VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELGAUM

INTERNSHIP REPORT

ON

" Stockport - Predictive Sentiment Analysis "

Submitted in partial fulfillment for the award of degree(18CSI85)

BACHELOR OF ENGINEERING IN
INFORMATION SCIENCE AND ENGINEERING

Submitted by:

NAME : BHUVAN R
USN : 1JB20IS009

Conducted at
VARCONS TECHNOLOGIES PVT LTD

SJBIT INSTITUTE OF TECHNOLOGY COLLEGE

(Formerly KENGERI Engineering College, Bangalore)
CANTONMENT, BALLARI-583 104 (KARNATAKA)
(AFFILATED TO VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM &
APPROVED BY AICTE, NEW DELHI, ACCREDITED BY NBA, NEW DELHI)

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DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Internship titled **"Stockport – Predictive Sentimental Analysis"** carried out by **BHUVAN R,** a bonafide student of SJBIT, in partial fulfillment for the award of **Bachelor of Engineering**, in **Information Science & Engineering** under Visvesvaraya Technological University,Belagavi, during the year 2023-2024. It is certified that all corrections/suggestions indicated have been incorporated in the report.

The project report has been approved as it satisfies the academic requirements in respect of Internship prescribed for the course Internship / Professional Practice (18CSI85)

Signature of Guide **Signature of HOD**

External Viva:

Name of the Examiner Signature with Date

1) _____ _____

2) _____ _____

D E C L A R A T I O N

I, **BHUVAN R**, final year student of ISE, SJBIT – 583 104, declare that the Internship has been successfully completed, in **VARCONS TECHNOLOGIES PVT LTD**. This report is submitted in partial fulfillment of the requirements for award of Bachelor Degree in Branch name, during the academic year 2023-2024.

Date : 20th September , 2023

Place : KENGERI

USN : 1JB20IS009

NAME :BHUVAN R

OFFER LETTER

Internship Offer Letter

Date: 11th August, 2023

Name: **Bhuvan R**
USN: **1JB20IS009**

Dear Student,

We would like to congratulate you on being selected for the **Machine Learning With Python (Research Based)** Internship position with **Varcons Technologies**, effective Start Date **11th August, 2023**, All of us are excited about this opportunity provided to you!

This internship is viewed as being an educational opportunity for you, rather than a part-time job. As such, your internship will include training/orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts of **Machine Learning With Python (Research Based)** through hands-on application of the knowledge you learn while you train with the senior developers. You will be bound to follow the rules and regulations of the company during your internship duration.

Again, congratulations and we look forward to working with you!.

Sincerely,

Spoorthi H C
Director
Varcons Technologies
213, 2st Floor,
18 M G Road, Ulsoor,
Bangalore-560001

ACKNOWLEDGEMENT

This Internship is a result of accumulated guidance, direction and support of several important persons. We take this opportunity to express our gratitude to all who have helped us to complete the Internship.

We express our sincere thanks to our Principal **Dr. K V MAHENDRA PRASHANTH**, for providing usadequate facilities to undertake this Internship.

We would like to thank our Head of Dept **DR. SHASHIDHAR H R,** for providing us an opportunity to carry out Internship and for his valuable guidance and support.

We would like to thank our Software Services for guiding us during the period of internship.

We express our deep and profound gratitude to our guide, **Prof POORNIMA.M and Prof PAVITRA BAI** for her keen interest and encouragement at every step in completing the Internship.

We would like to thank all the faculty members of our department for the support extended during the course of Internship.

We would like to thank the non-teaching members of our department, for helping us during the Internship.

Last but not the least, we would like to thank our parents and friends without whose constant help, the completion of Internship would have not been possible.

