FEDERAL STATE AUTONOMOUS EDUCATIONAL INSTITUTION OF HIGHER EDUCATION

“NATIONAL RESEARCH UNIVERSITY HIGHER

SCHOOL OF ECONOMICS”

MOSCOW INSTITUTE OF ELECTRONICS AND MATHEMATICS

TECHNICAL SPECIFICATION

" Python in Data Science"

Analysis of COVID-19 statistics in different countries

USER MANUAL

Student:

Mohamed Abdelhafiz Salem Abdelhafiz Youssef

Email: abmokhamed@edu.hse.ru

Phone number: +79067678234

Supervisor: Polyakov Konstantin Lvovich

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1. Install Prerequisites

Python 3.10

Check if Python is already installed in CMD:

- python --version on Windows
- python3 --version on Linux/MacOs

Something like **Python 3.10.6** should appear

If not installed:

Download the latest stable version (preferably Python 3.10 at least)

Download it from: https://www.python.org/downloads/

Run the installer and **check the box that says "Add Python to PATH"** before clicking "Install Now"

Anaconda

Check if Anaconda is already installed in CMD:

- conda --version

Something like **conda 24.x.x** should appear

If not installed:

Download it from: https://www.anaconda.com/download

Run the installer and accept all default settings.

MySQL + MySQL Workbench

Download it from: https://dev.mysql.com/downloads/

Download the one complete version of the installer (300mb+)

Run the installer and select the **FULL** installation and continue with execute and install, make sure to remember the **password**, the **port** and the **user**.

2. Project

After downloading the project ZIP file, Find the downloaded ZIP file (Work.zip) in your **Downloads** folder or wherever you saved it and extract it. The structure of the folder is the following:

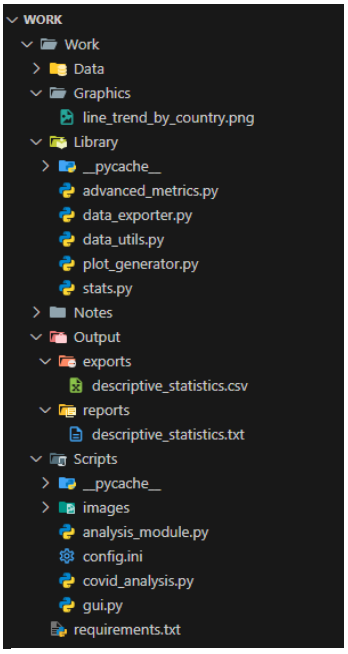


Figure 1 - Project Structure

Remarque: The data folder contains the daily reports csv files of all countries during the covid period, one thing you must be sure of is: when using other csv data files, make sure it has the same structure as the csv files inside the folder, also the name of these files must be DD-MM-YYYY.

3. Virtual Environment

After extracting the Zip file, Open **anaconda Prompt,** we will use the **Anaconda Navigator** later.

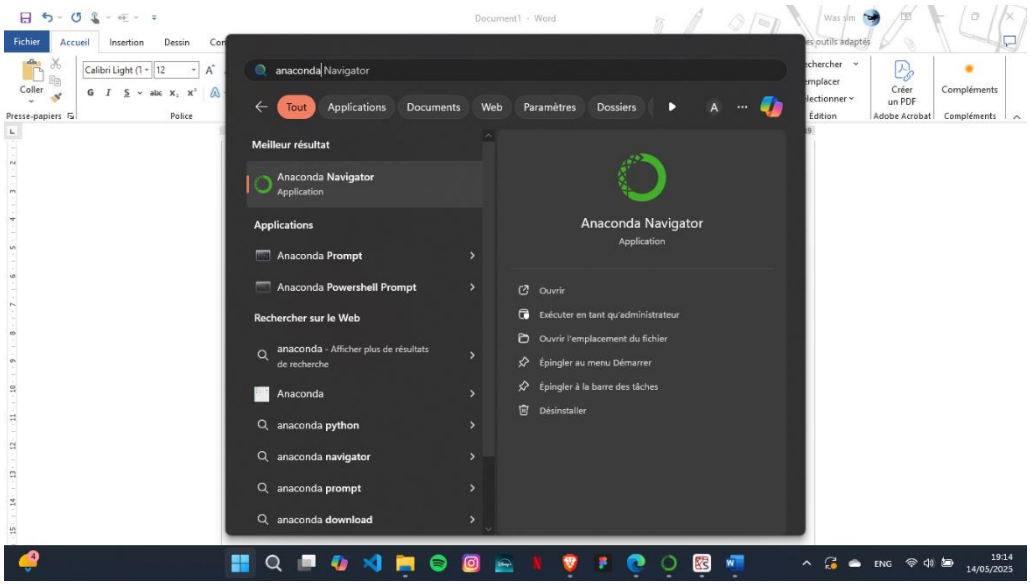


Figure 2 - Anaconda Prompt

Access the path to your extracted Work folder. If the folder was extracted in Downloads, it should be something like: **C:\Users\abahr\Downloads\Work\Work**

- Access Folder: **cd C:\Users\abahr\Downloads\Work\Work**

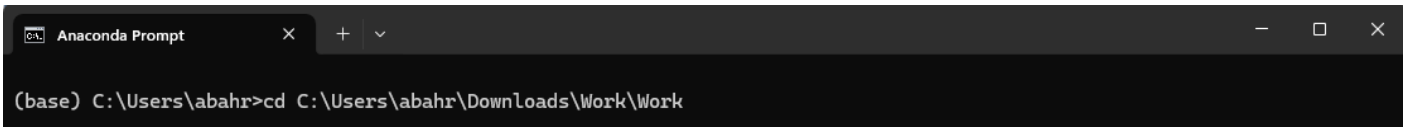


Figure 3 - Working Folder

- Create virtual environment: **conda create --name covid_analysis_env python=3.10**

```
(base) C:\Users\abahr\Downloads\Work\Work>conda create --name covid_analysis_env python=3.10
```

