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Module Coordinator & Lecturer	Dr. Miguel Nicolau & Darren Redmond
Tutor (if applicable)	Cillian Reid
Submission Deadline	30/11/2021
Date Submitted	30/11/2021
Grade/Mark	

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Declaration of Authorship

I declare that all material in this assessment is my own work except where there is clear acknowledgement and appropriate reference to the work of others.

Signed: Jake Pickering, Shreyas Pillai, Rohan Poulose, Conor Young, Deepak Albert

Date: 29/11/2021

GROUP 24 USER MANUAL

1 INTRODUCTION

This manual will focus primarily on our team's graphical user interface (GUI). That said, this manual includes the purpose of our team's program, a description of the procedures for system access, and an example of the application of our GUI. In addition, the contents of this manual will also include a brief section on error handling, followed by the program's UML Activity Diagram, as well as the program's references and appendices.

1.1 DISCLAIMERS

- For the best user experience please use the program in full screen mode and ensure that the system scale is set to 100%.
- If a date range is inputted before the IPO of a given security, the date will still display, however, the data will be taken from the initial public offering until the selected end date.
- To query a specific time range, the user must enter the start date and end date and click the apply time range button.
- When a new stock is queried, the maximum time range for that stock will be displayed.
- If a queried start date is beyond the end date, the system will remain unchanged.

1.2 Purpose & Functionality

The purpose of the program is to allow the system's users to model, analyse and consult stock time series data from an online database. Our program more specifically will allow users to:

- Search for stocks via ticker symbol
- Access a company's background information
- Query time ranges
- Analyse descriptive technical indicators
- Plot descriptive visualisations
- Plot inferential visualisations
- Download raw data

1.3 Required Libraries & Prerequisites for System Access

After downloading this manual's associated zip file (MIS41110_Group_24.zip), the following libraries must be imported/installed before running our program within Python3:

- Streamlit, pandas, numpy, yfinance, plotly, datetime, sklearn
- from requests.sessions import session
- from fbprophet import Prophet
- config.toml file should be placed in a folder named '.streamlit' that is in the same folder as GUI_group24.py, if not already present

If fbprophet is not working, it is most likely due to an incompatible version of pystan, therefore please run the following commands below line by line:

```
pip uninstall fbprophet pystan
pip --no-cache-dir install pystan==2.17  #any version
pip --no-cache-dir install fbprophet==0.2 #any version
conda install Cython --force
pip install pystan
conda install pystan -c conda-forge
conda install -c conda-forge fbprophet
```

1.4 Running the Program

After downloading the zip file and the required libraries in section 1.2, in order to run our GUI program in the command line the user must enter the following:

path> streamlit run GUI_group24.py

This command will open the program within a browser window. Again for the best user experience please use the program in full screen mode and address the disclaimers above.

To run the program's text interface, please enter the following:

path> python textinterface.py

2 APPLICATION OF OUR GRAPHICAL USER INTERFACE

2.1 Overview: Viewing Stock Data, Company Information & Querying Time Ranges

Now that the user has access to the program's GUI, to get started viewing stock data in the program, the user must enter a desired stock ticker in the specified field in the left ribbon. This ribbon will display key information as to what stock, time range, program view and options are being run. For example, if the user enters the ticker for Amazon (AMZN) and a specified time range, the user will receive the output depicted in **figure 1**. This first output is the *Overview* and is one of four select view options located within the program **(see figure 2).**

From this output, users will be able to view Amazon's stock closing prices and volume trends since its IPO. Also from the 'Overview', users will be able to manipulate the visual by the slide bar located underneath it (this function is available for all graphical visualisations).

Beneath the main output of the Overview, the user will be able to access a drop-down menu with information enclosed on the selected company **(figure 1)**.

2.2 Descriptive Statistics: Technical Indicators

If the user would like to get more descriptive analysis of Amazon, they can select the next view option: *Descriptive Statistics* located in the left ribbon of the program previously seen in **figure 2**. After this view is selected, Amazon's *Summary* descriptive statistics will display and another drop-down will appear in the left ribbon known as *Select Technical Indicators* **(figure 3)**.

From this drop-down, analysts will be able to select a specific technical indicator in which they want to analyse in an attempt to predict future price movements (**figure 3**). When one of these indicators is chosen, it will display the corresponding visualisation accompanied by a period selection drop-down and a brief description on what the visualisation achieves **(figures 3.1- 3.6).**

2.3 Forecasting

If the user would like to predict future closing prices, they can do so through accessing the *Forecasting* view located in the left ribbon **(figure 2).** Once this view has been accessed, the user will be able to

select what type of forecasting (Linear or Non-Linear) that they would like to conduct from a dropdown located in the left ribbon **(figure 4)**.

After a decision has been made on the type of forecasting, the program will display the future predictions for a selected stock one year from the current date **(figure 4.1-4.2)**. If the user would like to predict the future closing price using these forecasting tools a specific date, there is now a dropdown available to select a designated date to forecast until**.** In addition to the main output and forecasting parameters, the program will also display the corresponding values for the forecasted date's predicted closing price, RMSE and R^2 **(figure 4.1 or 4.2)**.

