

IMPLEMENTATION REPORT

Audience and purpose of the map

Our interactive map is targeted at the local citizens who are going to commute to the Melbourne CBD. We designed our map to provide those local citizens with their appropriate transportation method and commuting route. By doing so, we plotted the overall transportation condition in Melbourne, including the typical traffic volume in Melbourne, on-street parking bays, off-street parking bays, and the busload for each route. Our map is intended to bring the local citizens insights about which the busiest commuting route is and the availability of parking bays at different sites. Therefore, the local citizens could determine their most suitable commuting schedule based on the transportation situation and their preference.

Tools and implementation

Our interface was implemented by Tableau, Mapbox, and JavaScript. The final version has four-tab pages: Traffic Volume, Bus Load, on-street Parking rank, and off-street Parking rank. The main visualization part was done in tableau and the background map was made by Mapbox. In terms of the HTML interface, we use a tab in JavaScript to aggregate the separate tableau dashboard together and people can use it to choose different information.

Design of each map

Traffic volume map

The traffic volume map shows the typical hourly traffic volume in Melbourne. Users can see the traffic condition in Melbourne and avoid potential traffic jams. The size of the traffic volume is represented by the colour of five steps from green to yellow to red. Red indicates heavy traffic, green indicates relatively empty road conditions, and yellow indicates moderate traffic volume. There are eight directions of traffic flow, indicated by arrows. There are two filters at the top right of the page. The first filter DOW represents the day of the week. The second filter represents a certain time of day. The map can also play the changes in traffic flow during the day via using the play forward button and play the backward button. The dark background is used to have a better contrast with the colours of the traffic. At the same time, users usually have a more emotional response to dark backgrounds.

The busloads

Taking a bus is a method that is often used by local citizens in Melbourne. To help local citizens understand the passenger flow and operating conditions on the bus, we show the busload in 2019 in a map form, so that they can easily realize the degree of congestion on each bus route. We combine the bus route map Geojson data provided by PTV and the data of bus route patronage in 2019 collected on Philip Mallis. On the map, we can click on each route to get the information of the route number and the amount of patronage in 2019. The map of the busload can help people understand whether the bus is crowded, to avoid crowd gatherings and make more reasonable travel arrangements.

On-street Parking

On-street parking bays refer to those free-paid outdoors bays provided by the community of the city, but the parking duration permitted is always limited. Our on-street parking map describes the parking duration permitted for each bay. We use different colours in marks to represent the duration permitted. To be more specific, red dots represent the bays with the shortest parking duration permitted (less than 30 minutes), dark green dots represent the bays with the longest parking duration permitted (greater than 4 hours). Orange, yellow and light green separately represent the different

ranges in parking duration permitted for each bay. Also, we use a circle legend to better present what the marks indicate. Intuitively, the larger the circle is, the longer parking duration is permitted for each bay.

Off-street Parking rank

Off-street parking bays refer to the indoors facilities such as lots which provide a more flexible parking time limit. This map shows only the commercial parking. The map shows the off-street parking capacity of Melbourne. We also use different colours in marks to represent the number of spaces each bay has. Red dots represent the off-street bays with the fewest spaces(3-30), dark green dots represent the bays with the most spaces(over 1000). Orange, yellow and light green separately represent different ranges in each bay's capacity. The similar legend is used, the larger the circle is, the more spaces are equipped with each bay.

Design Innovation

Dynamic map pattern

We plotted a dynamic map by presenting the consecutive hourly traffic volume on different streets on different days. To be more specific, we broke the view into a series of pages of hourly traffic volume and combined the multiple pages into one worksheet. Therefore, the audience can interactively drag the timeline and have a better feel on how the traffic volume on each street changes over time.

Indication of the direction

We used different arrows to represent eight different directions of traffic flow.

Group the degree of measures

Rather than using a continuous measure, we divided the degree of measures into different groups, and the different groups are usually distinguished by five colour steps. For example, in the traffic volume map, we divided the level of traffic volume into five groups based on the number of vehicles. The smallest traffic volume is represented in dark green. The largest traffic volume is represented in dark red. The other levels of traffic volume are represented in light green, yellow and orange. Intuitively, the darker the colour is, the more traffic volume is on the street. The same idea is also used in the bus load map, in which the gradients in the colour palette are used to represent the different levels of busload.