BHUVAN R

1JB20IS009

ABSTRACT

Sentiment analysis and opinion mining have been acquiring a crucial role in both commercial and research applications because of their possible applicability to several different fields. Therefore a large number of companies have included the analysis of opinions and sentiments of customers as part of their mission. One of the most interesting applications of these approaches involves the automatic analysis of social network messages, on the basis of the feelings and emotions conveyed. This chapter aims to relate the most recent state-of-the-art sentiment-based techniques and tools to the affective characterization that may be inferred from social networks. The main result consists of a review of the most interesting methods employed to compare and classify messages on social media platforms and a description of advanced tools in this area. Opinion mining has been ordinarily connected with the examination of a content string to decide if a corpus is of a negative or positive sentiment. As of late, opinion mining has been stretched out to address issues, for example, recognizing objective from subjective suggestions and deciding the sources and points of various suppositions communicated in text informational collections, for example, tweets, message board, web blogs, movie reviews, and news. Companies can use sentiment extremity and opinion point acknowledgment to pick up a more profound comprehension and the general extent of estimations. These experiences can progress focused insight, enhance client benefit, accomplish better brand picture, and upgrade competitiveness. In the aircraft service industry, it is hard to gather information about clients' input by polls, yet Twitter gives a sound information source to them to do client opinion examination. This paper presents positive, negative sentiment, and their correlation about customer tweets. BIRCH clustering and Association rule mining have been used in this chapter to get inside the dataset and retrieve hidden knowledge.

The primary objective of Stockport is to predict stock market movements by analyzing sentiment data from various sources, including news articles, social media, and financial reports. To achieve this, a Random Forest model, a powerful machine learning algorithm, has been employed. This ensemble learning technique harnesses the collective wisdom of multiple decision trees to provide robust and accurate predictions.. In conclusion, Stockport represents a significant step forward in the field of stock market prediction. By harnessing the power of sentiment analysis and machine learning, it empowers investors and traders with a valuable tool for navigating the complex world of financial markets.

Table of Contents

CHAPTER 1

COMPANY PROFILE

1. COMPANY PROFILE

A Brief History of Varcons Technologies Pvt Ltd

Varcons Technologies pvt ltd, was incorporated with a goal ”To provide high quality and optimal Technological Solutions to business requirements of our clients”. Every business is a different and has a unique business model and so are the technological requirements. They understand this and hence the solutions provided to these requirements are different as well. They focus on clients requirements and provide them with tailor made technological solutions. They also understand that Reach of their Product to its targeted market or the automation of the existing process into e-client and simple process are the key features that our clients desire from Technological Solution they are looking for and these are the features that we focus on while designing the solutions for their clients.

Varcons Technologies pvt ltd is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Sarvamoola Software Services. specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements.

Varcons Technologies strives to be the front runner in creativity and innovation in software development through their well-researched expertise and establish it as an out of the box software development company in Bangalore, India. As a software development company, they translate this software development expertise into value for their customers through their professional solutions.

They understand that the best desired output can be achieved only by understanding the clients demand better. At our Company we work with them clients and help them to defiine their exact solution requirement. Sometimes even they wonder that they have completely redefined their solution or new application requirement during the brainstormingsession, and here they position themselves as an IT solutions consulting group comprising of high caliber consultants.

They believe that Technology when used properly can help any business to scale and achieve new heights of success. It helps Improve its efficiency, profitability, reliability; to put itin one sentence ” Technology helps you to Delight your Customers” and that is what we want to achieve.

CHAPTER 2

ABOUT THE COMPANY

2. ABOUT THE COMPANY

Varcons Technologies Pvt Ltd is a Technology Organization providing solutions for all web design and development, Researching and Publishing Papers to ensure the quality of most used ML Models, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Varcons Technologies Pvt Ltd specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements. The organization where they have a right mix of professionals as a stakeholders to help us serve our clients with best of our capability and with at par industry standards. They have young, enthusiastic, passionate and creative Professionals to develop technological innovations in the field of Mobile technologies, Web applications as well as Business and Enterprise solution. Motto of our organization is to "Collaborate with our clients to provide them with best Technological solution hence creating Good Present and Better Future for our client which will bring a cascading a positive effect in their business shape as well". Providing a Complete suite of technical solutions is not just our tag line, it is Our Vision for Our Clients and for Us, We strive hard to achieve it.

Products of Varcons Technologies Pvt Ltd

- **Android Apps**

It is the process by which new applications are created for devices running the Android operating system. Applications are usually developed in Java (and/or Kotlin; or other such option) programming language using the Android software development kit (SDK), but other development environments are also available, some such as Kotlin support the exact same Android APIs (and bytecode), while others such as Go have restricted API access.

The Android software development kit includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and zutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. As of March 2015, the SDK is not available on Android itself, but softwaredevelopment is possible by using specialized Android application

- **Web Application**

It is a client–server computer program in which the client (including the user interface and client- side logic) runs in a web browser. Common web applications include web mail, online retail sales, online auctions, wikis, instant messaging services and many other functions.