2.4 Raw Data

This final view within the program will display the designated stock's raw data for a specific time range (**figure 5).** If the user would like to export this data, there is a link displayed below the dataset that will allow the user to export the data to Excel for further analysis **(Figure 14)**.

3 POINTS OF CONTACT

For more information on the program, users can contact our designated support team by email at the addresses below:

- Conor.young@ucdconnect.ie
- Jake.pickering@ucdconnect.ie
- Shreyas.pillai@ucdconnect.ie
- Deepak@ucdconnect.ie
- Rohan.poulose@ucdconnect.ie

4 APPENDIX

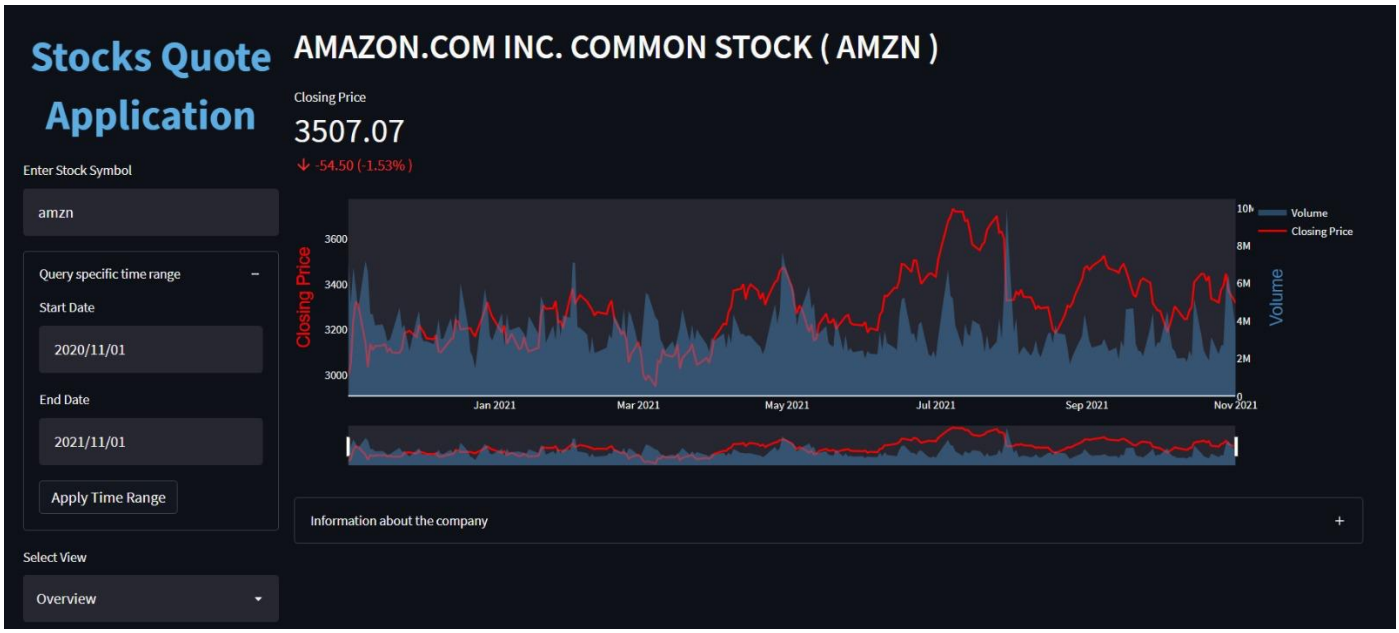


Figure 1. GUI Overview Display

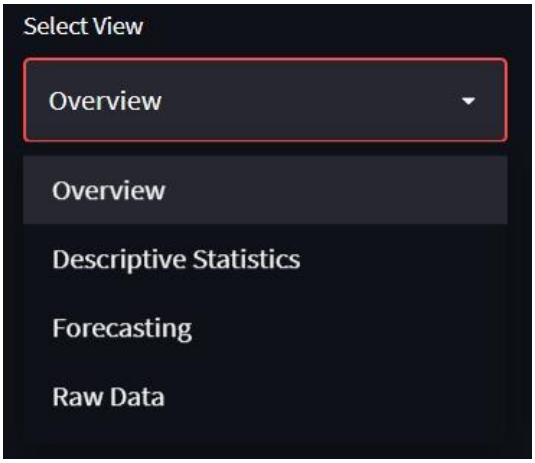


Figure 2. Select View Dropdown Menu

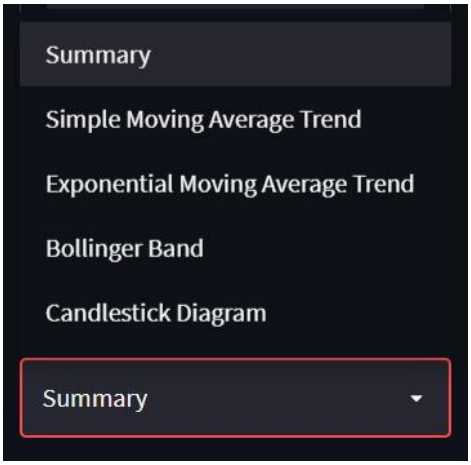


Figure 3. Technical Indicators Dropdown Menu

Figure 3.1 Summary Descriptive Statistics for Amazon

