DST_mini_project

Roll number: 9008

The design of the software

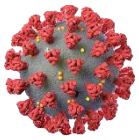
1. User interface

Python module

Tkinter package, a standard Python interface to the Tk GUI toolkit, is used to implement the UI.

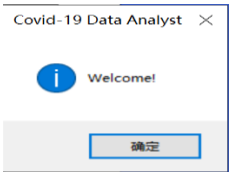
Logo

Since the feature of this application is to analyze the data of COVID-19 cases, a COVID-19 model is chosen to be the icon. In this way, it is easier for users to find the application and know what it does at the first sight.



Welcome!

A welcome message box will bound out after the icon is clicked. Users are able to enter the main interface by clicking “Yes”.

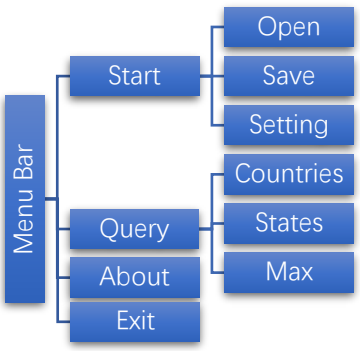


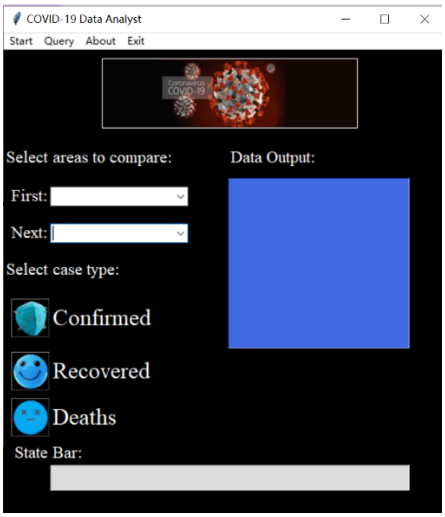
Main interface

The interface is consisted of the following widgets:

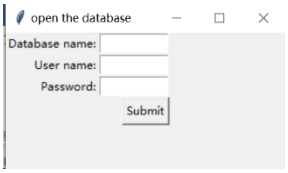
(1) Menu Bar

It has FOUR parts: Start, Query, About, Exit





(i) The START part has 3 features.

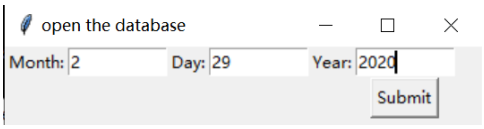


“Open”: Bound a new window out and require users to input the database name, username, and the password. If there’s no input, the application will use the default value.

“Save”: Get the data displayed on the data output box. Write them to the file that users want.

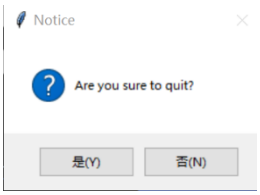
“Setting”: Change the settings of the application. This part is not needed in the current version of this application.

(ii) The QUERY part has 3 modes:
Compare countries mode will fill the combo box with the list of countries for users to choose.
Compare states mode will fill the combo box with the list of states for users to choose.
Max case country mode will bound out a window to ask an input of a specific day that users are investigating.



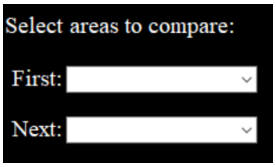
(iii) The ABOUT part will bound a message box out, including a brief introduction of this application and some information of copyright.

(iv) The EXIT part is used to quit. After clicking, a determination box will bound out to ask users about their intention.



(2) Combo box:

There are two combo boxes. Each contains a list of areas (countries or states, depending on the query that users selected). From these two boxes, users can choose the areas to compare.



(3) Button:

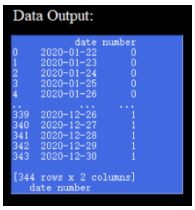
There are three buttons: Confirmed, Recovered and Death. Users are able to click one picture button (not the text besides) to choose one case type for analysis.
For example, if “Confirmed” button is clicked, the application will draw a confirmed_case vs time graph of the two areas being selected.

(4) Status bar:

This bar is used to display some information about the current status of the application.
For example, “Please wait, connecting the database”, “Connection Failed” etc.

(5) Data output:

This box is used to display the data fetched back and it can be saved into a TXT file using the SAVE feature in the menu.



2. *Query*

Query1: Compare the case number of the given case type of two countries. The application will display the data in the data output box and print the number vs time line for both countries in one graph.

Query2: Compare the case number of the given case type of two states. The application will display the data in the data output box and print the number vs time line for both states in one graph.

Query3: Find the country with the most cases (confirmed/recovered/death, based on users' choice) by a given day and draw a number vs time graph for it.

3. *Failure*

(1) Connection and Fetching failure

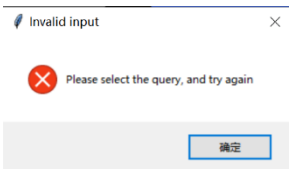
(Connection Failed, PostgreSQL psycopg2 cursor.execute() ERROR)

If failure occurs when connecting the PostgreSQL or fetching the data back, a try-except statement is used to capture and print out the error rather than quit the program directly. The error information will be shown both in the terminal and the status bar.