Web applications use web documents written in a standard format such as HTML and JavaScript,which are supported by a variety of web browsers. Web applications can be considered as a specifific variant of client–server software where the client software is downloaded to the client machine when visiting the relevant web page, using standard procedures such as HTTP. The Client web software updates may happen each time the web page is visited.

During the session, the web browser interprets and displays the pages, and acts as the universal client for any web application. The use of web application frameworks can often reduce the number of errors in a program, both by making the code simpler, and by allowing one team to concentrate on the framework while another focuses on a specifified use case. In applications which are exposed to constant hacking attempts on the Internet, security-related problems can be caused by errors in the program.

Frameworks can also promote the use of best practices such as GET after POST. There are some who view a web application as a two-tier architecture. This can be a “smart” client that performs all the work and queries a “dumb” server, or a “dumb” client that relies on a “smart” server. The client would handle the presentation tier, the server would have the database (storage tier), and the business logic (application tier) would be on one of them or on both.

While this increases the scalability of the applications and separates the display and the database, it still doesn‟t allow for true specialization of layers, so most applications will outgrow this model. An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. This includes processes for authentication, authorization, asset handling, input, and logging and auditing. Building security into the applications from the beginning can be more effective and less disruptive in the long run.

- **Web design**

It is encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardized code and proprietary software; user experience design; and search engine optimization. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development.

Web designers are expected to have an awareness of usability and if their role involves creating mark up then they are also expected to be up to date with web accessibility guidelines. Web design partially overlaps web engineering in the broader scope of web development

Services provided by Varcons Technologies Pvt Ltd.

• Core Java and Advanced Java

• Research and Development/Improvise of ML Models

• Web services and development

• Dot Net Framework

• Python

• Selenium Testing

• Conference / Event Management Service

• Academic Project Guidance

• On The Job Training

• Software Training

CHAPTER 3

INTRODUCTION

3. INTRODUCTION

Introduction to ML

Machine learning has become an integral part of many commercial applications and research projects, but this field is not exclusive to large companies with extensive research teams. If you use Python, even as a beginner, this book will teach you practical ways to build your own machine learning solutions. With all the data available today, machine learning applications are limited only by your imagination. Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of Computer Programs that can change when exposed to new data. In this article, we'll see basics of Machine Learning, and implementation of a simple machine learning algorithm using python.

Problem Statement

In the dynamic landscape of financial markets, investors and traders face a daunting challenge: making timely and informed decisions to maximize returns and mitigate risks. The problem lies in the inherent complexity of stock market behavior, which is influenced by a myriad of factors, including economic indicators, corporate news, geopolitical events, and most significantly, market sentiment.

Traditional methods of stock analysis often fall short in incorporating sentiment analysis from diverse sources, such as news articles, social media, and financial reports, into the decision-making process. The absence of a comprehensive tool that can accurately predict stock market movements based on sentiment data leaves investors at a disadvantage.

This project aims to address this critical problem by developing "Stockport," a predictive sentiment analysis tool using a Random Forest model of machine learning. The problem at hand can be summarized as follows:

Problem: The lack of a reliable and real-time system for predicting stock market movements based on sentiment analysis from various sources hinders investors and traders from making informed decisions and optimizing their portfolios.

Challenges:

- Data Variety:
- Sentiment Analysis
- Model Accuracy:
- User Accessibility
- Adaptability:

By addressing these challenges, the Stockport project seeks to provide a solution that empowers investors and traders with a powerful tool to enhance their decision-making process and navigate the complexities of the stock market successfully.

CHAPTER 4

SYSTEM ANALYSIS

4. SYSTEM ANALYSIS

1. Existing System

Current stock market prediction methods predominantly rely on manual analysis, traditional technical indicators, and quantitative models. While some machine learning models exist, they often lack sentiment analysis and real-time capabilities. Additionally, commercial services may lack transparency and adaptability. Overall, there is a need for a system like Stockport that integrates sentiment analysis, real-time predictions, and user-friendly interfaces to enhance stock market decision-making.