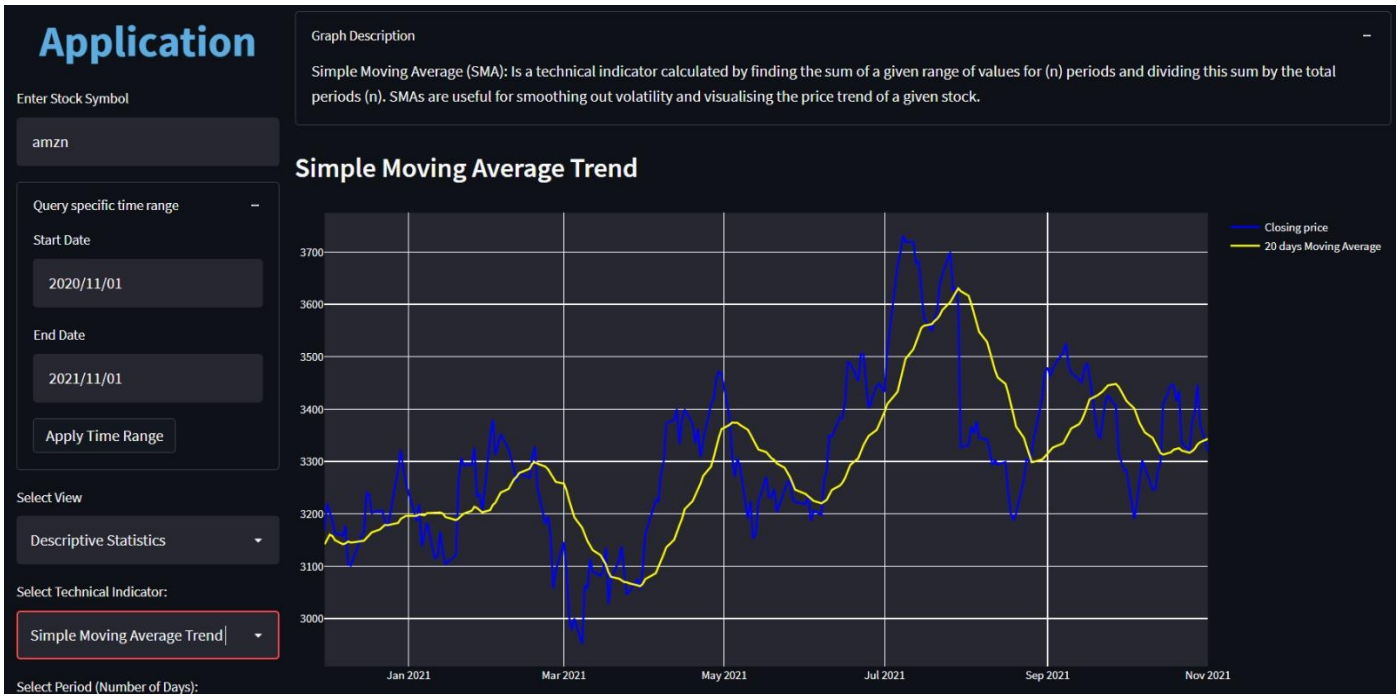


Figure 3.2 Simple Moving Average Trend for Amazon

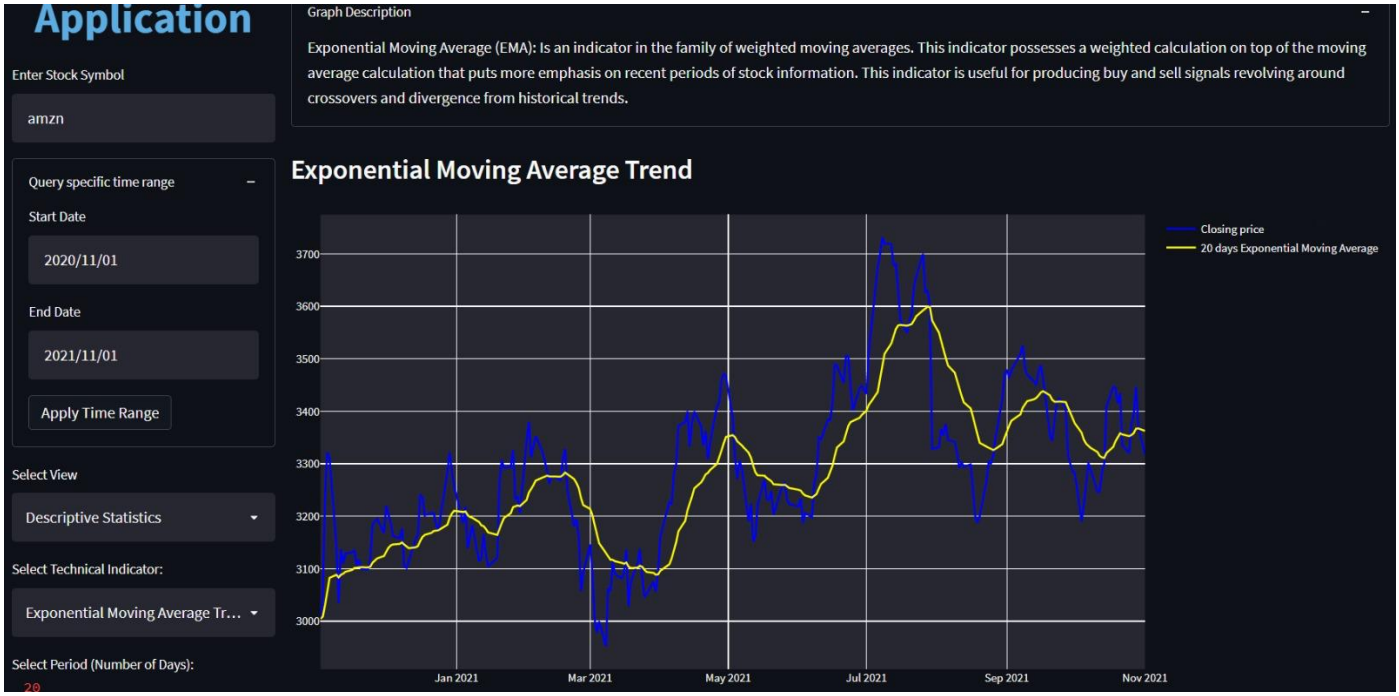


Figure 3.3 Exponential Moving Average for Amazon

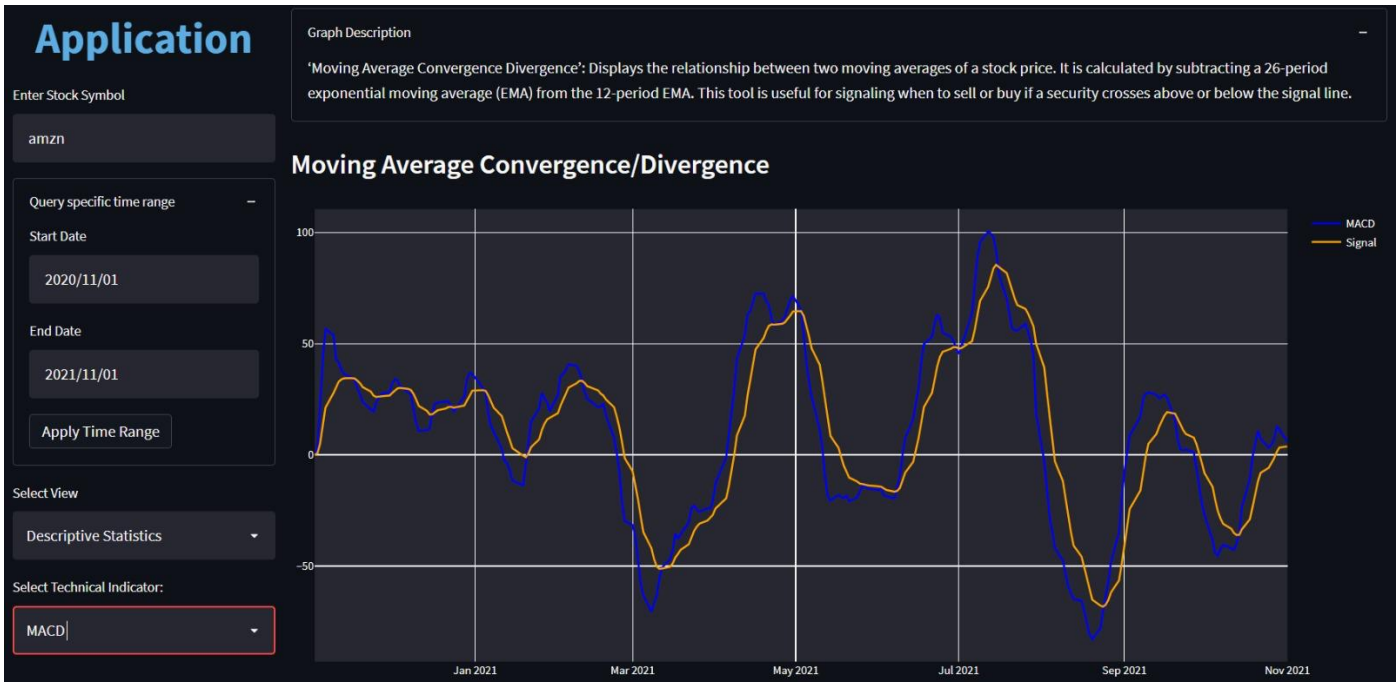


Figure 3.4 Moving Average Convergence/Divergence for Amazon

