

proj-paper.pdf

Name of the group members and CNetIDs

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A brief overview of the final project (200 words maximum)

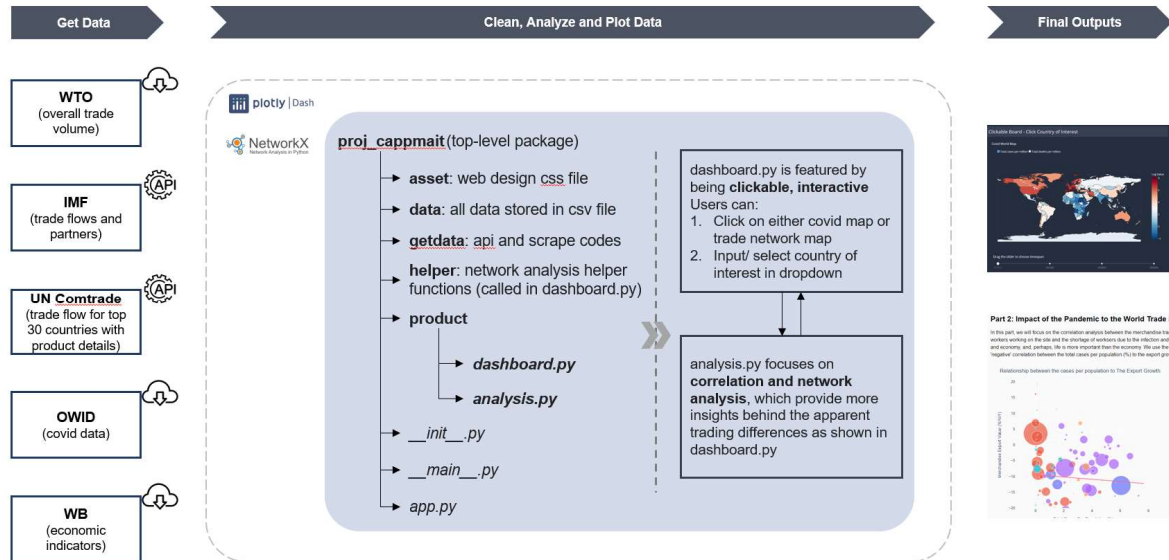
Covid 19 has had a devastating economic impact around the world. Worldwide merchandise trade flows decreased significantly in 2020. Our project generates an interactive dashboard and an analysis report, which look into important trading factors of 197 countries during the pandemic. We collected export data from international organizations' databases (e.g. WTO, UN and IMF), COVID-19 and economic indicators data (e.g. Our World in Data & World Bank). Both the dashboard and the report used dash and plotly as core packages.

For the interactive dashboard, we introduced a clickable world map, trade network map, and country detail graphs. The world map shows COVID-19 cases/deaths. The network map is constructed by country nodes whose size represent PageRank¹ value and edges of best trading partners. For the country details, we drew a bar chart for overall trade volume, a sankey diagram for top 10 trading partners, and a dot plot for top 5 product categories.

For the analysis report, we analyzed winners and losers during the pandemic, did correlation analysis for various factors impacting export growth / decrease. A basic regression was included as well in this part. Finally, we did network analysis to display relevant countries' trading networks.

¹ See the use of PageRank in trade network analysis:
<https://www.sciencedirect.com/science/article/pii/S1049007821001470>

The overall structure of the software (1-page maximum). It would be nice to include a helpful diagram of how the modules are connected with each other but not required.



A user can execute our program by `ipython -m proj_cappmait` and typing the command:

- **analysis or dashboard**

As shown in the diagram, the analysis report and dashboard are located in the product folder.

Moreover, due to the restriction of dash package, we must have the assets folder in two locations, inside the product folder and in the same level of app.py.

- **getdata**

This command is used for retrieving and cleaning data from various sources. The getdata folder stores the Python codes for downloading and cleaning data. If the user runs the optional getdata command, the program will store the dataset in data/data_from_prog folder. Note that the actual program is based on existing data from data and data/archived folder.

User can get any of the following three categories of data:

- (1) unapi: type this the program will collect data from UN comtrade API by using un_api.py code
- (2) imfapi: type this the program will collect data from IMF API by using imf_api.py code
- (3) loadcsv: type this the program will collect data from Our World in Data, World Bank, WTO, Country code. Then clean whole dataset and generate PageRank data.

A description on the code responsibilities for each group member (i.e., who was responsible for what module, files, tasks, etc.)

- Taishi: Data collection (imf_api.py), Analysis Report, install.sh
- Ayako: Data collection (get_wto, get_countrycode), Data cleaning (clean_data.py, page_rank.py), Dashboard (dashboard.py, network_analysis.py)
- Guo: Dashboard (dashboard.py), Web design (trade.css)
- Ittipat: Data collection (un_api.py , get_owid, get_wb), Analysis Report (Part 2 - Correlation, 3 - Network), Package construction (__main__.py, app.py)

Short description on how to interact with the application and what it produces.

To use this application, please run the following steps:

1. Make clone the repository.

```
git clone git@github.com:uchicago-CAPP30122-win-2022/proj-cappmait.git
```

2. Navigate to the repository.

```
cd ./proj-cappmait
```

3. Install Environment.

```
bash ./install.sh
```

4. Activate the virtual environment.

```
source env/bin/activate
```

5. Launch the dashboard and open the address on the command line

```
ipython3 -m proj_cappmait
```

6. When you successfully run our program, please input any of the below arguments for running our products. Note that dashboard and analysis will be opened in a browser.
 - dashboard for open dashboards
 - analysis for open analysis report
 - getdata for retrieving data from various sources (optional)
7. The getdata has subcommands. Users can input these arguments to run the specific commands. Note that this downloaded data will be kept in data/data_from_prog folder
 - imfapi for retrieving data from the IMF
 - unapi for retrieving data from the UN
 - loadcsv for downloading & cleaning other data (e.g. WTO, OWID, World bank)

What the project tried to accomplish and what it actually accomplished (200 words)

The main task that we want to accomplish for this project is to analyze the key facts in the trade section, mainly focusing on the export. We intended to create two products, which were interactive dashboards and a report. We are very delighted that we can accomplish all things that we want to do. Specifically, we can do interactive dashboards, plus we can do cross-filtering and cross-interaction between charts. Moreover, in the analysis part, we can reveal key facts of exports, and we can do some basic network analysis such as computing centrality and the recommendation system based on open-triangle. Therefore, the products we finally launch meet our target and we are very proud to accomplish them.