REPORT

Programming for Analytics (MIS41110) Individual Project

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User Manual

Using the Stock Analyser application

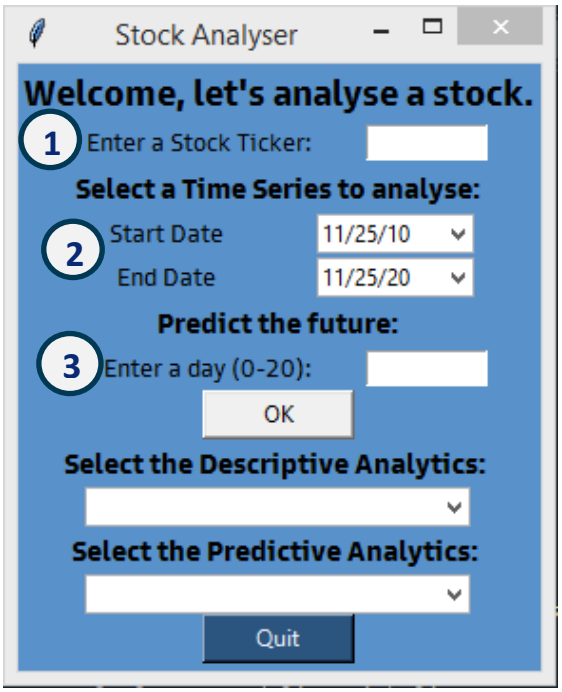
Before running the application, the user should make sure to have the following Python packages installed: datetime, matplotlib, numpy, pandas, scipy, seaborn, sklearn, tkcalendar, tkinter, yfinance (if not yet installed, one may do so by running “pip install <package name>” on the command line).

To launch the Stock Analyser application, run the stock_analyser_sk.py file on the command line (CLI). This will prompt the user to confirm on the CLI if she is ready to proceed. The screenshot shows the brief exchange.

```
PS C:\Users\[redacted]\main> python stock_analyser_sk.py


When you are ready, the Stock Analyser GUI will launch.
Are you ready? Then enter YES.
```

Once the user types “YES” and presses Enter, the below window will open. As long as anything else is typed, the program will remain on the CLI and not proceed to the GUI.

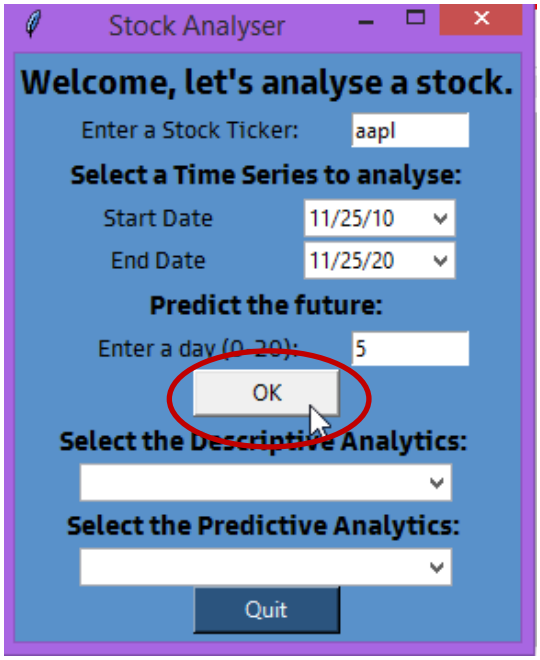


In the GUI:

1. Enter a valid Stock Ticker (e.g. AAPL for Apple Inc.). You may enter capital or lower case letters.

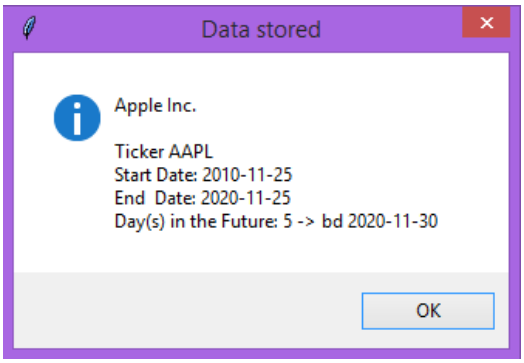
2. Select Start and End Date from the calendar drop down or enter the date in the field in the displayed format: MM/DD/YY.
Default Start Date equals today’s day and month in 2010. Default End Date equals today’s date.

3. Enter a number n between 0 and 20 to define how many days into the future should be predicted. This value will be used to calculate and predict the Closing Price in n days (if a day falls onto a weekend, it will be the next business day, bank holidays are not considered) past the End Date.