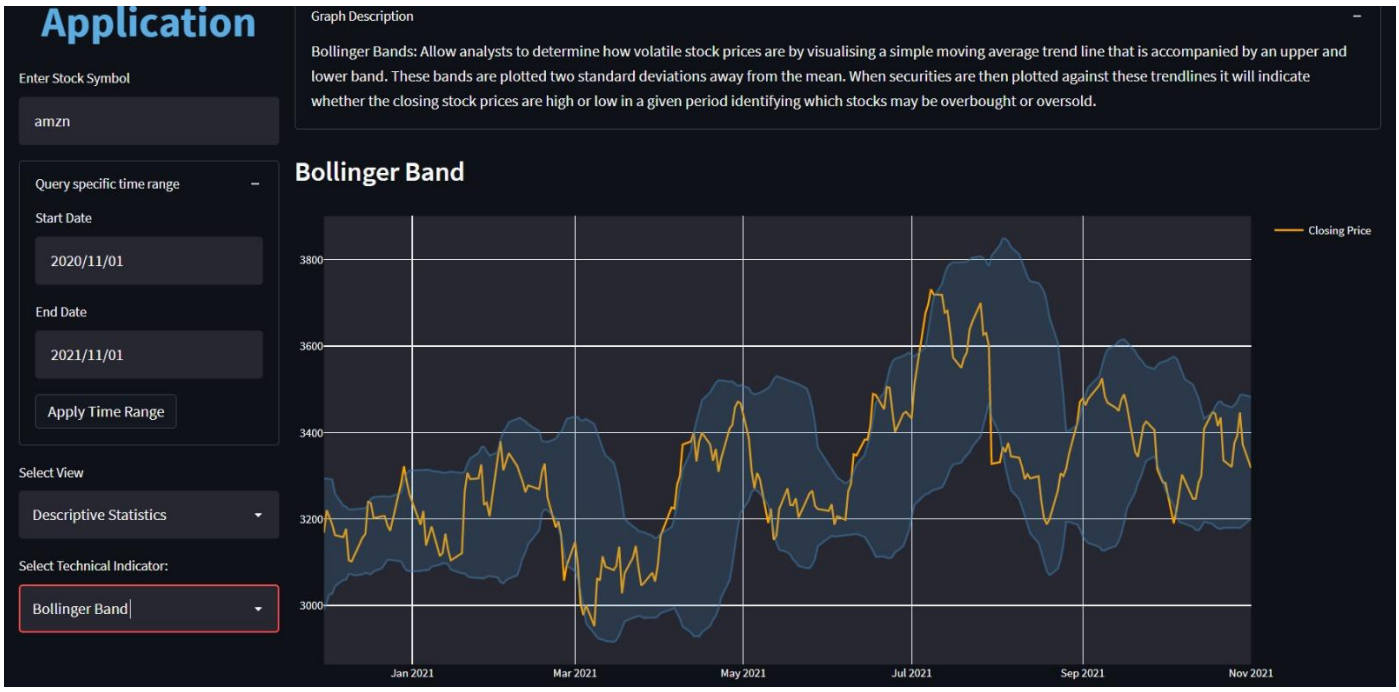


Figure 3.5 Bollinger Bands

Figure 3.6 Candlestick Diagrams

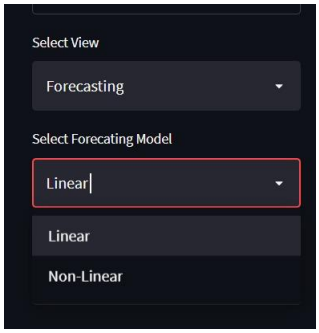


Figure 4. Forecasting Menu

Figure 4.1 Linear Forecasting Model for Amazon

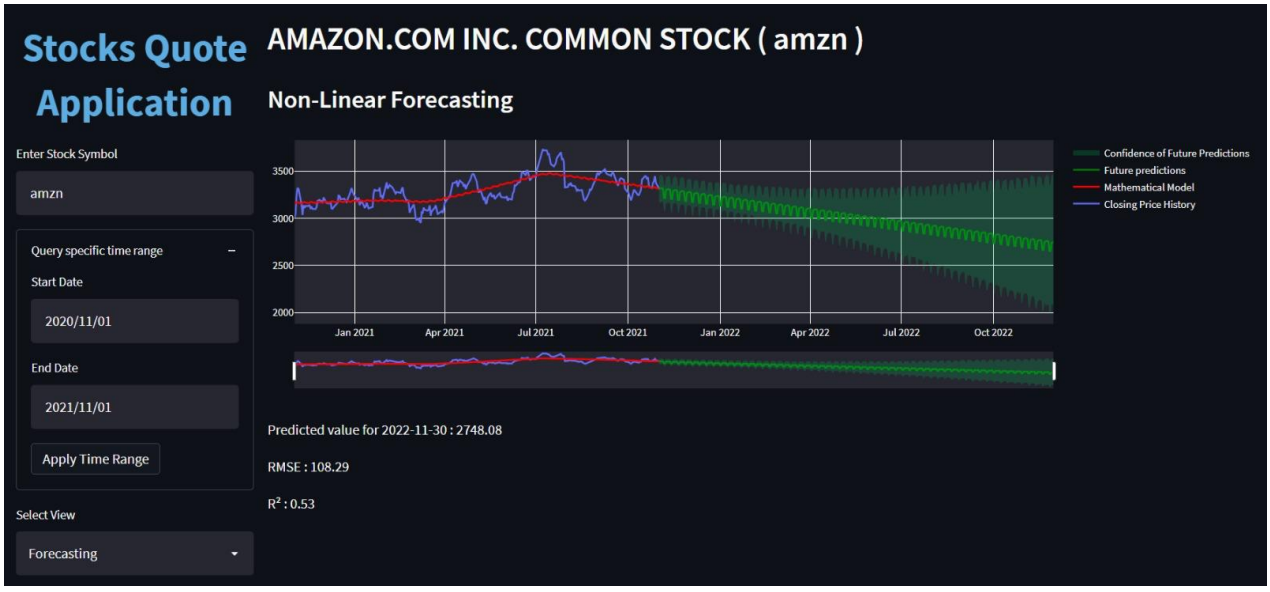
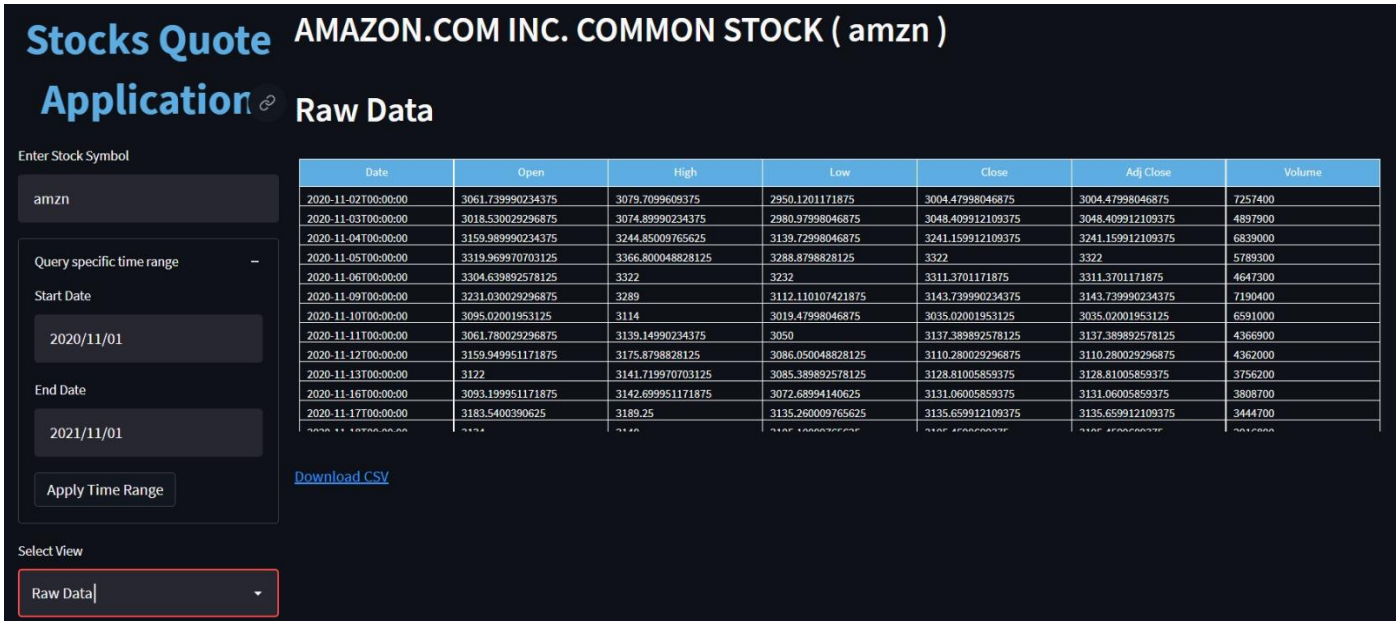