Figure 4 - Virtual environment creation

- Activate it: **conda activate covid_analysis_env**

```
(base) C:\Users\abahr\Downloads\Work\Work>conda activate covid_analysis_env
```

Figure 5 - Environment activation

  - **Base** will change into **covid_analysis_env** which means the environment is activated

```
(covid_analysis_env) C:\Users\abahr\Downloads\Work\Work>
```

Figure 6 - Environment activated

- Install all dependencies: **pip install-r requirements.txt**

```
(covid_analysis_env) C:\Users\abahr\Downloads\Work\Work>pip install -r requirements.txt
```

Figure 7 - Install dependencies

Now Open Anaconda Navigator and choose the environment we just created

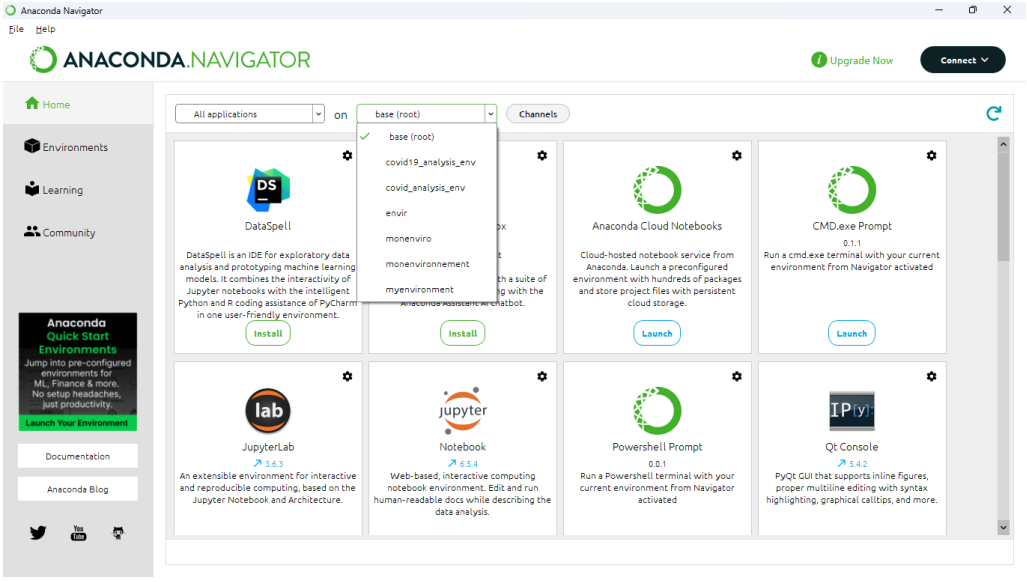


Figure 8 - Environment selection

Search for Spyder, Install It and launch it

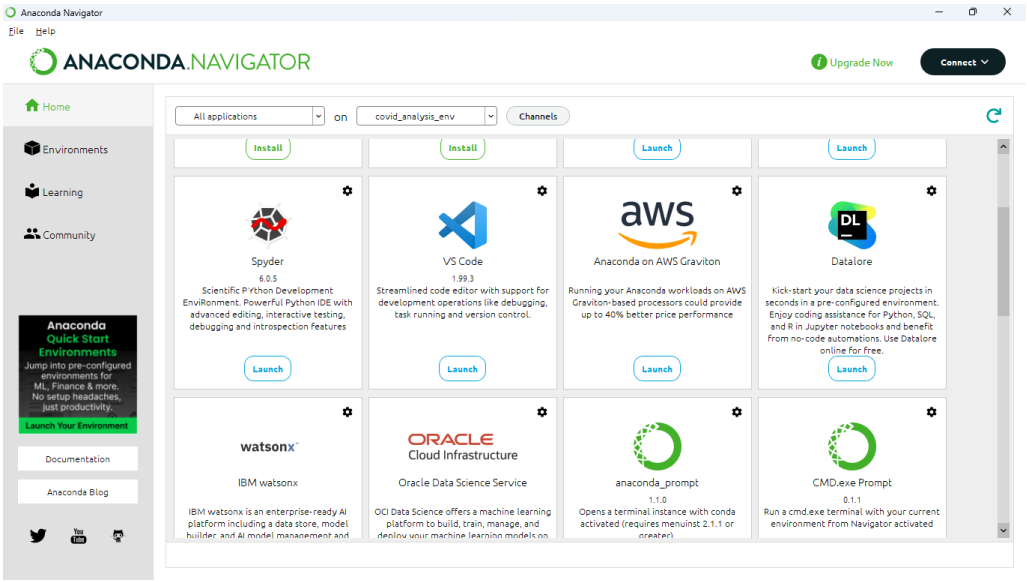


Figure 9 - Spyder installation and launch

Inside Spyder Open the **covid_analysis.py** and the **config.ini** files from **Work/Scripts folder**