(2) Invalid user input

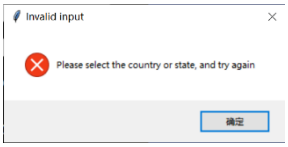
Case1:

If users clicked the button without selecting the query, an error message box will show up and interrupt the process.



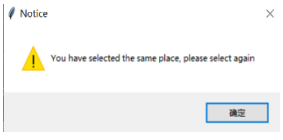
Case2:

If users selected the query but clicked the button without selecting the areas, an error message box will appear.



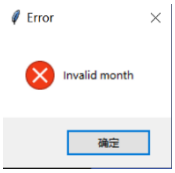
Case3:

If users selected the same area for both combo boxes, a waring message box will show up to alert.



Case4:

If users select the wrong year, month or day. An error message box will show up to warn. The valid date is from 2020-1-22 to 2020-12-30.



Database

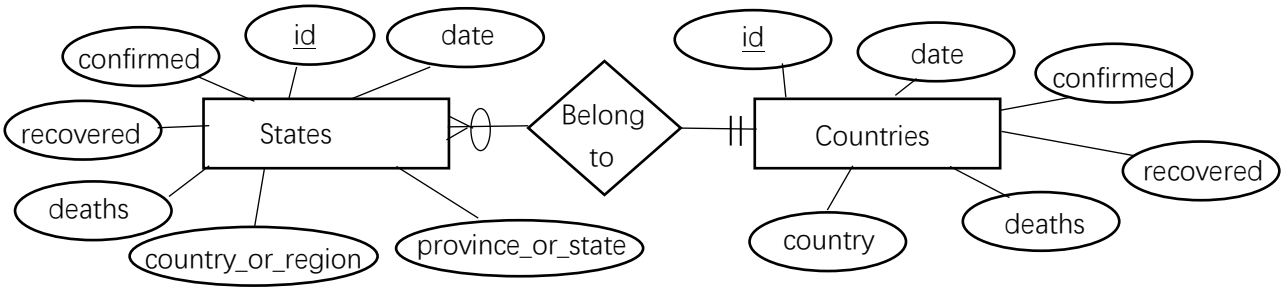
1. The database being used

The database being used is named “final”. It contained two tables called “Countries” and “States”. The “Countries” table is modified by countries-aggregated csv file and an id column is added as a primary key. It has 7 columns, id, date, confirmed cases, recovered cases, deaths cases, country_or_region and province_or_state. Similarly, the “States” table is modified by time-series-19-covid-combined_csv csv file and an id column is added as a primary key. It has 6 columns, id, date, confirmed cases, recovered cases, deaths cases and country.

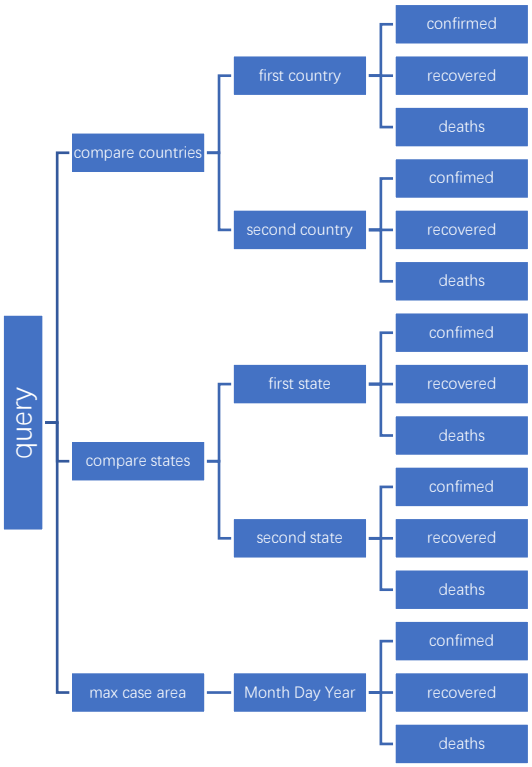
2. The design of the database

Each state belongs to exactly one country. A country may have many states belonging to it, but it does not have to have any.

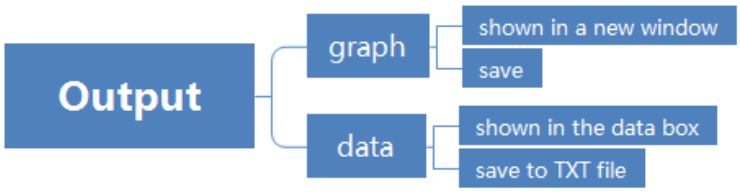
3. Database’s ERD



Input



Output



When clicking the one of the three buttons (Confirmed/Recovered/Deaths), data will be inserted to the data box and a graph will appear in a new window at the same time. As the mouse moves over the curve, the corresponding value is displayed the lower right corner of the new window. The data can be saved into TXT file using the SAVE feature in the menu bar while the graph can be saved by clicking the save button in the new window.