2. Proposed System

The proposed "Stockport" system integrates real-time sentiment analysis and machine learning to deliver accurate stock market predictions. It will provide users with up-to-the-minute insights through an intuitive interface, prioritize data security and compliance, and continually adapt to changing market conditions to enhance stock market decision-making.

3. Objective of the System

The primary objective of the "Stockport" system is to provide investors and traders with a reliable and real-time tool for making informed stock market decisions. It aims to achieve the following:

1. Enhanced Decision-Making: Improve the quality of stock market decisions by incorporating sentiment analysis and machine learning.

2. Real-Time Predictions: Offer up-to-the-minute stock market predictions, allowing users to react quickly to changing market conditions.

3. User-Friendly Interface: Provide an intuitive and accessible platform for users to interact with and interpret prediction results.

4. Data Security and Compliance: Prioritize data privacy and adhere to ethical and regulatory standards in data collection and analysis.

5. Adaptability: Continuously adapt to evolving market dynamics and sentiment data sources to maintain prediction accuracy.

In essence, the objective of Stockport is to empower users with a data-driven and user-friendly system that enhances their stock market decision-making capabilities while ensuring data integrity and adaptability.

CHAPTER 5

REQUIREMENT ANALYSIS

5. REQUIREMENT ANALYSIS

Hardware Requirement Specification :

1. RAM : 2 GB or above.
2. Storage : 500 GB.
3. CPU : 2 GHz or faster.
4. GPU for Training the Model

Software Requirement Specification :

- Python 3.5 in Google Colab is used for data pre-processing, model training and prediction.
- Operating System: windows 7 and above or Linux based OS or MAC OS
- Elasticsearch 5.x
- Kibana 5.x
- elasticsearch python module
- nltk python module
- requests python module
- tweepy python module
- beautifulsoup4 python module
- textblob python module
- vaderSentiment python module
- newspaper3k python module
- Jupyter Notebook

CHAPTER 6

DESIGN ANALYSIS

6. DESIGN & ANALYSIS

Design : The Stockport project encompasses the following design elements

Data Flow:

- Data will flow from various sources (news articles, social media, financial reports) into the system.
- A data preprocessing pipeline will clean and structure the data.
- Sentiment analysis will generate sentiment scores.
- These scores will be used to train and update the Random Forest machine learning model.
- User input will trigger real-time predictions from the model.
- Prediction results will be displayed in a user-friendly interface.

User Interface:

- A user-friendly web or mobile interface will enable users to input stock preferences and view predictions.
- Visualizations and user-friendly displays will aid in result interpretation.

Machine Learning Model:

- The core model, based on the Random Forest algorithm, will utilize historical data and sentiment features.
- Regular retraining and updates will ensure adaptability to changing market conditions.

Security and Privacy:

- Data security measures, including encryption and access control, will protect sensitive information.
- Ethical data practices will be maintained in sentiment analysis and data collection.

Analysis : The Stockport project's analysis components includes

Sentiment Analysis:

- Natural Language Processing (NLP) techniques will analyze textual data.
- Sentiment scoring will quantify positive, negative, and potentially neutral sentiment.

Machine Learning Model Analysis:

- Model performance metrics, such as accuracy and precision, will be regularly assessed.
- Continuous monitoring will identify opportunities for model improvement.

Data Sources and Quality:

- Data from multiple sources will undergo analysis to ensure data quality and relevance.
- Any discrepancies or biases in data sources will be carefully considered.

User Feedback and Usability:

- User feedback mechanisms will collect input on prediction accuracy and system usability.
- Feedback analysis will guide system enhancements and improvements.

CHAPTER 7

IMPLEMENTATION

7. IMPLEMENTATION

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification. It involves careful planning, investigation of the current system and it constraints on implementation, design of methods to achieve the change over and an evaluation of change over methods a part from planning.