Once all fields are filled as per the user's preferences, click *OK* to store the data in the cache. This will also populate the drop down menus for Descriptive and Predictive Analytics for the user to choose.

The below Message Box will pop up and show a summary of the data that will be used for the different Analytics. This confirms that the entered data will have been stored correctly for the program to proceed.

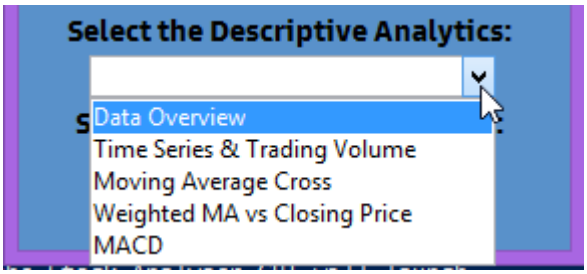


The user can decide to change that data any time. To do so, she just needs update the values and click *OK* again so the updated data will be stored.

Descriptive Analytics:

There are 5 options to choose from as can be seen in the screenshot.

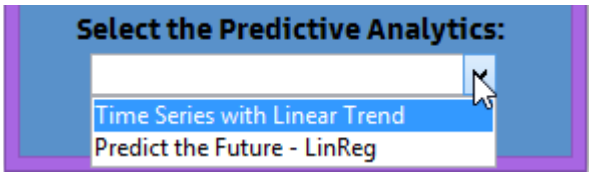
For every Option that creates a pop window, the user can only proceed once that window is closed. So if the user wants to select a different Option, she must close the graph or message box. Then she can return to the GUI and select anew from the drop down menu.



Option (1) will print the first 5 and the last 5 lines of the data for the selected stock and time period as well as a summary of descriptive statistics of the closing price and an overview of important stock info, regardless of the selected time period.
Option (2) will show the time series of the stock's closing price and its trading volume.
Option (3) will show a graph of the Moving Average (MA) cross where a simple short- and the long-term MA are compared. The short-term MA is defined at 50 days and the long-term MA is defined at 200 days as widely accepted in the financial industry.
Option (4) will show a graph of a simple 10-day weighted MA in comparison to the closing price.
Option (5) will show a graph of a Moving Average Convergence Divergence (MACD) with its base and signal line.

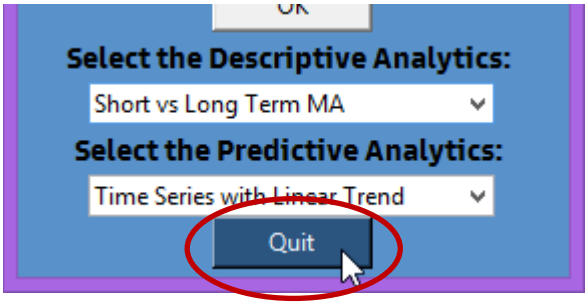
Predictive Analytics:

There are 2 options to choose from as can be seen in the screenshot.



Option (1) will print the closing price for the selected time period with a linear trend line based on a linear regression that is calculated based on the selected time period.
Option (2) will open a message box with the predicted closing price n days after the selected End Date based on the same linear regression. It will also include the R-value, p-value and RMSE to determine the validity of the linear regression model.

