

# Where we are in fighting against COVID-19

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## Abstract

On March 11, 2020, the World Health Organization announced the novel coronavirus disease (COVID-19) as a pandemic. Despite an increasing number of international attempts using maps to present and communicate COVID-19-related information in different organizations, most map products have only used the presentation function of maps. Against this backdrop, we offer an automatically daily-updated, color-blind-friendly, Tableau-based interactive dashboard to demonstrate *where* and *how* different countries are fighting against COVID-19. The dashboard allows users to specify countries they want to compare and aggregate relevant data on a daily, weekly, or monthly basis.

## Keywords

Interactive dashboard, geovisual analytics, COVID-19

On March 11, 2020, the World Health Organization (WHO) announced the novel coronavirus disease (COVID-19) as a pandemic. As of May 11, 2020, the COVID-19 outbreak has over 4,013,728 confirmed cases, and over 278,993 confirmed deaths across 215 countries or territories in the world (World Health Organization, 2020). With the intuitive user interfaces

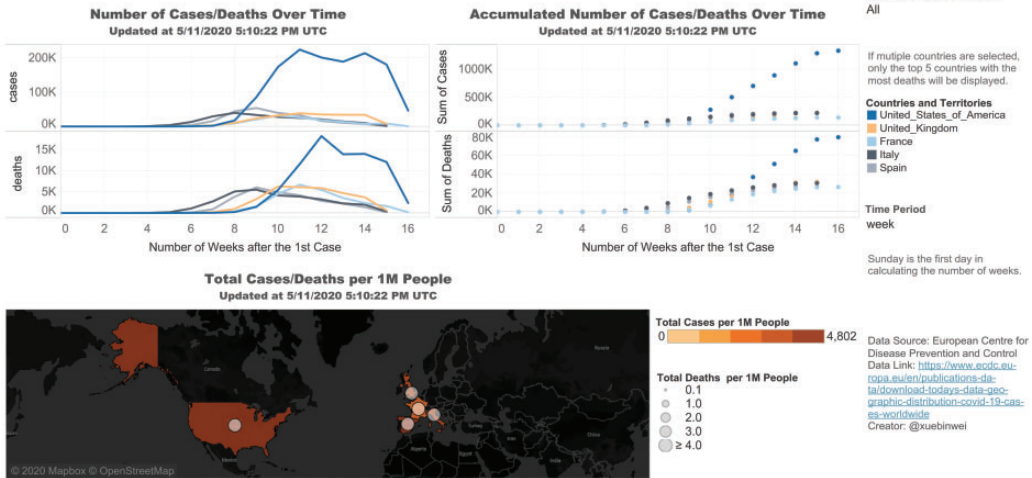
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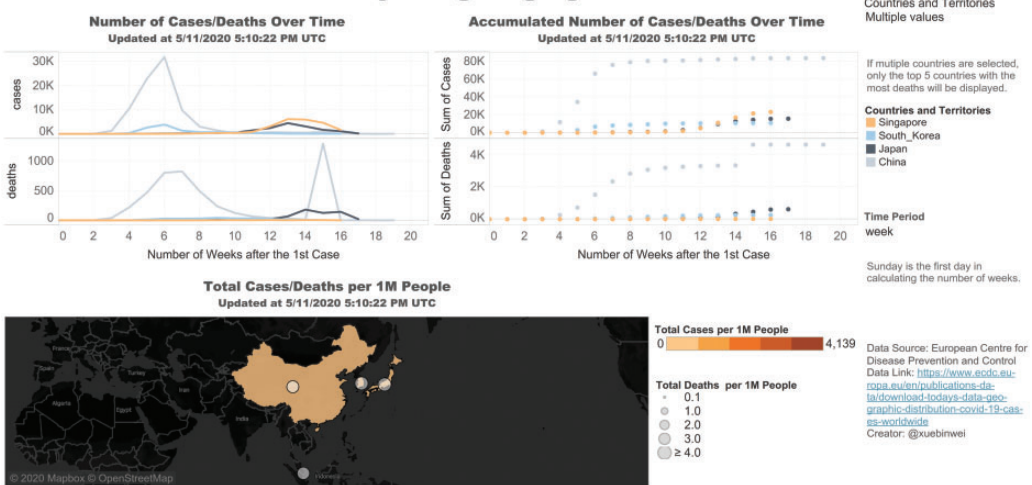
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### Where is Each Country in Fighting Against Covid-19



### (b) Where is Each Country in Fighting Against Covid-19



**Figure 1.** An example of the proposed Tableau-based interactive dashboard. (a) The top five countries with the highest mortality due to COVID-19. (b) Four Asian countries and territories impacted by COVID-19 in January.

of online mapping platforms and the accessibility of COVID-19-related data, there is an increasing number of international attempts with maps to present and communicate COVID-19 relevant information in different organizations. For example, Dong et al. (2020) from John Hopkins University, utilizing ArcGIS Online with crowdsourced data, presents one of the first online dashboards related to the global COVID-19 outbreak. However, most map products have only used the presentation function of maps. To understand changing patterns, it is essential to consider the analytical reasoning facilitated by interactive (geo)visual interfaces (Kraak, 2020).

Against the backdrop, we present a Tableau-based interactive dashboard (<https://bit.ly/ECDCCOVID19>) to compare and contrast *where* people are fighting against the COVID-19

around the world. When designing the dashboard, we mainly took the following technical and cartographical elements into consideration. First, the data are downloaded automatically from the European Center for Disease Prevention and Control and refreshed in the Tableau platform, rather than processed manually. Second, while users can select as many countries or territories as they want for the comparison in this interactive dashboard, we set the dashboard to display no more than five items, based on the highest number of death cases, to reduce the recognition load. Third, about one in 12 men are color-blind. In the most common type of red–green color-blindness, people cannot distinguish between the two (National Eye Institute, 2019). Therefore, we chose all color-blind-friendly colors in this dashboard. Fourth, while the dashboard is refreshed daily, the user can aggregate the data on a daily, weekly, or monthly basis.

For up to five countries or territories that a user specifies, the dashboard illustrates (1) the number and accumulated number of new confirmed/death cases after the first confirmed case; and (2) the total confirmed/death cases per one million population. Figure 1 displays how such geovisual analytics can be applied to show weekly trends and patterns. Figure 1(a) displays the top five countries with the highest mortality so far, as of May 11, 2020. All five countries have high Gross Domestic Product (GDP), and the United States of America, which has the highest GDP in the world, grieved the highest number of accumulated cases and deaths (The World Bank, 2020). Four of the top five countries are in Europe, and three of them are adjacent to each other. Specifically, the number of cases started to expand in the fifth week in Italy, the sixth week in Spain, and the seventh week in France. However, those numbers began to decline in the four European countries in the ninth to the 11th week. In the US, the number of deaths reached a peak in the 12th week, but the case and death numbers are remarkably higher than in other countries. Figure 1(b) compares the four Asian countries that have been impacted by COVID-19 since January 2020. Japan and Singapore had a small number of cases and deaths in the first 10 weeks, and both reached a peak in the 13th week. The number of deaths in Japan also started to increase in the 14th week. South Korea and mainland China have a similar pattern that both countries reached a peak of outbreaks in their sixth week after the detection of their first cases. However, a significant increase in deaths was recorded in China in the 15th week due to new data received in Wuhan (The State Council of the People's Republic of China, 2020). Aggregated data for the latest week/month should be interpreted with caution as the dashboard may not include data for the entire week/month.

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