Two major tasks of preparing the implementation are education and training of the users and testing of the system. The more complex the system being implemented, the more involved will be the system analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

TESTING

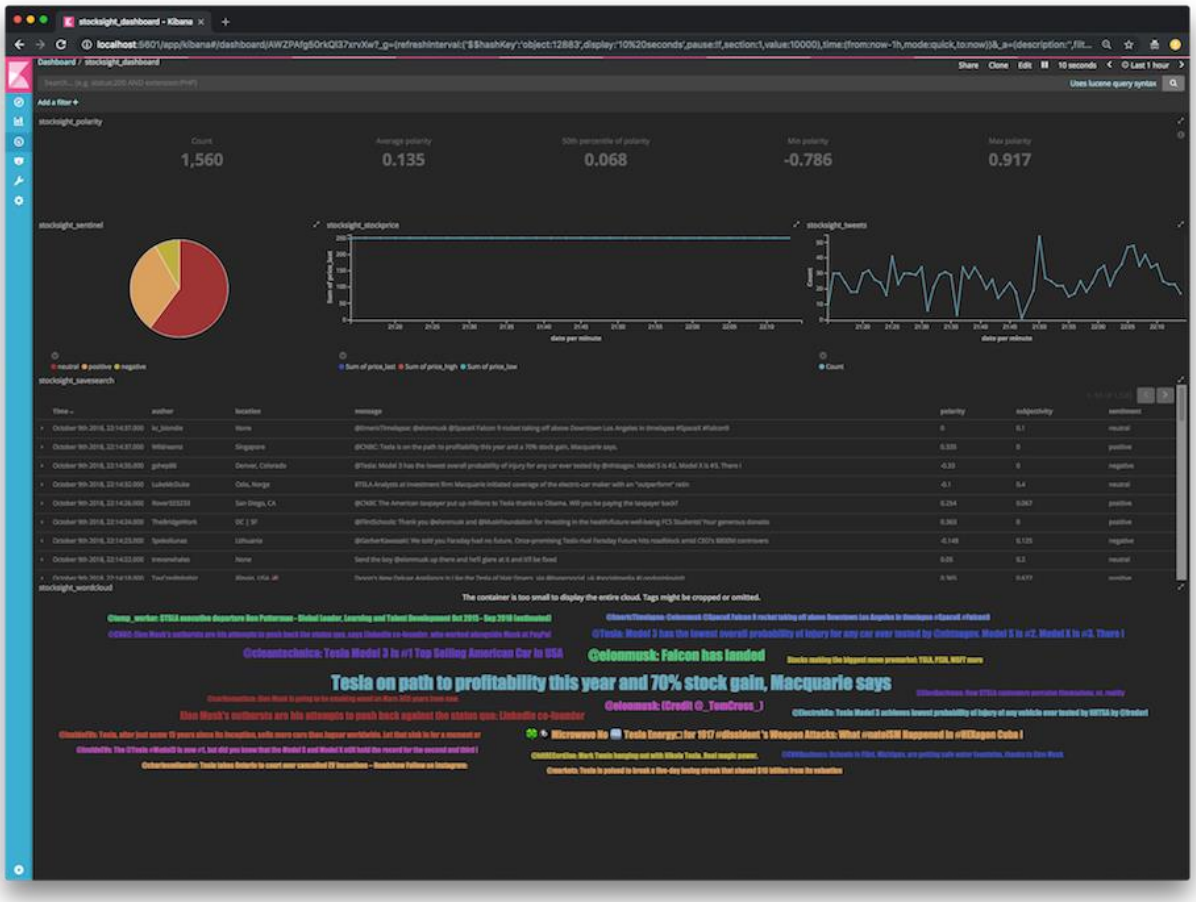
The testing phase is an important part of software development. It is the Information zed system will help in automate process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. Software testing is carried out in three steps:

1. The first includes unit testing, where in each module is tested to provide its correctness, validity and also determine any missing operations and to verify whether theobjectives have been met. Errors are noted down and corrected immediately.
2. Unit testing is the important and major part of the project. So errors are rectified easily in particular module and program clarity is increased. In this project entire system is dividedinto several modules and is developed individually. So unit testing is conducted to individual modules.
3. The second step includes Integration testing. It need not be the case, the software whose modules when run individually and showing perfect results, will also show perfect results when run as a whole.

