

Real-time Covid-19 Data Dynamic Visualization

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I. Overview and Motivation

The Covid-19 pandemic has brought an unprecedented impact on 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 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 from region to region. Data-sharing platforms such as DingXiang, Tencent, and Baidu provide the latest available 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.

For this project, we built a website that showcased the inter-region differences in terms of the status of the pandemic in China by tracking key numbers such as the number of confirmed cases and the mortality rate.

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

II. Questions to Answer

Using our interactive covid-19 pandemic information dashboard, we would like to provide information regarding the general status of the epidemic in China and allow everyone to make reasonable expectations about the potential impact of the epidemic on their lives.

In addition, people can see the pandemic status in various provinces and cities through our interactive visualization dashboard. They can also see more specifically the trend of the number of infected people in a specific location, and the severity of the case. This information can also aid epidemiological studies and policymaking. For example, one policy to prevent imported cases could be compulsory physical examination upon entry to China and the compulsory isolation of infected persons.

III. Data Source

We conducted data scraping from several websites to gain the up-to-date information on the covid data across China. These websites included DingXiang, Baidu, and Tencent.

confirmedCount	confirmedIncr	curedCount	curedIncr	currentConfirmedCount	currentConfirmedIncr	dateId	deadCount	deadIncr	highDangerCount	midDangerCount	suspectedCount	suspectedCountIncr
confirmedCount	confirmedIncr	curedCount	curedIncr	currentConfirmedCount	currentConfirmedIncr	dateId	deadCount	deadIncr	highDangerCount	midDangerCount	suspectedCount	suspectedCountIncr

The CSV file stored the data we scraped from the DingXiang.com, Baidu.com and Tencent.com. It concluded 13 columns.

- confirmedCount ---- Total confirmed case count
- confirmedIncr ---- Daily confirmed case increment
- curedCount ---- Total cured case count
- curedIncr ---- Daily cured case increment
- currentConfirmedCount ---- Current confirmed case count
- currentConfirmedIncr ---- Current confirmed case count
- dateId ---- Date(YYYY-MM-DD)
- deadCount ---- Total dead case count
- deadIncr ---- Daily dead case increment
- highDangerCount ---- High danger area count
- midDangerCount ---- Median danger area count
- suspectedCount ---- Total suspected case count
- suspectedCountIncr ---- Daily suspected case increment

IV. Design Evaluation

Sketches

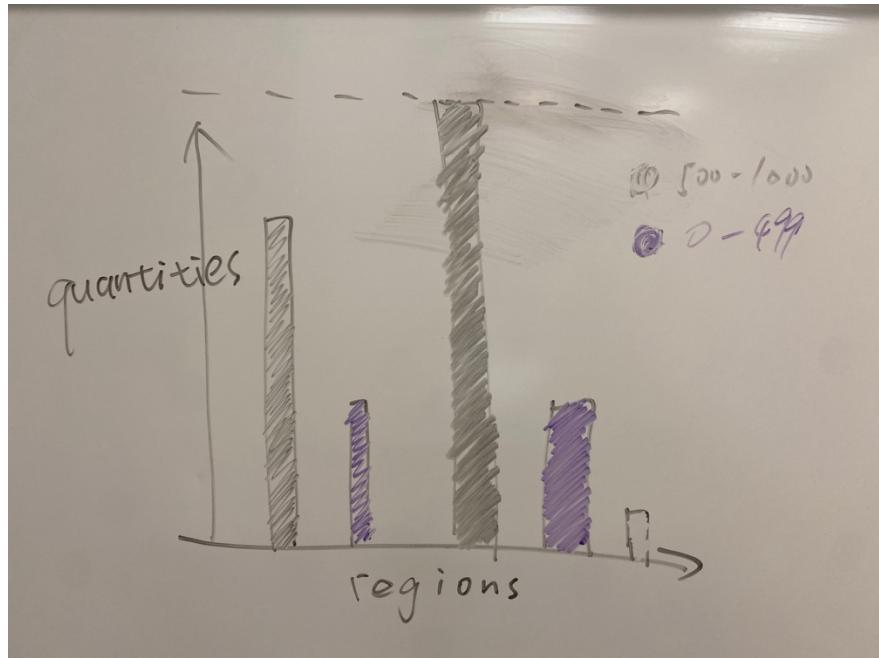
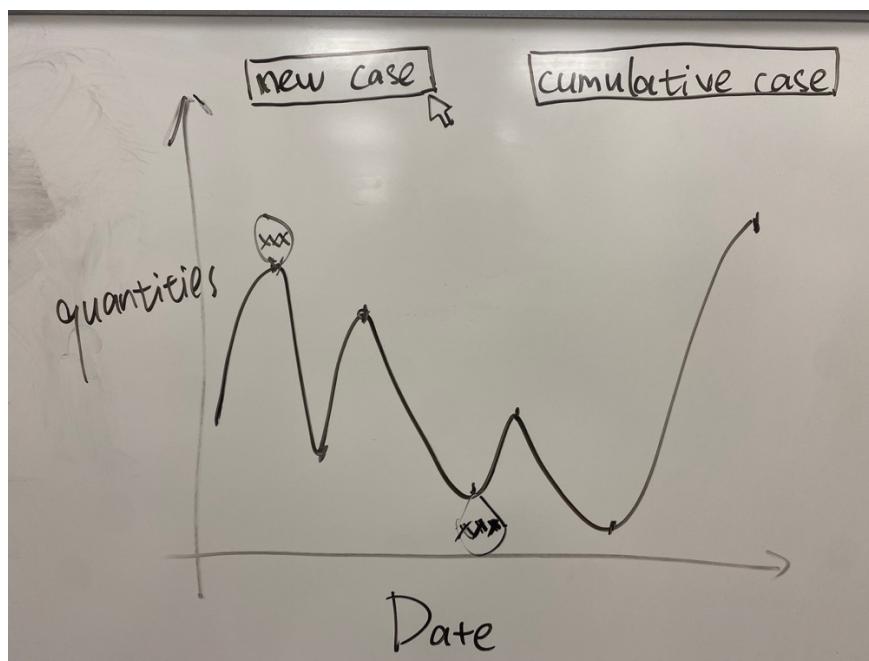


