margin so it does not affect the investors and lead them to take a wrong decision.

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Safety Requirements

NFR3: It is expected that in order to make the system safe and reliable, the data chosen and the preprocessing that takes place, happens correctly.

NFR4: It is expected that the machine learning algorithm that is implemented is error free and handle cases within a certain tolerance.

NFR5: Users should use the product with caution because of the volatile nature of the stock market.

Security Requirements

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Software Quality Attributes

- It is expected that time taken to make the predictions does not take too long.
- The system should be adaptable and must be able to react to new trends and patterns in the stock market.
- The model should work for various stocks.
- The prediction made by the machine learning algorithm should be reliable.

Business Rules

Taxes will be applicable on the transaction of selling a share. Hopes to be profitable, successful, high-yielding, gainful, remunerative for the user.

Other Requirements

- An in-depth knowledge of the stock market
- Risk Assessment
- Natural ability to make good judgements
- Decide a time horizon before buying a stock
- Be responsible and spend money wisely

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Appendix A: Glossary

ML	- Machine Learning
LSTM	- Long short-term memory
UML	- Unified Modelling Language
FTP	- File Transfer Protocol
HTTP	- Hypertext Transfer Protocol
IDE	- Integrated Development Environment

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Appendix B: Requirement Traceability Matrix

SL NO	REQUIREMENT ID	BRIEF DESCRIPTION OF REQUIREMENT	ARCHITECTURE REFERENCE	DESIGN REFERENCE	CODE FILE REFERENCE	TEST CASE ID	SYSTEM TEST CASE ID
1	FR01	Landing Page	Static Site Generation (SSG)	Self	-	UT01	UT01
2	FR02	Login Page	Static Site Generation (SSG)	Self	-	UT02	UT02
3	FR03	Search for Stock Page	Static Site Generation (SSG)	Self	-	UT03	UT03
4	FR04	Prediction Page	LSTM	Self	-	UT04	UT04
5	FR05	Past predictions page	Static Site Generation (SSG)	Self	-	UT05	UT05