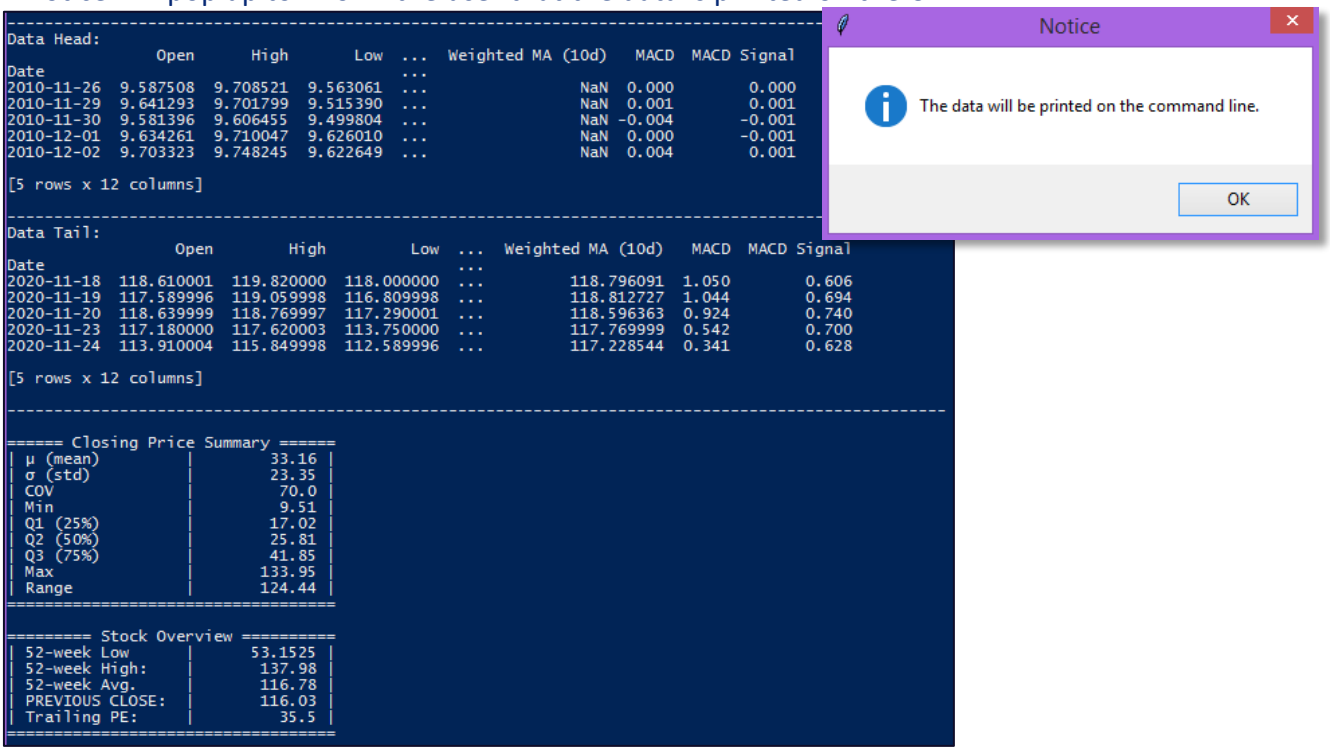
To exit the program, the user can click the *Quit* button in the GUI at any time.