Figure 1 Sketch of quantities by regions



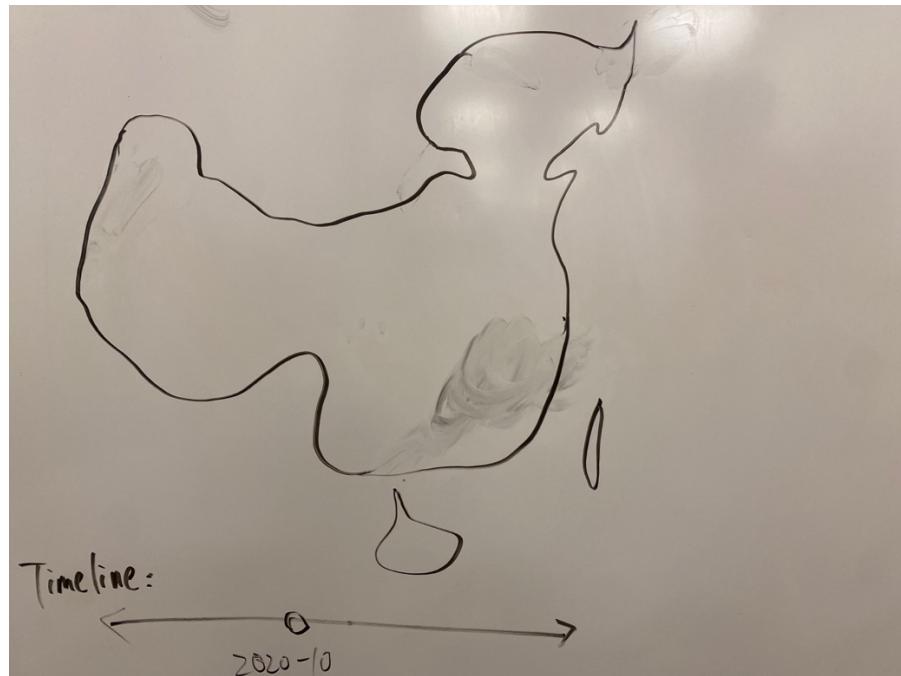


Figure 3 Heat map over time

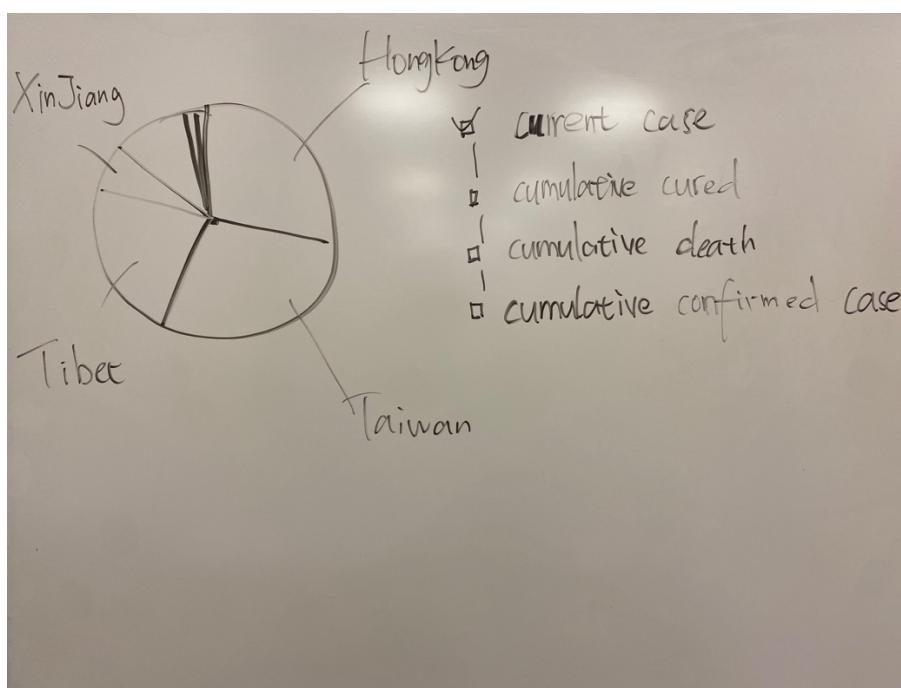


Figure 4 Pie Chart of Case distribution in 31 province

V. Implementation

We created an interactive covid-19 dashboard consisting of six different components. Each of the component was able to show a specific type of the covid data. We will explain the functions of each section of this dashboard below.



Figure 1 Overview of the Dashboard

On the news page shown in Figure 2, we can see some figures of the overall Covid-19 statistics such as the total number of confirmed cases in China and cumulative number of confirmed cases in China since the outbreak of the pandemic. This page also contains a section underneath the statistical figures, showing rolling news on the pandemic. Viewers will be able to click on the news to go to the original website.



Figure 2 News and Statistical Data Page

On the bar chart shown in Figure 3, we tracked the breakdown of confirmed cases by province, color coded for different number ranges of confirmed cases. It clearly shows the severity of the pandemic by location.

