

Covid-19 Pandemic Dynamic Data Visualization

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1. Introduction

The Covid-19 pandemic has brought an unprecedented impact to the world. Many scholars are focusing on studying the relationship between the spread of the epidemic and geographical regions. There are also many scholars who analyze the policy aspect from a higher level. That is, the relationship between the national anti-epidemic policy and the development of the epidemic.

For this project, we want to focus on the covid data in China. China is a vast country with 34 provincial-level administrative regions, including 23 provinces, 5 autonomous regions, 4 municipalities directly under the Central Government, and 2 special administrative regions. Epidemic status varies by state. Data-sharing platforms such as DingXiang, Tencent, and Baidu provide the latest available public data on COVID-19 in all regions across China in real time. Such data can be used to gain key insights into the spatial and temporal spread of the disease within China.

This project will build a website that showcases the inter-provincial differences of the epidemic in China by tracking key numbers such as the number of confirmed cases and the mortality rate. The information will be shown by various interactive graphs and maps.

2. Description of this project

Based on the real-time covid-19 data in China, we will create different types of interactive charts and maps to help people understand the current status of the pandemic as well as how the pandemic evolves.

3. Project type

Web Page/Data Scraping/Database

4. Audience for this project

Our first audience is the general public. The general public can learn about the local epidemic status through our website. This information can allow the general public to have a more intuitive understanding of the severity of the epidemic, and also allow everyone to make reasonable expectations about the potential impact of the epidemic on their lives.

Our second audience is the Chinese CDC. CDC researchers can more intuitively see the epidemic situation in various provinces and cities through our interactive visualization website. They can also see more specifically the trend of the number of infected people in a specific location, and whether the infected person is a severe case. This information will aid epidemiological studies and policy making.

Finally, our audience also includes government executives. Through our website, policymakers can better formulate epidemic-related policies to prevent imported cases from abroad as well as to prevent the spread of the epidemic within the country. For example, a policy to prevent imported cases could be compulsory physical examination upon entry to China and the compulsory isolation of infected persons.

5. Approach

1. Dataset:

We will first do data scraping from websites to gain the up-to-date information on the covid data across China. We will consider using real-time data from DingXiang and Tencent.

2. Visualization:

- Map: we will consider showing a map by province, where the intensity of color for each province shows the severity of the pandemic. By clicking on the date, the map will show the severity of the pandemic by province for that particular day.
- Line chart: we will show the new covid cases nation-wide per day by a line chart. This chart will be able to show the trend, which will be useful for the administrators.
- pie chart: we intend to draw a pie chart for detailed information regarding the breakdown value by province in terms of different metrics, including the number of new cases, new death count, cumulative cases, cumulative death count.

We will be using the Django framework to build the interactive website for the above visualizations.

6. Impact statement (conclusion statement) for this project?

In the best case scenario, our website will contain all the graphs and maps to show the up-to-date covid data across China. For example, when the viewer clicks on a certain day on the map, he will see the number of new cases per region on the map shown by different density of color. We intend to show all the data in a clear and easy-to-understand way.

Ideally, the viewers can interact with our map and graphs to see the selected data. In addition, the speed to retrieve the data is fast enough to provide a better user experience.

7. All major milestones for this project.

1. Use python to scrape the up-to-date data.
2. Experiment with map and pie charts.
3. Add year pivot to find the changes with years.
4. Add location pivot to find the change with location.

8. Obstacles During This Project

8.1. Major obstacle

There is a pivot under the map which can control the year and data will be changed. This is a technical challenge to our team.

8.2. Minor obstacle

We will need to learn how to use the Django framework to create a quality web application.

9. Resources needed

1. Real-time covid data from China using websites such as Dingxiang and Tencent.

2. Some help with using Django for building the website.

10. Definition of Success

Our definition of success is that each of our target audiences has intuitive access to information that is useful to them. The functions of the website can be realized stably, the icons are clear, and the interactive functions are accurate and usable.

11. Major publications relevant to this project

- <https://mama.dxy.com/outbreak/daily-of-nationwide-new?index=20200206&locationIds=999&from=todh5>
- <https://news.qq.com/zt2020/page/feiyan.htm#/>
- <https://voice.baidu.com/act/newpneumonia/newpneumonia>
- Hasyira Ahmad Wafa, Raihah Aminuddin, Shafaf Ibrahim, Nur Nabilah Abu Mangshor, Nor Izreen Fara Abdul Wahab, "A Data Visualization Framework during Pandemic using the Density-Based Spatial Clustering with Noise (DBSCAN) Machine Learning Model", *System Engineering and Technology (ICSET) 2021 IEEE 11th International Conference on*, pp. 1-6, 2021.
- Maya John, Hadil Shaiba, "Data Visualization as a Tool for Decision Making: Analysis based on COVID-19 Data", *Decision Aid Sciences and Application (DASA) 2021 International Conference on*, pp. 870-874, 2021.
- Yaksh Talavia, Priyanka Singh, Sathiamoorthy Manoharan, "Covid-19 Tracker: A data visualization tool for time series data of pandemic in India", *Computer Science and Data Engineering (CSDE) 2021 IEEE Asia-Pacific Conference on*, pp. 1-5, 2021.
- Addepalli Lavanya, Panwar Darsha, Pasumarthi Akhil, Jaime Lloret, Navandar Yogeshwar, "A Real-Time Human Mobility Visualization of Covid-19 Spread from East Asian Countries", *Social Network Analysis Management and Security (SNAMS) 2021 Eighth International Conference on*, pp. 1-8, 2021.