Legend

To minimize the redundancy, bubble charts in the on-street Parking map and off-street Parking map can not only be used to identify the amount or size of different parking space categories but also used as legends for the maps.

Filter

Besides the function mentioned above, the legends also provide the filter functionality that the audience could choose what information to be visualized based on his interest. For example, if the audience plans to commute on Monday, he could drag the DOW timeline to visualize Monday's traffic volume. If the audience is interested in parking bays that permit for 2-hour stay, when he clicks on the yellow circle on the legend, only parking bays permitted for 2-hour stay will be visualized for the audience's better analysis.

Pattern Summary

On-street Parking Bay

In Melbourne CBD, there are few bays permitted for long time on-street parking. Closed to Melbourne Central and State Library of Victoria, the longest parking duration permitted is for 30 minutes, and the parking bays are marked as red dots. This is probably because the traffic in Melbourne CBD is usually crowded and busy, so the traffic volume should be strictly restricted, including the driving cars. From Melbourne Central out, the parking bays permitted for a relatively longer parking duration increase. This could be seen from the increasing number of light-coloured (e.g. orange, yellow, green) dots outside the CBD. For example, you could see more yellow dots and orange dots on Little Lonsdale Street and Little Bourke Street, and even a few green dots are spreading on Russell Street. This means that the car drivers could find it much easier to park from Melbourne Central out.

Off-Street Parking Bay

If on-street parking limits aren't long enough for your intended stay, the City of Melbourne provides off-street parking bays with competitive rates as well. There are a large number of commercial off-street car parks available Melbourne too, mostly spreading among the main East-west streets in CBD: Little Lonsdale St, Lonsdale St, Little Bourke St, Bourke St, Little Collins St, Collins St, and Flinders St. The off-street parking bays are divided into five groups based on the range of the number of parking spaces. The parking bays with fewest available spaces (3-30) are denoted as red dots, the parking bays with most available spaces (over 3000) are denoted as dark green dots. The different ranges of each bay's available spaces are distinguished by the gradients in colour. In Melbourne CBD, the primary off-street parking bays are those with 31-1000 available spaces on each, which is presented by the greatest number of orange, yellow and light green dots.

Traffic

Transport is another important thing that we need to consider in our daily life. For the people who own vehicles, the traffic volume map can give them some information about the areas with frequent road congestion then they can choose another way which is not crowded. The HTML page shows traffic volume in all periods. Users can arrange their travel time and ways of travel according to the degree of traffic congestion. For example, if someone needs to reach Melbourne CBD at 7:30 and he needs to pass by Victoria Street. From the map, it can be seen that traffic in Victoria street is busy at about 7 o'clock. To arrive on time, the user is suggested to change his route or leave home earlier to allow time waste due to traffic congestion. Users can also use public transport to reach Melbourne CBD. From the busload map, we can see that Route 684, 234, 220, 251 will enter the CBD. This map of busloads is also helpful during the pandemic period. To ensure the social distance, users can choose not to take a busy bus.

Rational

For our target group (citizens commute to CBD) to understand street-related information more intuitively, maps are the best choice. Based on the understanding of the view path, people tend to notice the information located in the centre of the map first. Since the destination of our target customer is Melbourne CBD, we designed the CBD in the centre of the map, making it the visual centre to highlight the focus of our design. We ignore or weaken some unimportant geographic information, highlighting the visual data (points and lines) we designed. We also took advantage of the impact of colour on vision. In general, green means a good condition, yellow means needing attention, and red means something urgent or bad. These are our design rationale that will give users a better understanding of our map.

Use Cases

Melbourne own car commuters

Amy is a sales assistant who works in Myer Melbourne CBD store and she normally drives to work. She has to find a parking spot to park her car every weekday. The car park that she normally parks in might be full on Friday. By using the off-street Parking map, she found a larger commercial car park which is further away from her workplace but normally has parking spots available.

Melbourne casual commuter

Jack is a student of RMIT who lived in Brunswick. Normally he drives to the campus in the city. Parking is one problem that has bothered him. He can not afford the high parking fee in CBD. Further, the traffic can be terrible within the CBD.

By using the traffic volume map, he found that the traffic volume around North Melbourne and Parkville is moderate. At the same time, there is a bus line in Parkville that will enter the city. So he decided to rent a parking space at a cheaper price. There is a bus route near the car park so he can take the bus to Uni.