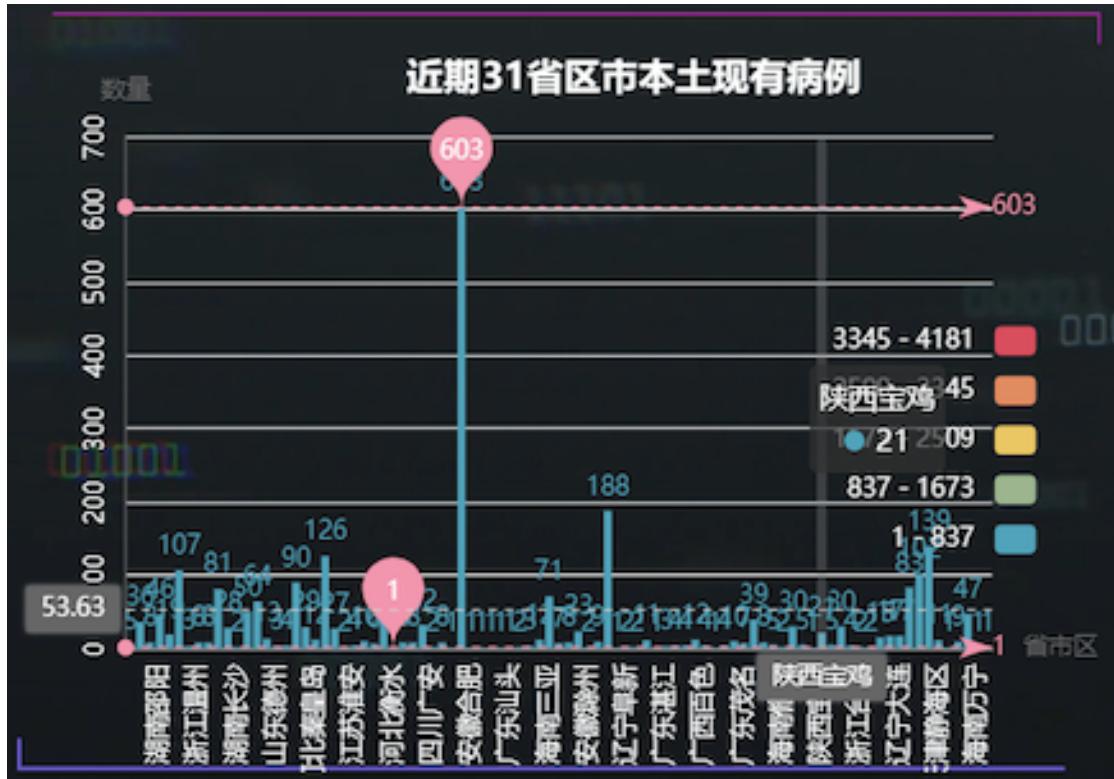


Figure 3 Bar Chart for Breakdown of Cases by Region

In Figure 4, we can see a line chart which shows the new covid cases nation-wide per day for the past 2 months. The line chart is color coded for different number ranges of new cases. This chart will be able to show the overall trend of the new cases nationwide.

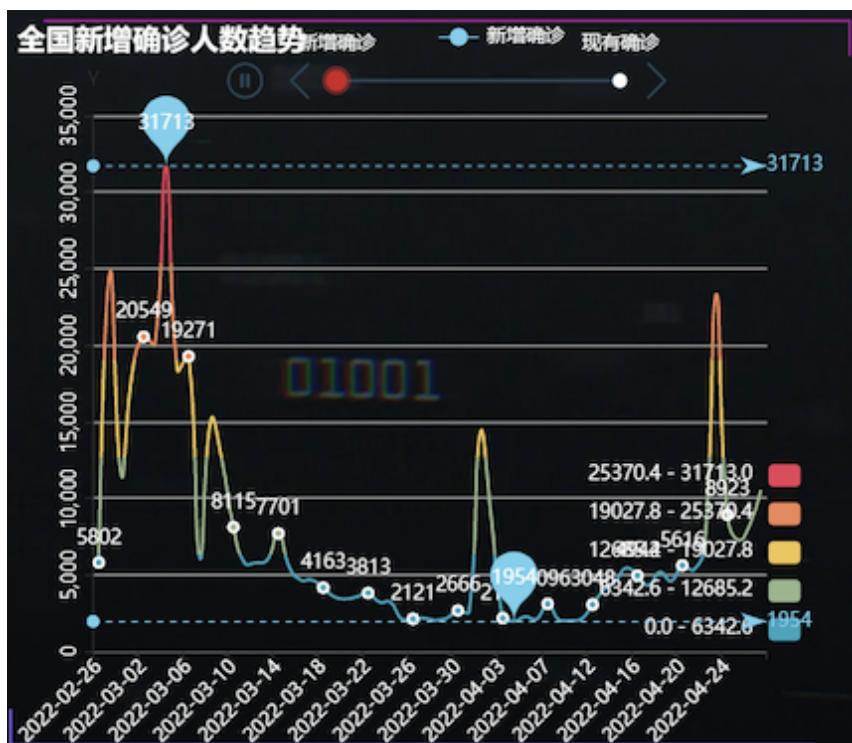


Figure 4 Line Chart for the Overall Trend of New Cases

In Figure 4, we see an interactive map of China that shows the breakdown of the number of confirmed cases 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 a particular day. This map shows the overall trend of the new cases nationwide and how the neighboring provinces are similar or dissimilar in terms of the pandemic status.



Figure 5 Interactive Map for Tracking the Number of Confirmed Cases Over Time

In this graph, we show 2 types of regions: middle-risk regions (in yellow) and high-risk regions(in red). We can read the names the 2 types of the regions from the above. And those names are also shown in a radial chart below. We can clearly see that the number of high risk regions is small (8), and the number of middle risk regions is a lot larger (107), as the radial chart is much densely populated.