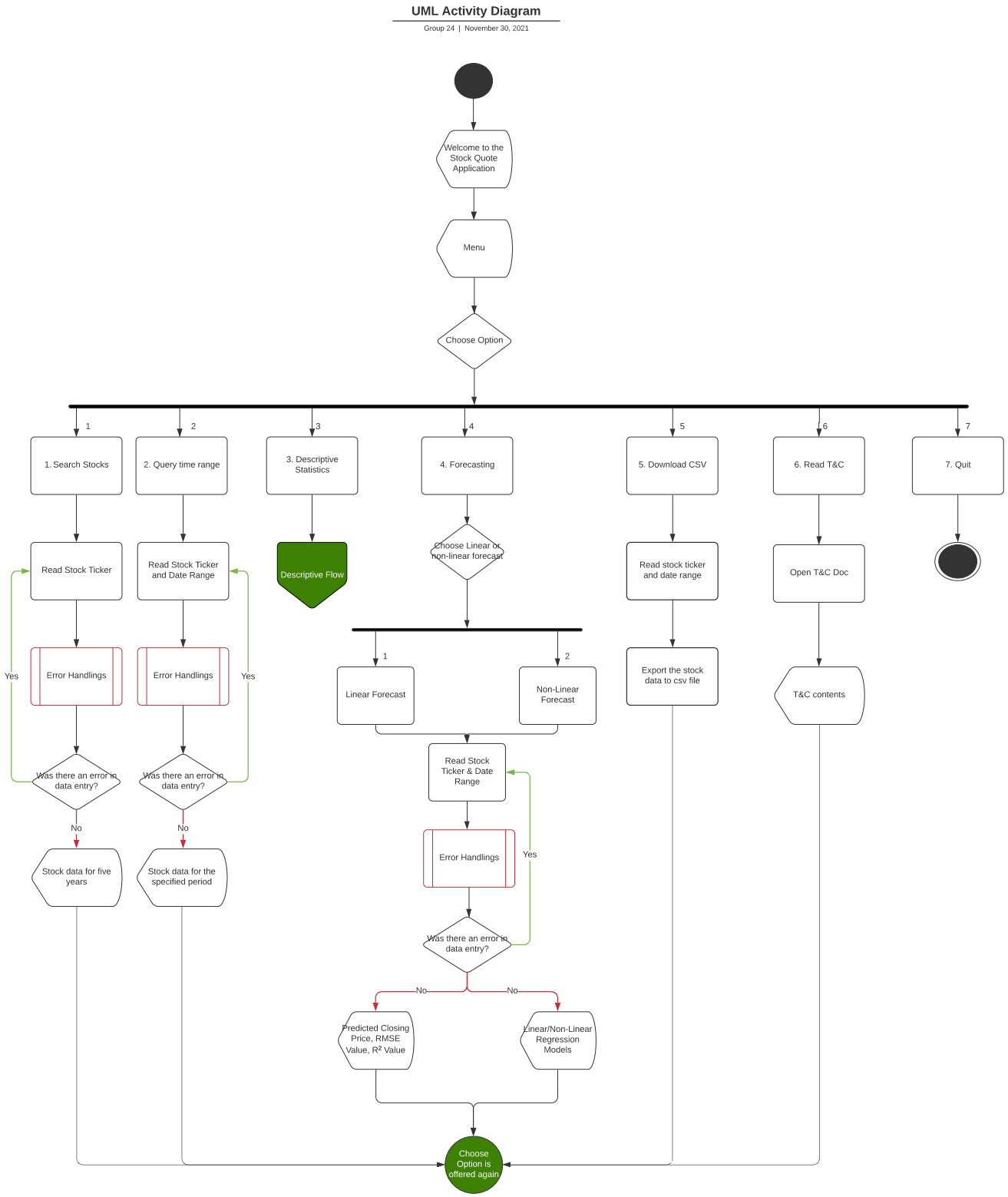
Figure 4.2 Non-Linear Forecasting Model for Amazon