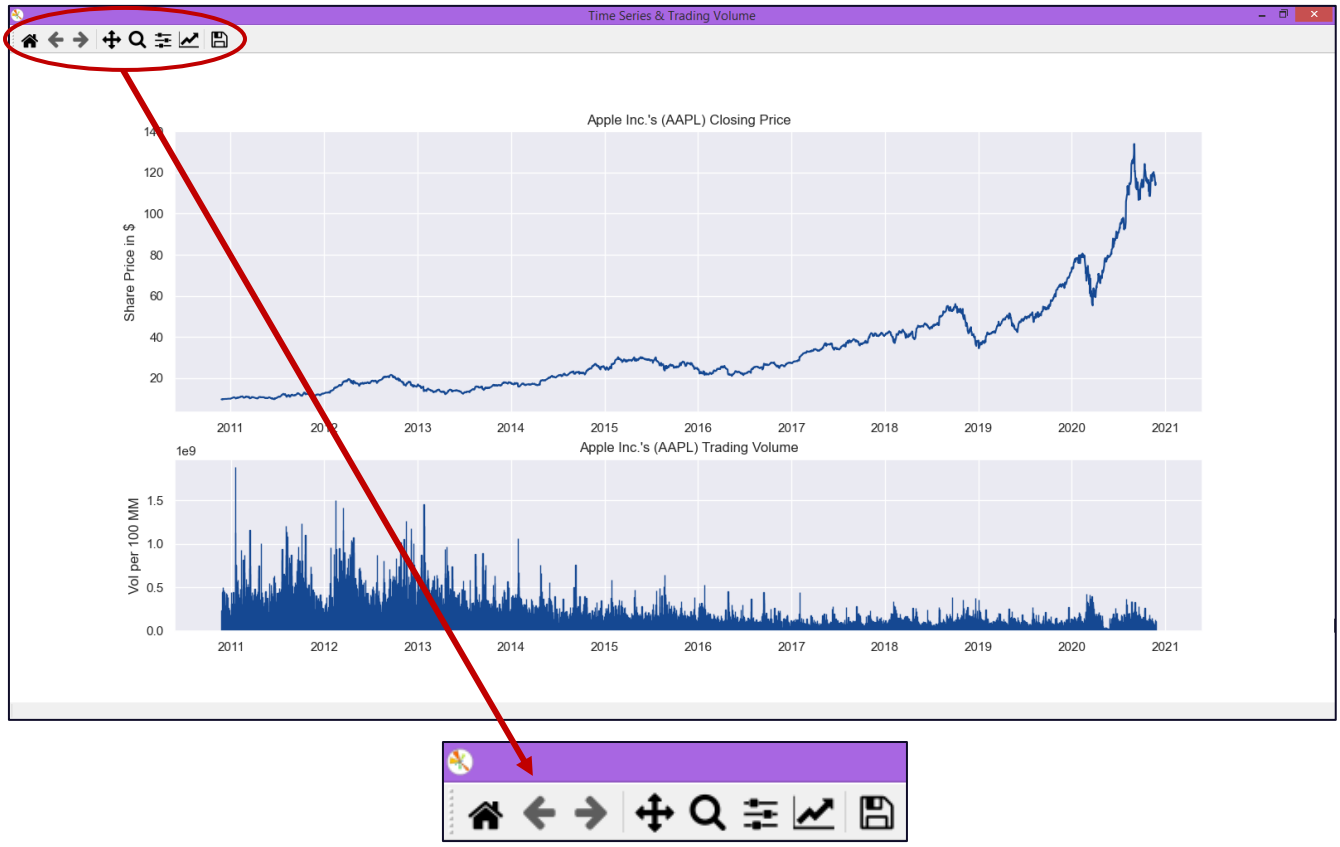
Sample Outputs

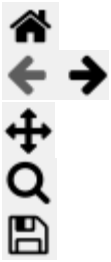
Descriptive Analytics – Option 1 "Data Overview"

A notice will pop up to inform the user that the data is printed on the CLI.



Descriptive Analytics – Option 2 "Time Series and Trading Volume"





Returns to the original graph.

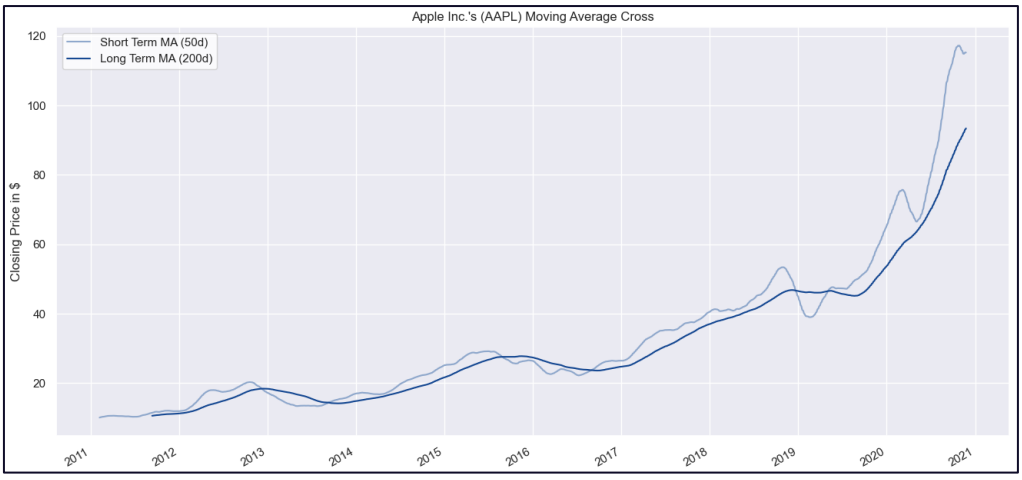
Allows the user to go through made changes one by one (backwards and forwards).

Move the graph along the y-axis and x-axis.

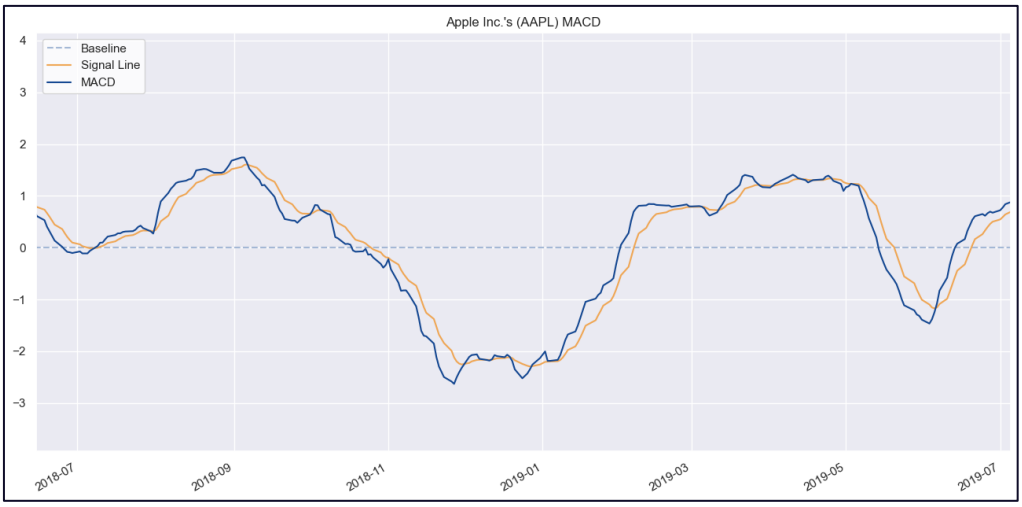
Zoom into the data and a certain time frame that is of interest.