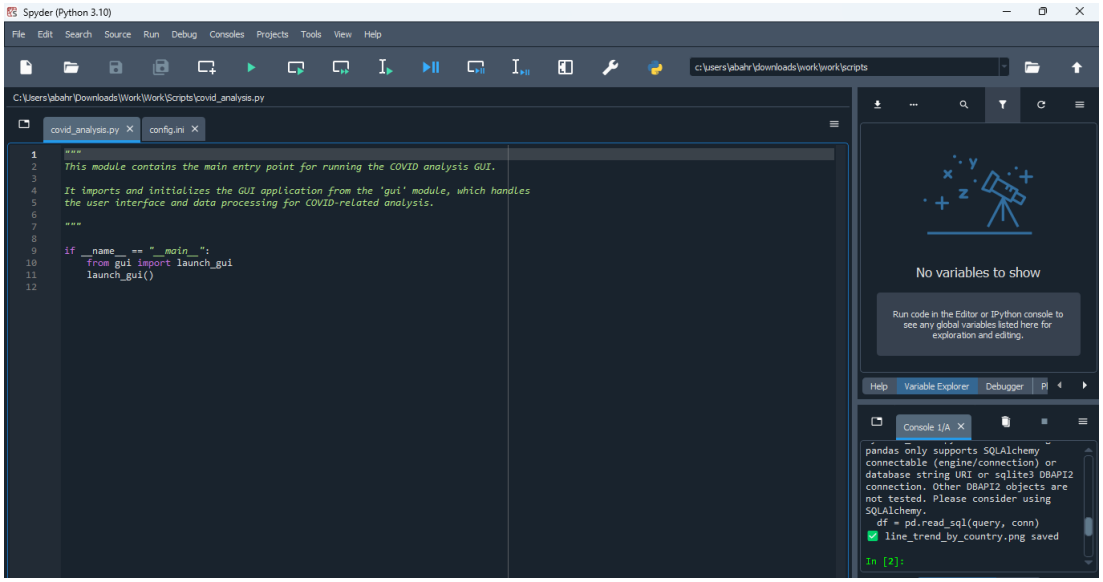


Figure 10 - Spyder IDE

4. Database

Now after Opening **covid_analysis.py** and **config.ini** in spyder we need to configure the **database** information's so:

- Open MySQL Workbench

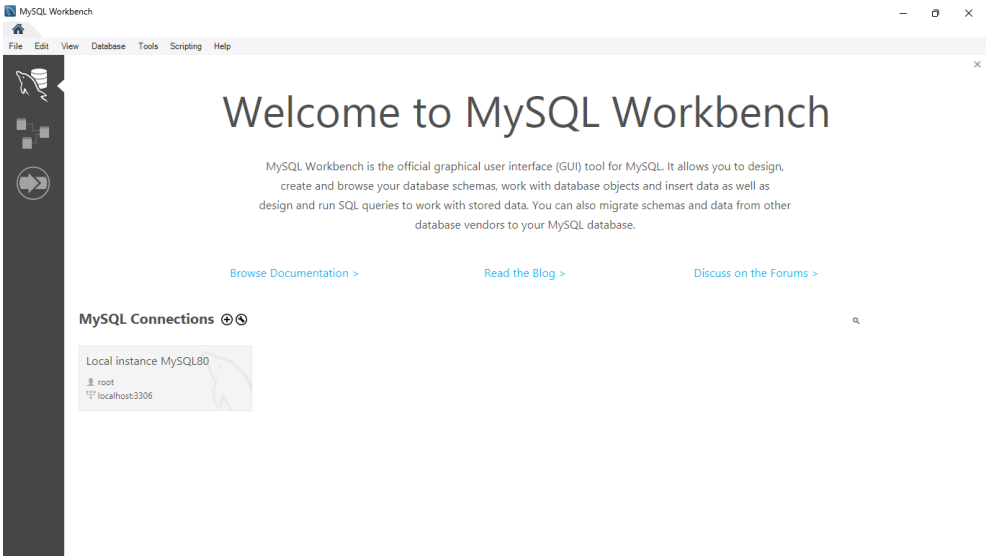


Figure 11 - MySQL Workbench

- At the bottom you can see MySQL localhost connection click on it, it will ask for **user** and **password**, the ones you used during installation, and then it will take you into this interface
- Create a new database schema and name it **covid_analysis_db,** it's empty for now.

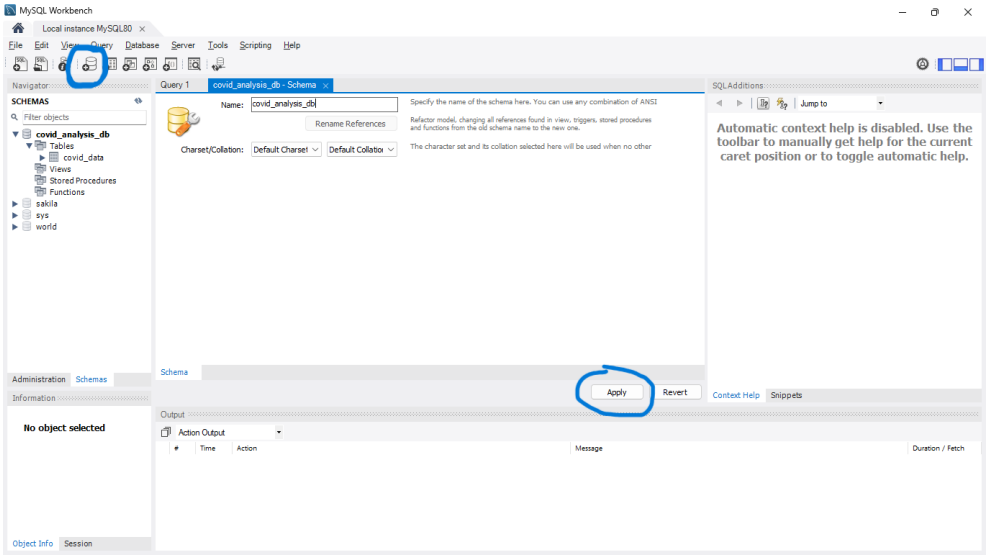


Figure 12 - Database creation

- Now we go back to spyder to update the **config.ini** file for now it's something like this, fill the variables with the right information's: **password** and **user** used during **installation**, and the **name** of the database we just created

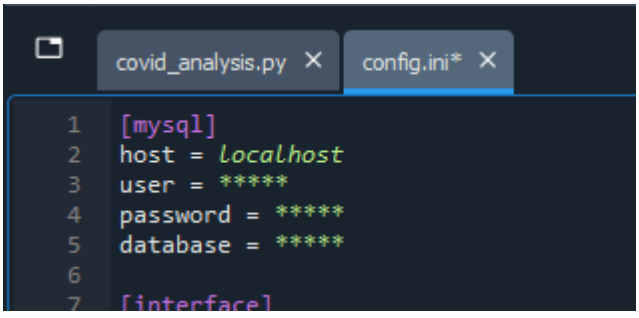


Figure 13 - MySQL configuration

5. Python Interpreter

Inside Spyder in **Tools>Preferences>Python Interpreter** choose the one used by the environment we created previously. (In our example **covid_analysis_env\python.exe)**. Click apply, maybe you will need to restart Spyder for the change to take action