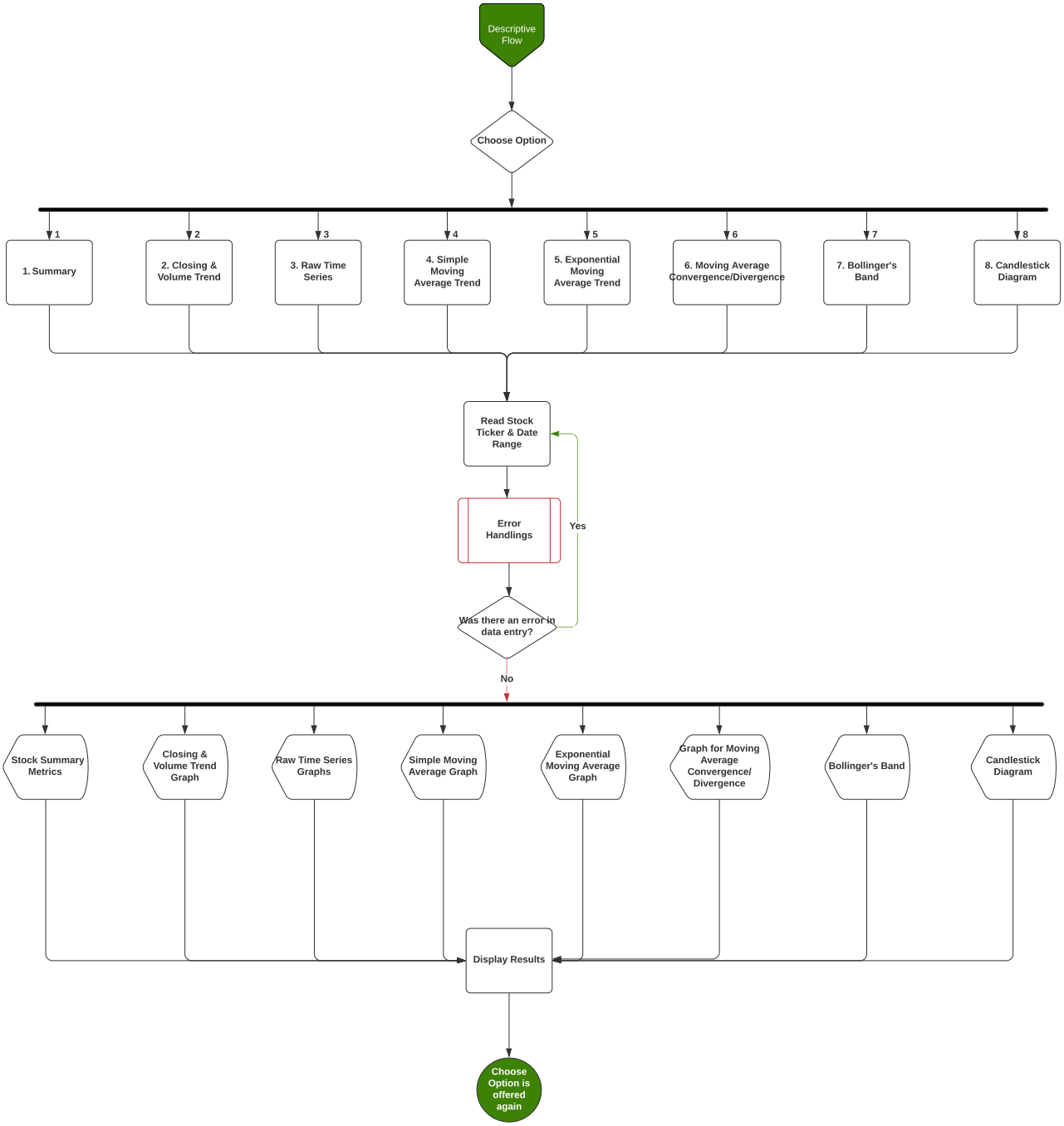


Date	Open	High	Low	Close	Adj Close	Volume
2020-11-02T00:00:00	3061.739990234375	3079.7099609375	2950.1201171875	3004.47998046875	3004.47998046875	7257400
2020-11-03T00:00:00	3018.530029296875	3074.89990234375	2980.97998046875	3048.409912109375	3048.409912109375	4897900
2020-11-04T00:00:00	3159.989990234375	3244.85009765625	3139.72998046875	3241.159912109375	3241.159912109375	6839000
2020-11-05T00:00:00	3319.969970703125	3366.800048828125	3288.8798828125	3322	3322	5789300
2020-11-06T00:00:00	3304.639892578125	3322	3232	3311.3701171875	3311.3701171875	4647300
2020-11-09T00:00:00	3231.030029296875	3289	3112.110107421875	3143.739990234375	3143.739990234375	7190400
2020-11-10T00:00:00	3095.02001953125	3114	3019.47998046875	3035.02001953125	3035.02001953125	6591000
2020-11-11T00:00:00	3061.780029296875	3139.14990234375	3050	3137.389892578125	3137.389892578125	4366900
2020-11-12T00:00:00	3159.949951171875	3175.8798828125	3086.050048828125	3110.280029296875	3110.280029296875	4362000
2020-11-13T00:00:00	3122	3141.719970703125	3085.389892578125	3128.81005859375	3128.81005859375	3756200
2020-11-16T00:00:00	3093.199951171875	3142.699951171875	3072.68994140625	3131.06005859375	3131.06005859375	3808700
2020-11-17T00:00:00	3183.5400390625	3189.25	3135.260009765625	3135.659912109375	3135.659912109375	3444700

Figure 5. Amazon Raw Data & Download Link

5 UML ACTIVITY DIAGRAM




Descriptive Flow
Choose Option
1
2
3
4
5
6
7
8
1. Summary
2. Closing & Volume Trend
3. Raw Time Series
4. Simple Moving Average Trend
5. Exponential Moving Average Trend
6. Moving Average Convergence/Divergence
7. Bollinger's Band
8. Candlestick Diagram
Read Stock Ticker & Date Range
Error Handlings
Yes
Was there an error in data entry?
No
Stock Summary Metrics
Closing & Volume Trend Graph
Raw Time Series Graphs
Simple Moving Average Graph
Exponential Moving Average Graph
Graph for Moving Average Convergence/ Divergence
Bollinger's Band
Candlestick Diagram
Display Results
Choose Option is offered again

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