Save the graph.

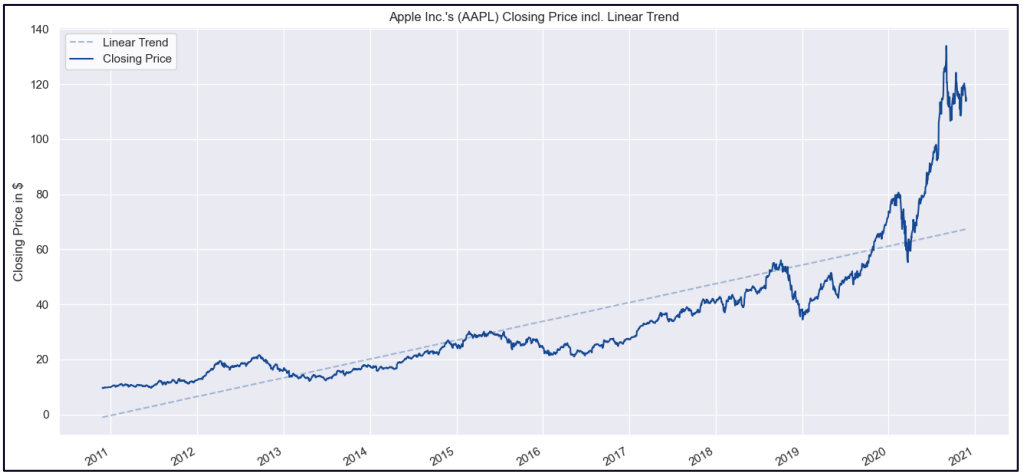
Descriptive Analytics – Option 3 "Moving Average Cross"



Descriptive Analytics – Option 5 “MACD”

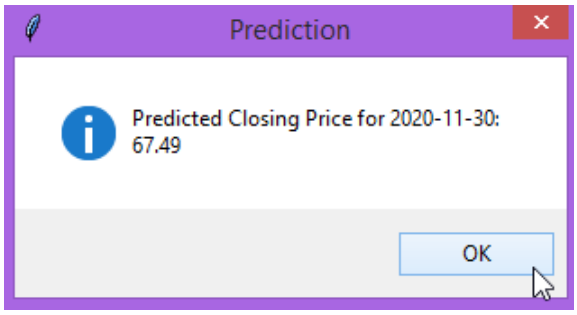


Predictive Analytics – Option 1 “Time Series with Linear Trend”

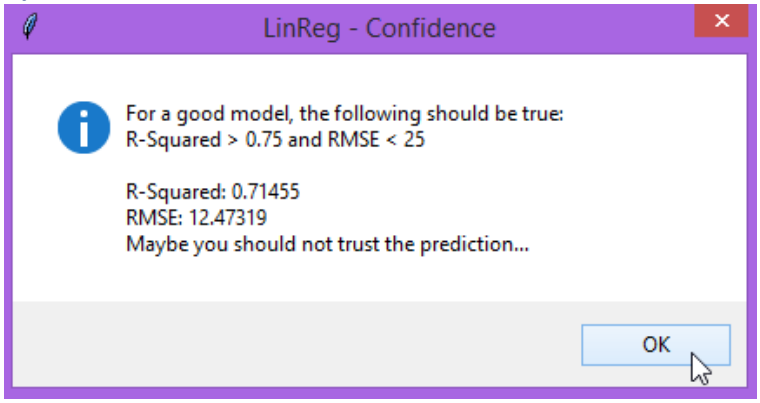


Predictive Analytics – Option 1 “Predict the Future - LinReg”

1)



2)



UML Activity Diagram