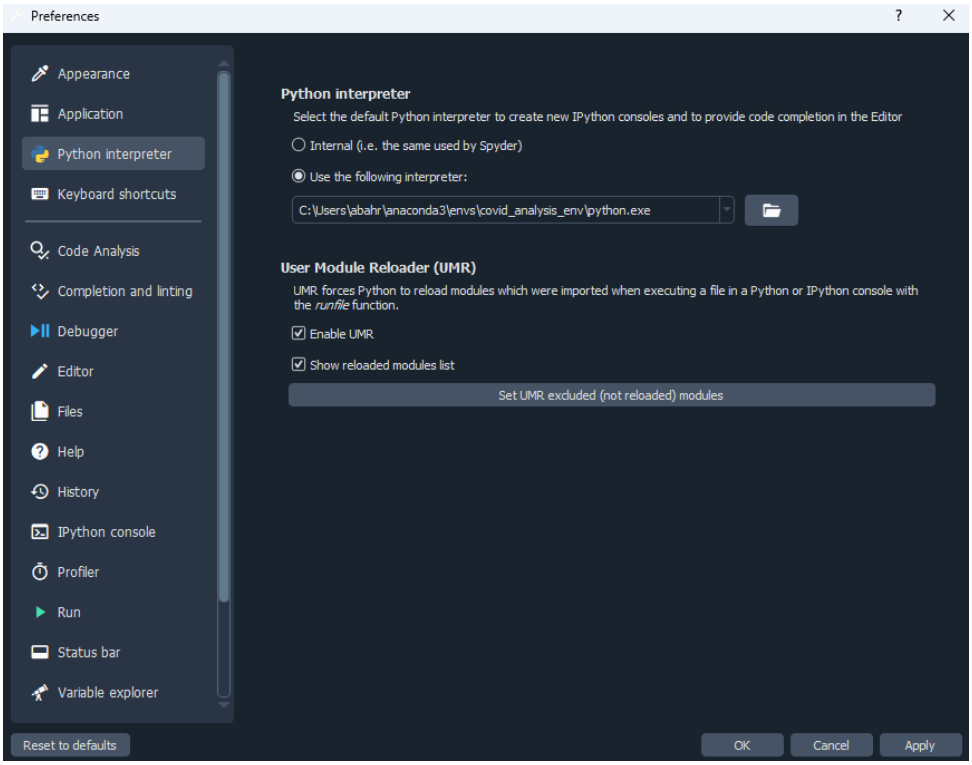


Figure 14 - Python interpreter

You should see the environment we are using at the bottom of Spyder, make sure it's the right one:

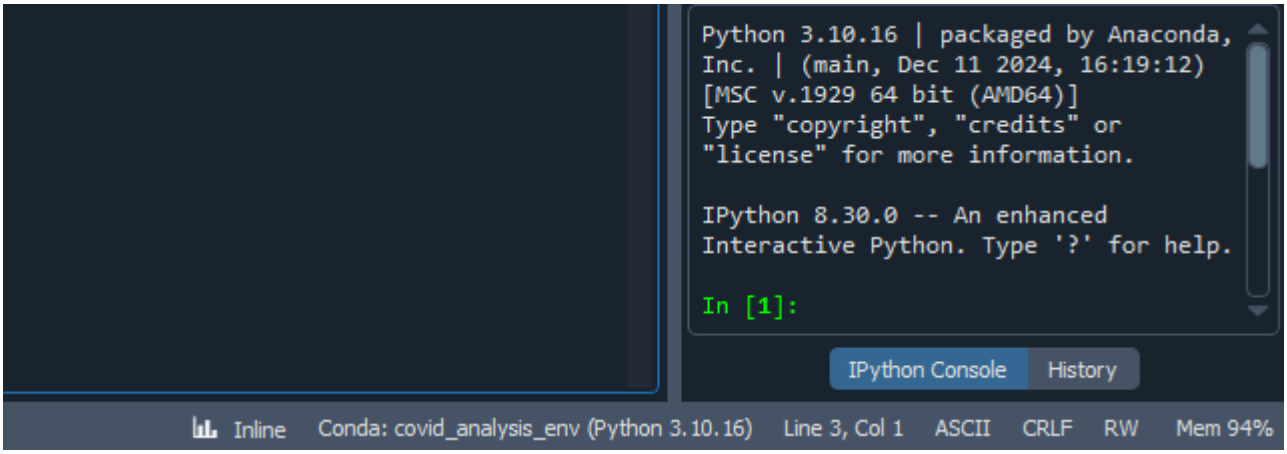


Figure 15 - Environment check

6. Run the Program

Now go to the covid_analysis.py file opened in Spyder and run it and the GUI must appear

7. User App Guide

Once you run the covid_analysis.py file the tkinter app will appear, a sidebar on the left to make the navigation easy and better. The app has 5 pages one for Data Loading and Preprocessing, a page where you can read data and filter it, a page for statistics, export and report generation, a page for visualization and a page for configuration of the app.