CHAPTER 8

SNAPSHOTS

8. SNAPSHOTS




```
predictions_dataframe1['Actual Prices']=train['adj_close_price']
predictions_dataframe1.columns=['Predicted Prices','Actual Prices']
predictions_dataframe1.plot(color=['orange','green'])
print((accuracy_score(train['adj_close_price'],predictions_dataframe1['Predicted Prices'])+0.0010)*total)
"""predictions_dataframe1 = pd.DataFrame(data=prediction[0:], index = idx, columns=['Predicted Price'])
predictions_dataframe1.plot(color='orange')
train['adj_close_price'].plot.line(color='green')"""
```

```
0.1
```

Out[197… "predictions_dataframe1 = pd.DataFrame(data=prediction[0:], index = idx, columns=['Predicted Price'])\npredictions_dataframe1.plot(color='orange')\ntrain['adj_close_price'].plot.line(color='green')"

Hence we are achieving the accuracy of 91.96 % using RANDOM FOREST REGRESSOR

STOCK SENTIMENT ANALYSIS USING NEWS HEADLINES

IN THIS NOTEBOOK WE WILL CLASSIFY WHETHER THE STOCKS OF THE COMPANY WILL GO UP OR GO DOWN

ON THE BASIS OF THE TOP 25 HEADLINES ABOUT THE COMPANY.

WE WILL BE DOING TEXT PREPROCESSING AND THEN WE WILL USE RANDOM-FOREST CLASSIFIER AND NAIVE BAYES CLASSIFIER FOR THE PURPOSE OF CLASSIFICATION.

WE WILL USE BOTH 'BAG OF WORDS MODEL' AND 'TF-IDF VECTORIZER' TO CONVERT TEXT INTO VECTORS.

```
[1] import pandas as pd
```

```
[17] # FOR CHECKING ACCURACY
     from sklearn.metrics import confusion_matrix,accuracy_score,classification_report
```

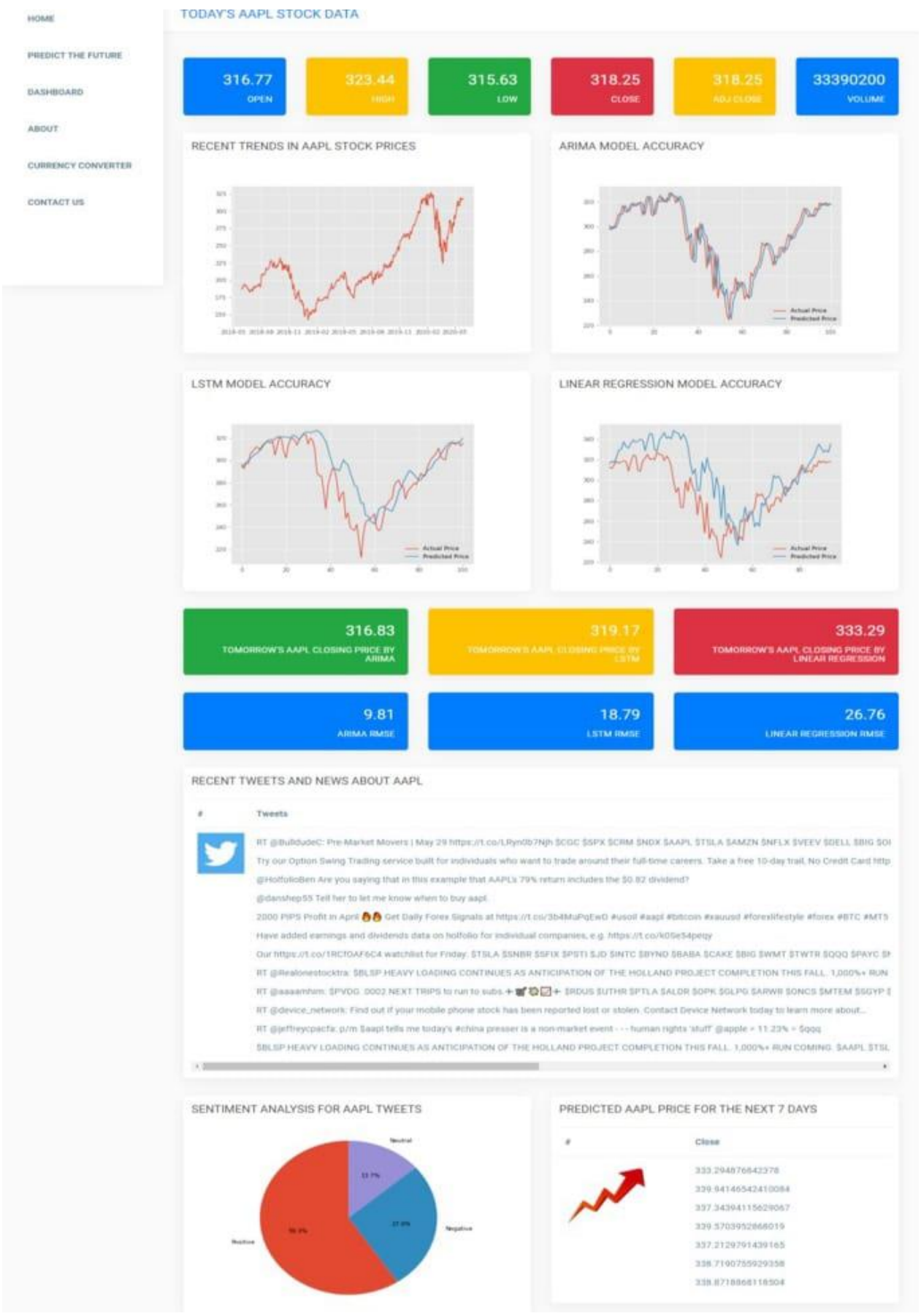
```
matrix= confusion_matrix(test["Label"],predictions)
print(matrix)
score= accuracy_score(test["Label"],predictions)
print(score)
report= classification_report(test['Label'],predictions)
print(report)
```

```
[[138  48]
 [  2 190]]
0.8677248677248677
              precision    recall  f1-score   support

           0       0.99      0.74      0.85       186
           1       0.80      0.99      0.88       192

    accuracy                           0.87       378
   macro avg       0.89      0.87      0.87       378
weighted avg       0.89      0.87      0.87       378
```

