

Digital Tools for Finance

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Overview

- 1 Overview
- 2 Version Control
- 3 Collaboration Tools
- 4 Writing with LaTeX
- 5 Data Management
- 6 Analysis
- 7 Visualisation
- 8 Knowledge Transfer

This set of slides was produced to give an overview of different digital tools, used in our final project.

In general, we got experience with Git/Github, Slack, R, Python, SQL, LaTeX (Overleaf and Sublime Text editor) to elaborate the project.

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Version control was implemented via Git. The commands were sent via command line and GitHub desktop.

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We collaborated on the project, using Git.

Also we created a Slack channel and connected it to our Git repository.

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We configured Sublime Text editor to use LaTeX.

- Using Sublime Text and TeXShop, we produced this set of slides as a beamer presentation.
- Using Sublime Text and TeXShop, we produced the report (report.tex), that contains a table of contents, figures, tables and bibliography.
- We elaborated the bibliography, having created an auxiliary file /text/biblio.bib.

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For our project we performed a set of calculations in R
(/R/oil_stocks.Rproj).

Specifically we calculated the cost of capital of oil companies with the following steps:

- Downloaded .csv files with stock and index data
- Processed and filtered the data in R, using SQL
- Used regression analysis to estimate historical betas
- Produced LaTeX output in R
- Built plots in R
- Assembled the findings in LaTeX

We also used Python for the analysis of stock prices. Specifically we provided the overview of the industry stock prices following the steps:

- Called the data from Yahoo Finance API, using *yfinance* library. The reasons for this choice of API
 - free
 - large range of data
 - can be easily integrated into Python
- Uploaded necessary libraries for calling the data, analysis, plotting and prediction
- Analysed Stock Prices
- Predicted Stock Prices for 2 yaers

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The analysis of Stock Prices was carried out in Python, using Jupyter Notebook.

Some of the libraries, that we used were:

- *yfinance* to load data
- *prophet* to predict stock prices, without constructing a sophisticated model
- *matplotlib* to plot the results

Overview

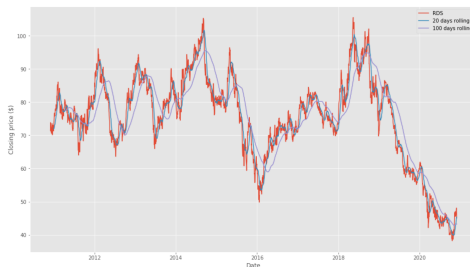
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Visualisation [1/2]

To visualize the data we followed the strategies for effective data visualisation

- Follow Hierarchy of Visual Attention
- Split the information to primary and secondary

The findings were visualised using R-shiny and Jupyter Notebook



Limitations of the project due to Visualisation

- The prices of some companies distorted the graphs dramatically. We had to omit them for a better representation.
- The graph on Return deviation of the industry was not included, as it was overwhelmed with colours, that layered on each other.

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Knowledge transfer

With the means of R shiny we produced an interactive page, that processes user's input into graphs (/R/data/app.R).

The application allows user to choose one of the companies and time interval to visualize stock dynamics on a graph. The user may also choose an option to see the dynamics of S&P 500 on the same graph.

Plot stock price of:

Choose company:

China Petroleum & Chemical ▼

☐ S&P 500

Choose interval:

2015-01-01 to 2020-11-30

Knowledge transfer

Example of output:



Min	38.20
Max	105.50
Mean	71.29
Median	73.38