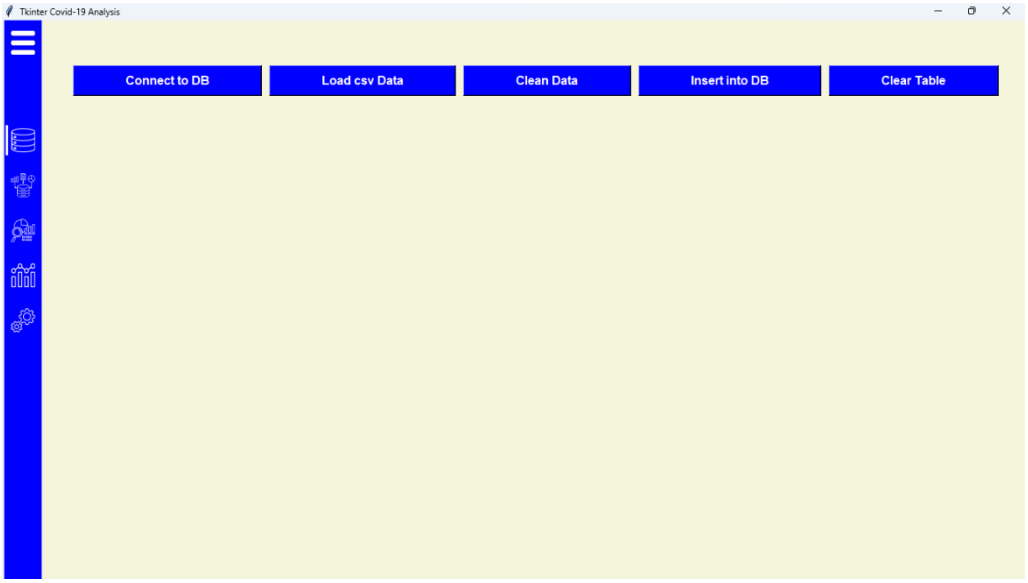


Figure 16 - App

Loading & Preprocessing

The following instructions in **Loading/Preprocessing** page are **mandatory before anything else**, after you have done them, you can skip them on the next launch

a. At first the user must Connect to the database; this will create the covid data table in database if it doesn't exist.

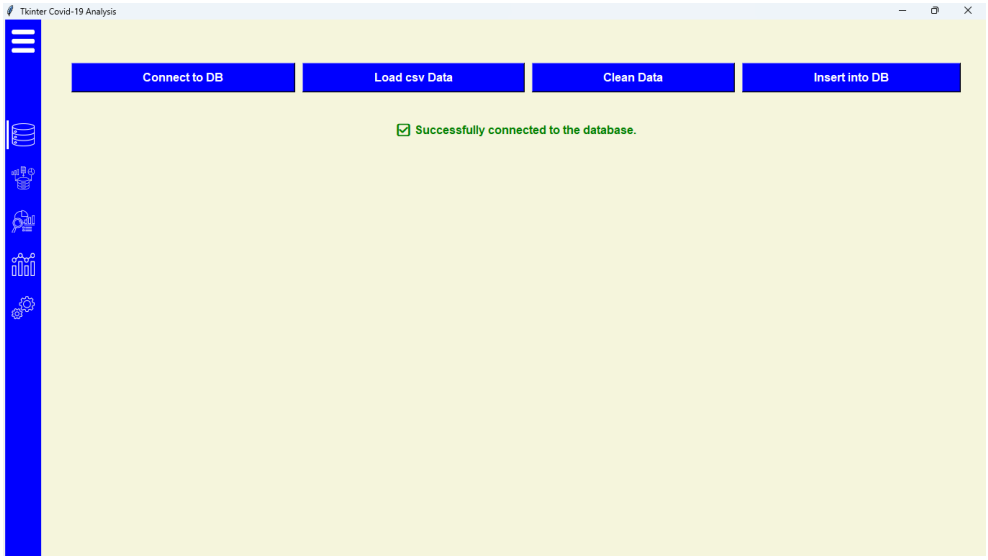


Figure 17 - Database Connection

b. The user can use Clear table to delete all rows from database and start fresh.

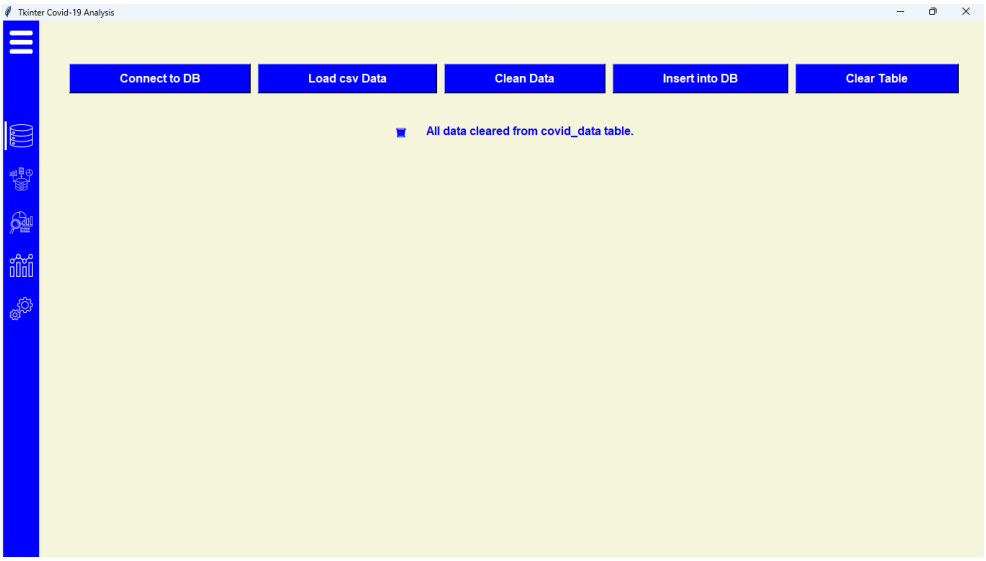


Figure 18 - Clear Table

c. Load data will read the data from the csv files inside the DATA folder.

