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Master of Arts in Banking and Finance

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Adaption of an automated stock report in python

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1   Introduction

Nowadays, a lot of information is shared through the internet about several stocks. An analyst should often represent all the relevant information about a position in a compact way. Furthermore, private users and investors also need an effective overview about the performance of their stock in order to derive future decisions about further investments. The process to find the required data, analyse and represent it in a compact way is often time consuming. Therefore, it is essential to use a suitable tool in the financial analysis process.

The aim of our project is to adapt an existing automated stock report according to our ideas. The report shall consist of an analysis of the actual and past situation as well as of a part with future investment recommendations. The research question is the following:

How can an app be adapted that it alleviates the research, analysis and interpretation of the user's stock portfolio?

The documentation is structured as follows. At first, the theoretical background for the report is explained. Hence, the reader gets a suitable understanding for the functionality and the financial background. Afterwards, it is explained how the user can run the program. Finally, the documentation is concluded with a few described advantages and challenges.

As the time within we have to conduct this project is rather limited, we will deliver a basic report with basic analysis and recommendation. However, the structure should allow the interested coder to expand it according to his needs.

2 Theoretical background

2.1 Moving Average

2.1.1 Concept

The moving average is also called rolling mean and allows to describe an overall trend by smoothing data (e.g. price development) down. (cf. https://towardsdatascience.com/in-12-minutes-stocks-analysis-with-pandas-and-scikit-learn-a8d8a7b50ee7) In the program, a simple moving average is used, which is calculated as follows. Firstly, a time frame is selected and its average price is determined. Then, the window is rolled over one period and the average is calculated again. Repeating these steps provides a series of smoothed averages. If the window is e.g. 200 days and the timeseries starts on day 1 and ends on day 500, the average of the first 200 days is determined at the beginning. Afterwards, the window is shifted one day forward and the average of days 2 to 201 is calculated. (cf. https://pythonprogramming.net/stock-data-manipulation-python-programming-for-finance/) A larger window creates a smoother line and represents a long-term trend compared to a small window which shows as short-term trend.

2.1.2 Trading strategies with moving average

In Finance, a simple trading strategy is to sell stocks when their price is high and to buy them, when their price is low. At a maximum of a moving average, it can be assumed, that the stock is overpriced. In this case, profits can be made by selling it. At a minimum, the stock is supposed to be underpriced. The stock can be bought cheaply. (cf. https://www.investopedia.com/articles/investing/081415/look-buy-low-sell-high-strategy.asp)

In our program, we used the moving average to determine a minimum or maximum. As the price development fluctuates from day to day, implementing the strategy with the price series would have been much more difficult.

In the code, the time frame, in which a moving average maximum or minimum can occurre to have an impact on the investment decision, is chosen arbitrarily as 20 days. This has no specific theoretical foundation.

A so-called crossover strategy derives a trading recommendation from a long-term and a short-term moving average. Should the short moving average decrease faster after an intersection, a downward trend is expected and the favorable action is selling the asset. Contrary, if the short-term moving average increases faster, the trend is expected to shift up and the trader advised to buy the asset. (cf.

https://www.investopedia.com/articles/active-trading/052014/how-use-moving-average-buy-stocks.asp)

The code for the moving average has been taken from the following webpage: https://towardsdatascience.com/in-12-minutes-stocks-analysis-with-pandas-and-scikit-learn-a8d8a7b50ee7.

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3 Instruction to use the program manually

The program can be executed according to the following procedure:

1. Download the ZIP-File from *https://github.com/jan4j/Automatic-Stock-Analysis-Report* to your computer.

2. Extract the file and open it as a new project in your coding environment – e.g. pycharm.

3. Install all the necessary modules.

4. Run the app "app.py.".

5. Answer the questions which are posed to you in the terminal. Press enter after each question.

6. You need to have internet access in order to see the report. After executing the file, click on the link, which is represented in the terminal. Your internet browser will open and load the report.

7. Click into the report to display the different pages. Move over the graphs to use the interactive elements. Read the report and work with it.

On github, an instruction how to use the program with a virtual environment is provided.

4 Conclusion

The programming of the recommendations has a rather simple approach. The idea was to expand the existing code with self-coded parts to apply concepts learned during the course. It can be improved with more sophisticated interception analysis.

The report could be expanded with a machine learning future price development forecast to improve recommendations. For time reasons, we couldn't implement this. The recommendations shall be expanded with qualitative suggestions. It can be enhanced with more stocks as inputs and the analysis can be expanded either. The program could also be optimized and adjusted for mobile devices.

The moving average could be extended in a way, that the analysis is done for all the stocks which are entered at the beginning. Some more sophisticated trading strategies could be implemented too.

One disadvantage is that there are many packages which need to be installed at the beginning. In addition, the program may crash if the user enters incorrect inputs.

One advantage is that the app is consisting of three time related pillars – past, present and future. It provides an analysis of the past development, indicates the actual situation and derives a recommendation which assumes some ideas about the future development. The user gets consequently a holistic overview of his stocks. With the app, the user can also save time to search and convert data during his decision-making process. Moreover, it gives some indications about actions to take for the future. Furthermore, the program can also be used for different stocks. If the user changed his portfolio, there is no problem to adapt the program with the current stocks. In addition, the app shows other key figures about the stock and the company behind. Thus, the user gets an integrated picture of his portfolio.

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5 List of references

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