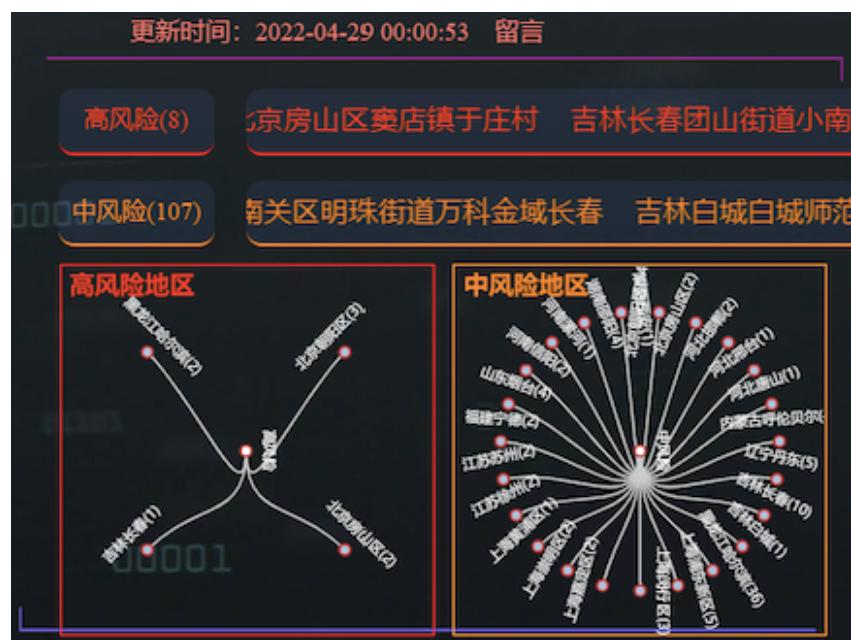


Figure 6 Display of Middle and High Risk Regions

In Figure 7, we can see a pie chart showing 4 different key figures of the pandemic statistics in China: current number of confirmed cases, cumulative cured cases, total number of deaths and cumulative confirmed cases, shown in a vertical line on the right. When the viewer click on any of these 4 names on the line, the pie chart will show the breakdown of number by province for this particular pandemic statistics.

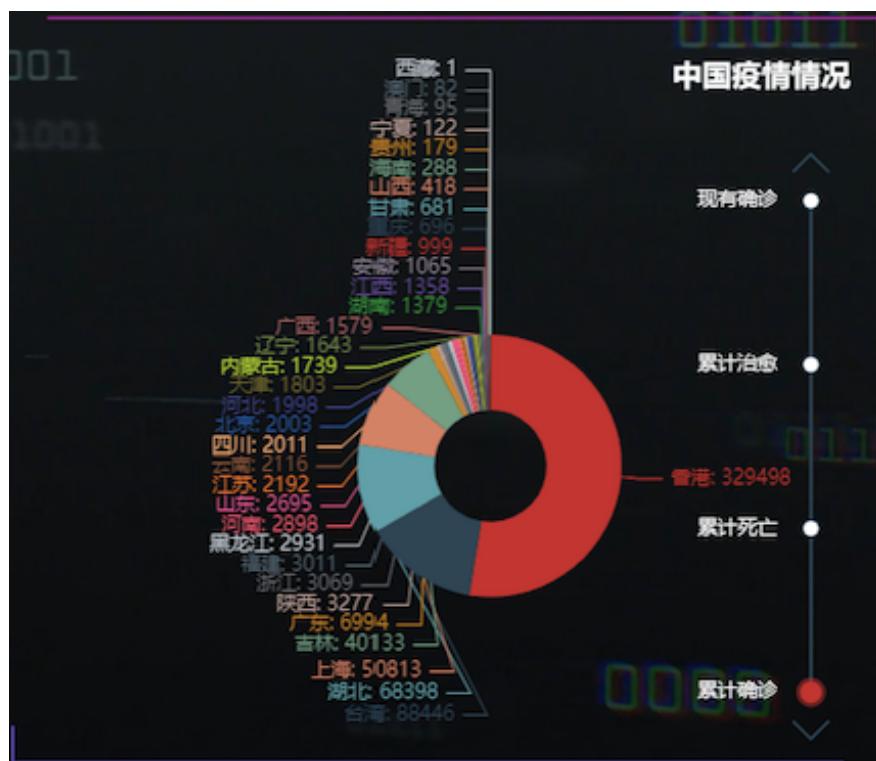


Figure 7 Pie Chart for the Key Figures By Province

V. Result

Each of our dashboard's six components is capable of displaying data from a website. The website functions are stable, the icons are clear, and the interactive functions are accurate and usable. Users can intuitively see which city has the largest number of cases, and the trend of new and existing diagnoses across the country. The cumulative confirmed cases will also be displayed on the map of China in the form of a heat map. With the time screening function, we can intuitively see the direction of the spread of the virus over time. What's more, when a viewer clicks on a day on the map, he/she will see the number of new cases in each area displayed in different color densities on the map.

VI. Future Work

We would like to increase the speed to retrieve the data to provide a better user experience. x

VII. Reference

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