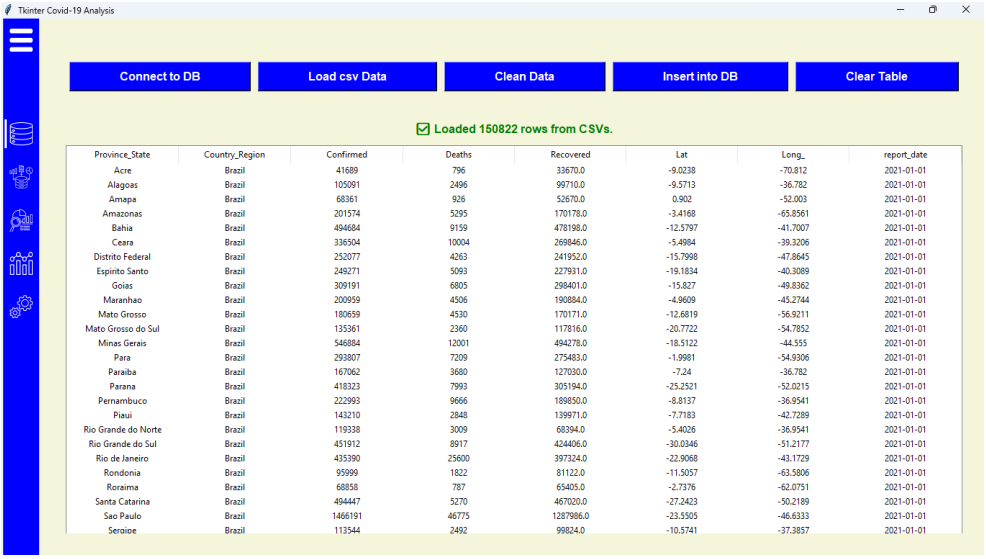


Figure 19 - Data loading from CSVs

d. Clean data to prevent having null values in database, it helps checking and filling fields with appropriate default data.

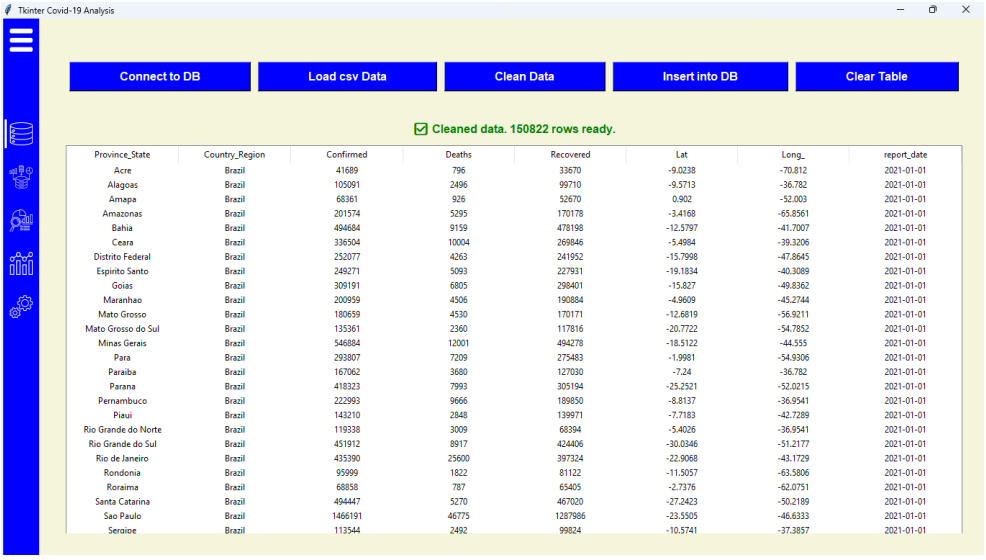
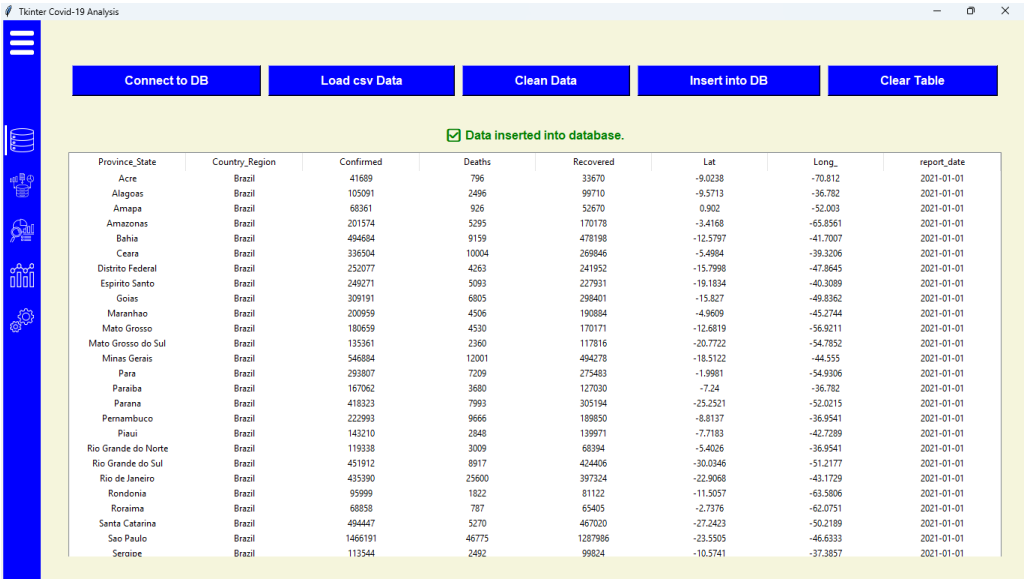


Figure 20 - Data cleaning

e. At the end, the user must insert that data into the database so it can be used later.