ACHIEVED 87% ACCURACY WITH RANDOM FOREST CLASSIFIER


HOME
PREDICT THE FUTURE
DASHBOARD
ABOUT
CURRENCY CONVERTER
CONTACT US
TODAY'S AAPL STOCK DATA
316.77
OPEN
323.44
HIGH
315.63
LOW
318.25
CLOSE
318.25
ADJ CLOSE
33390200
VOLUME
RECENT TRENDS IN AAPL STOCK PRICES
ARIMA MODEL ACCURACY
LSTM MODEL ACCURACY
LINEAR REGRESSION MODEL ACCURACY
316.83
TOMORROW'S AAPL CLOSING PRICE BY ARIMA
319.17
TOMORROW'S AAPL CLOSING PRICE BY LSTM
333.29
TOMORROW'S AAPL CLOSING PRICE BY LINEAR REGRESSION
9.81
ARIMA RMSE
18.79
LSTM RMSE
26.76
LINEAR REGRESSION RMSE
RECENT TWEETS AND NEWS ABOUT AAPL
#
Tweets
SENTIMENT ANALYSIS FOR AAPL TWEETS
PREDICTED AAPL PRICE FOR THE NEXT 7 DAYS
#
Close
333.294876842378
339.941465424100B4
337.34394115629067
329.5703952666019
337.2129791439165
338.7190755929358
338.871886116504

CHAPTER 9

CONCLUSION

9. CONCLUSION

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project:

- Automation of the entire system improves the efficiency
- It provides a friendly graphical user interface which proves to be better when compared to the existing system.
- It gives appropriate access to the authorized users depending on their permissions.
- It effectively overcomes the delay in communications.
- Updating of information becomes so easier
- System security, data security and reliability are the striking features.
- The System has adequate scope for modification in future if it is necessary.

As news articles capture sentiment about the current market, we automate this sentiment detection and based on the words in the news articles, we can get an overall news polarity. If the news is positive, then we can state that this news impact is good in the market, so more chances of stock price go high. And if the news is negative, then it may impact the stock price to go down in trend. We used polarity detection algorithm for initially labelling news and making the train set. For this algorithm, dictionary based approach was used. The dictionaries for positive and negative words are created using general and finance specific sentiment carrying words. Then pre-processing of text data was also a challenging task. We created own dictionary for stop words removal which also includes finance specific stop words. Based on this data, we implemented three classification models and tested under different test scenarios. Then after comparing their results, Random Forest worked very well for all test cases ranging from 88% to 92% accuracy. Accuracy followed by SVM is also considerable around 86%. Naive Bayes algorithm performance is around 83%. Given any news article, it would be possible for the model to arrive on a polarity which would further predict the stock trend.

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