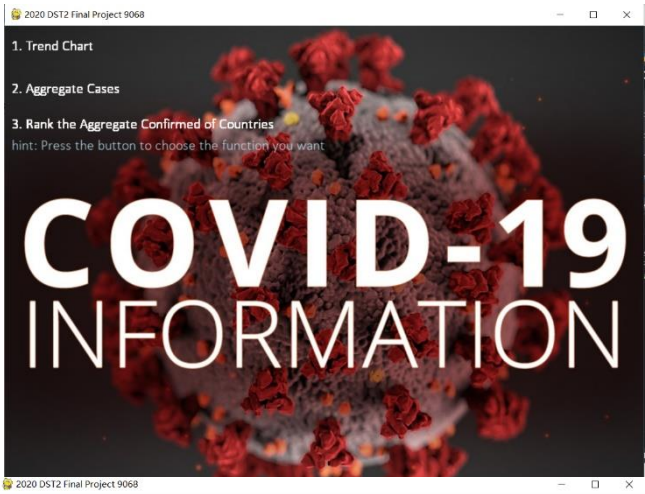
Covid_19 trend chart and daily data search app

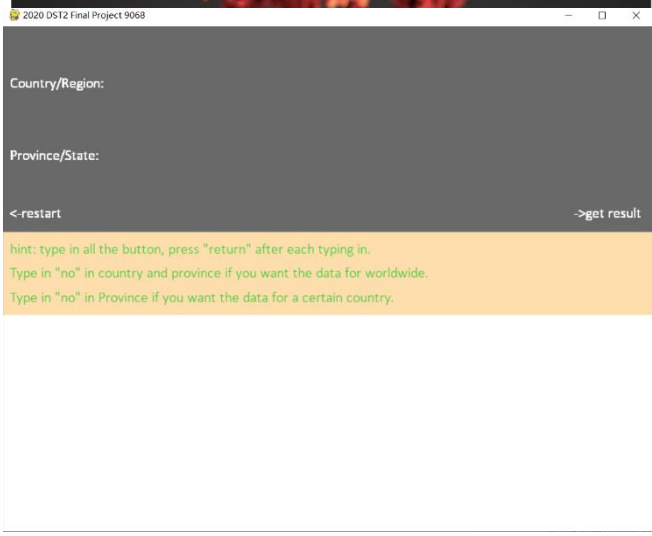
1. The design of my software

a. User interface

For the user interface, when users open the app, there will be the first interface. Here is the picture. Users can choose one of three query function on it. The first query is to draw a trend chart for worldwide, a country/region, or a province/state. The middle one is to get the aggregate data for the place you want. The last query is to get the ranking of aggregate confirmed of countries.



Press one of the buttons, the interface will change. Here is the picture for the second interface. Users need to type in all the button according to the hints and press “get result” button. The result will appear in the white place. Press the “restart” button can return to the first interface.



The user interface is made by python with module pygame.

b. Query function

This software is used to get the trend chart, the accurate data for a specific place, and the rank of aggregate confirmed of countries. With these detailed and intelligible charts and data, we can acquire the epidemic situation and the effect of epidemic prevention and control in different places easily. Covid_19 is a large-scale pandemic sweeping the world. It has brought an enormous blow to human society, so it is significant to get some search apps like this.

2. Databases

a. Database source

For the database, all the data is got and modified from the website *https://datahub.io/core/covid-19.* I use three .csv files, *worldwide-aggregate.csv, countries-aggregated.csv,* and *time-series-19-covid-combined.csv.*

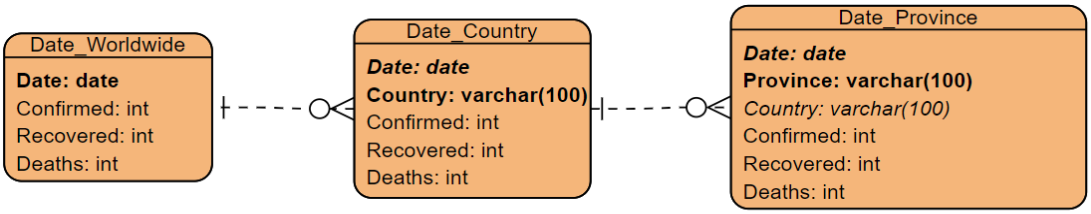
b. Design database

The name of the database is “Covid_19”. I create three tables in it, *date_worldwide, date_country* and *date_province*, and a temporary table, *cp*.

Table *cp* is copied from *time-series-19-covid-combined.csv* files. Table *date_worldwide* is copied from *worldwide-aggregate.csv,* drop the column *increase_rate,* and let the date be the primary key. Table *date_country* is copied from *countries-aggregated.csv.* Let the date and country to be primary key together. The foreign key is date referencing to table *date_worldwide*. Table *date_province* is inserted from the table *cp* WHERE province NOTNULL. The primary key is date and province. The foreign key is date and country referencing to table *date_country.* In the end, drop the table *cp.*

c. ER Diagram

The ERD for database Covid_19 is shown here. The attribute in bold font means it is the primary key or part of the primary key. The attribute in italic font means it is the foreign key or part of the foreign key. The line between each table means the relationship. All the line in this diagram means one-to-many relationships. For example, a country can have many provinces, but a province will only belong to one country.

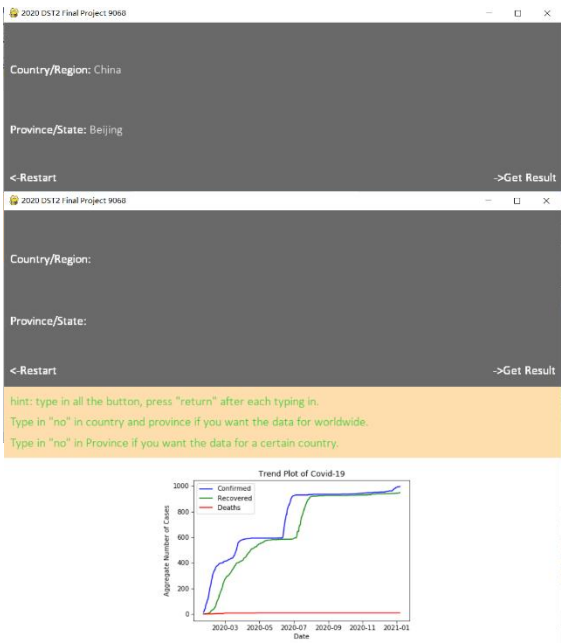


3. Input and Output

a. Query1: Trend Chart

For input, you need to type in all the buttons. Country/Region button and Province/State button need to type in a name. you can type in “no” in two buttons and will get the chart worldwide. And can type in “no” in Province/State button to get the chart for a country. If both type in a name, the result will be a chart for a province.

For output, the software will output a trend chart, made by matplotlib, for the place you type in. Here the picture shows the input and output.



b. Query2: Aggregate Cases

For input, the date button should be typed in in this format “year-month-day”, for example, “2020-02-22”. The other two buttons are the same as the Query1.

For output, the output will be four lines, shows the aggregate number of confirmed, recovered cases and deaths as of that date.

c. Query3: Rank the Aggregate Confirmed cases of Countries

For input, the date button is the same as Query2, the rank button needs to type in an integer, which is the ranking you are interested in.

For output, it will output three lines, showing the country's name, and the aggregate number of confirmed cases as of that date.

For all these Querys, if part of the buttons is empty, or input is not in the table, it will output "Some of the buttons have not typed in or the input is not in the table."

4. Acknowledgement

Thanks for the code given by Dr.Liu, which gave the basic structure of my code. Also thanks so much for the help from my classmates.