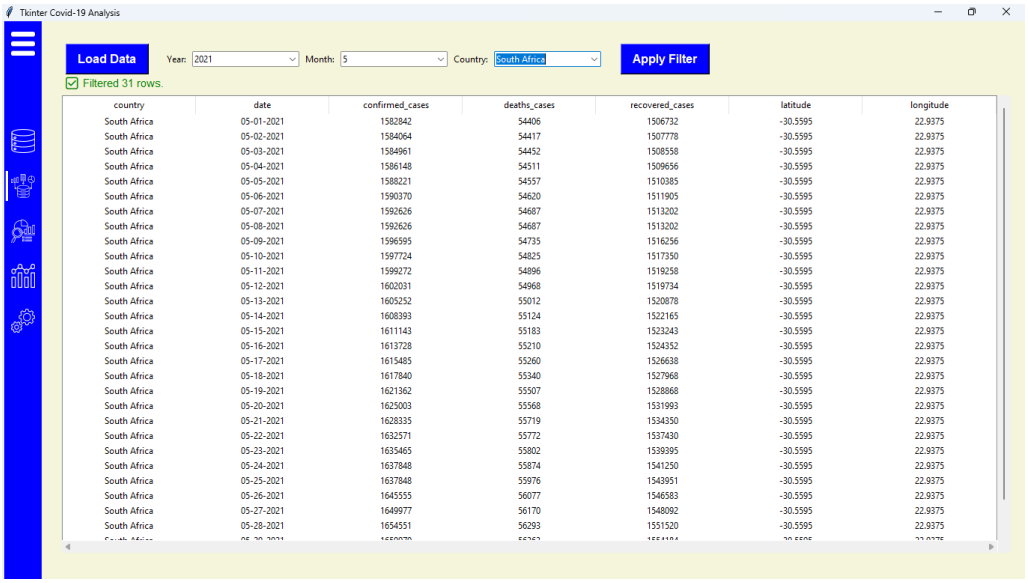


Province_State	Country_Region	Confirmed	Deaths	Recovered	Lat	Long_	report_date
Acre	Brazil	41689	796	33670	-9.0238	-70.812	2021-01-01
Alagoas	Brazil	105091	2496	99710	-9.5713	-36.782	2021-01-01
Amapa	Brazil	68361	926	52670	0.902	-52.003	2021-01-01
Amazonas	Brazil	201574	5295	170178	-3.4168	-65.8561	2021-01-01
Bahia	Brazil	494684	9159	478198	-12.5797	-41.7007	2021-01-01
Ceara	Brazil	336504	10004	269846	-5.4984	-39.3206	2021-01-01
Distrito Federal	Brazil	252077	4263	241952	-15.7998	-47.8645	2021-01-01
Espirito Santo	Brazil	249271	5093	227931	-19.1834	-40.3089	2021-01-01
Goias	Brazil	309191	6805	298401	-15.827	-49.8362	2021-01-01
Maranhao	Brazil	200959	4506	190884	-4.9609	-45.2744	2021-01-01
Mato Grosso	Brazil	180659	4530	170171	-12.6819	-56.9211	2021-01-01
Mato Grosso do Sul	Brazil	135361	2360	117816	-20.7722	-54.7852	2021-01-01
Minas Gerais	Brazil	546884	12001	494278	-18.5122	-44.555	2021-01-01
Para	Brazil	293807	7209	275483	-1.9981	-54.9306	2021-01-01
Paraiba	Brazil	167062	3680	127030	-7.24	-36.782	2021-01-01
Parana	Brazil	418323	7993	305194	-25.2521	-52.0215	2021-01-01
Pernambuco	Brazil	222993	9666	189850	-8.8137	-36.9541	2021-01-01
Piaui	Brazil	143210	2848	139971	-7.7183	-42.7289	2021-01-01
Rio Grande do Norte	Brazil	119338	3009	68394	-5.4026	-36.9541	2021-01-01
Rio Grande do Sul	Brazil	451912	8917	424406	-30.0346	-51.2177	2021-01-01
Rio de Janeiro	Brazil	435390	25600	397324	-22.9068	-43.1729	2021-01-01
Rondonia	Brazil	95999	1822	81122	-11.5057	-63.5806	2021-01-01
Roraima	Brazil	68858	787	65405	-2.7376	-62.0751	2021-01-01
Santa Catarina	Brazil	494447	5270	467020	-27.2423	-50.2189	2021-01-01
Sao Paulo	Brazil	1466191	46775	1287986	-23.5505	-46.6333	2021-01-01
Sergipe	Brazil	113544	2492	99824	-10.5741	-37.3857	2021-01-01

Figure 21 - Data insertion

Data Filtering

The next page is **Data Filtering** where the user must first load data and then he can filter by **year**, **country** and **month**, the user can choose either **one**, **two** or **three at a time** to filter.



country	date	confirmed_cases	deaths_cases	recovered_cases	latitude	longitude
South Africa	05-01-2021	1582842	54406	1506732	-30.5595	22.9375
South Africa	05-02-2021	1584064	54417	1507778	-30.5595	22.9375
South Africa	05-03-2021	1584961	54452	1508558	-30.5595	22.9375
South Africa	05-04-2021	1586148	54511	1509656	-30.5595	22.9375
South Africa	05-05-2021	1588221	54557	1510385	-30.5595	22.9375
South Africa	05-06-2021	1590370	54620	1511905	-30.5595	22.9375
South Africa	05-07-2021	1592626	54687	1513202	-30.5595	22.9375
South Africa	05-08-2021	1592626	54687	1513202	-30.5595	22.9375
South Africa	05-09-2021	1596595	54735	1516256	-30.5595	22.9375
South Africa	05-10-2021	1597724	54825	1517350	-30.5595	22.9375
South Africa	05-11-2021	1599272	54896	1519258	-30.5595	22.9375
South Africa	05-12-2021	1602031	54968	1519734	-30.5595	22.9375
South Africa	05-13-2021	1605252	55012	1520878	-30.5595	22.9375
South Africa	05-14-2021	1608393	55124	1522165	-30.5595	22.9375
South Africa	05-15-2021	1611143	55183	1523243	-30.5595	22.9375
South Africa	05-16-2021	1613728	55210	1524352	-30.5595	22.9375
South Africa	05-17-2021	1615485	55260	1526638	-30.5595	22.9375
South Africa	05-18-2021	1617840	55340	1527968	-30.5595	22.9375
South Africa	05-19-2021	1621362	55507	1528868	-30.5595	22.9375
South Africa	05-20-2021	1625003	55568	1531993	-30.5595	22.9375
South Africa	05-21-2021	1628335	55719	1534350	-30.5595	22.9375
South Africa	05-22-2021	1632571	55772	1537430	-30.5595	22.9375
South Africa	05-23-2021	1635465	55802	1539395	-30.5595	22.9375
South Africa	05-24-2021	1637848	55874	1541250	-30.5595	22.9375
South Africa	05-25-2021	1637848	55976	1543951	-30.5595	22.9375
South Africa	05-26-2021	1645555	56077	1546583	-30.5595	22.9375
South Africa	05-27-2021	1649977	56170	1548092	-30.5595	22.9375
South Africa	05-28-2021	1654551	56293	1551520	-30.5595	22.9375

Figure 22 - Data Filtering Page

Statistics

The next page is **Statistics** where the user must first load data and then can select from a dropdown menu an option for statistics.

- The user can after, generate a report, which will be stored inside **Work/Output/reports** folder.
- The user can after, export the statistic, which will be stored inside **Work/Output/exports** folder.

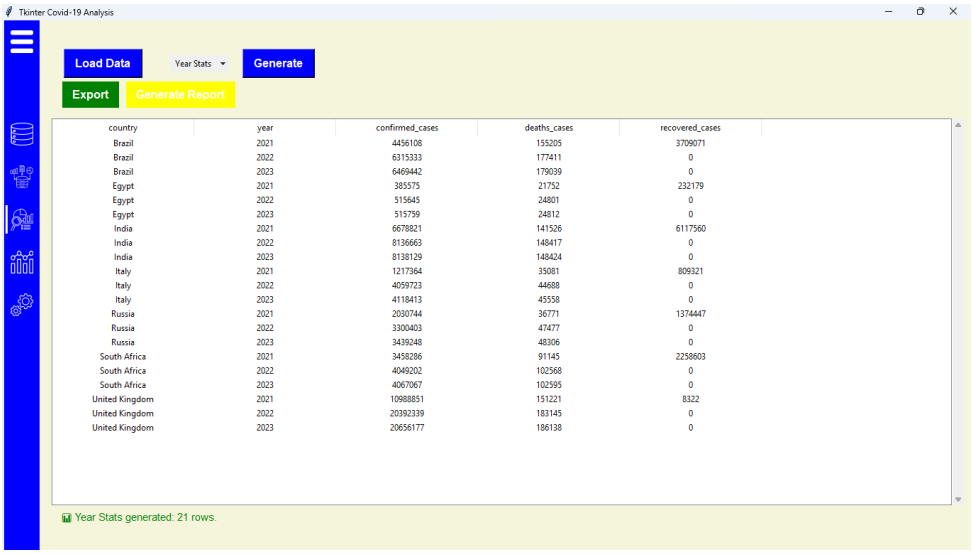


Figure 23 - Statistics page

Visualization

The next page is **Visualization** where the user must first load data and then can select from a dropdown menu an option for visualization.

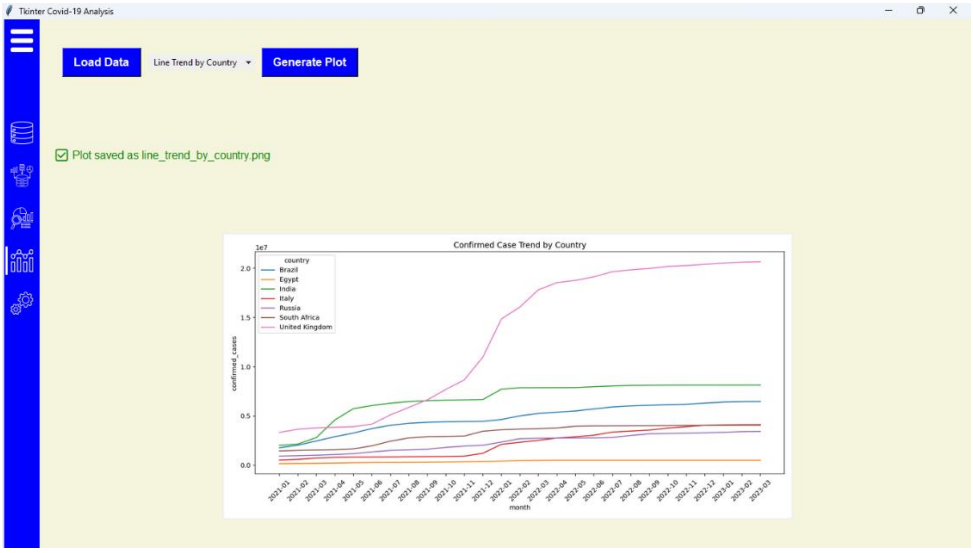


Figure 24 - Visualization page

Configuration

The last page is the **Configuration** page where the user can customize the interface by changing the fonts and colors, when the changes are saved, the app will automatically restart to show updates.

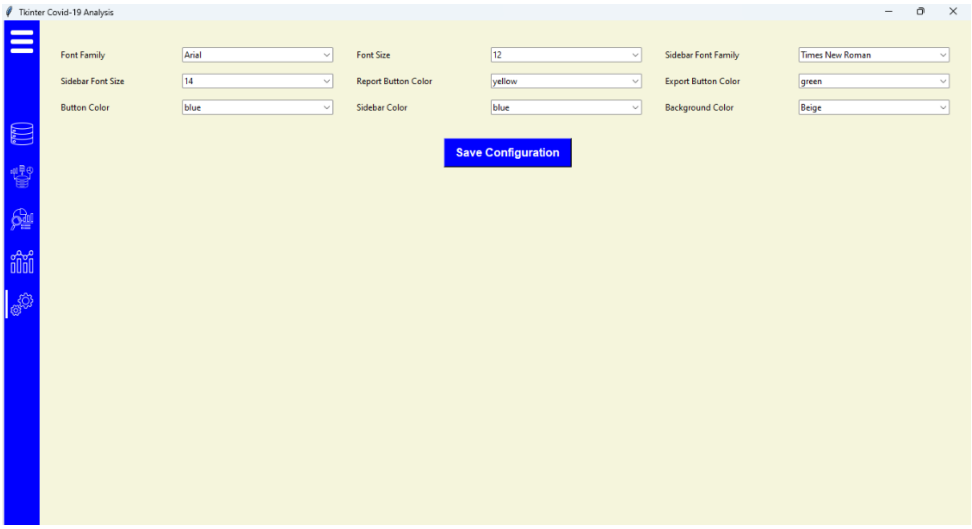


Figure 25 - Configuration page