Group 28 Report

1. Design summary

Our group has chosen tourists who may visit Melbourne as our target audience and has taken advantage of POI dataset. The platform we aim to present our visualisation is a HTML website. As the POI geojson file has set each point with a "theme", our group has categorized all those points into 9 groups since the number of objects an average human can hold in short-term memory is **7** ± **2**. In the hope of providing enough information to tourists, we have searched online for Melbourne Cafes And Restaurants and Must Visit attractions datasets. Two separate layers are provided. The filters include 10 groups with must_visit extracted and summarized from POI dataset. These three datasets are what our visualisation reveals.

Our design has included the following *features*:

1) Filters of must-visit attractions and other 9 categories of attractions in Melbourne by highlighting through customised markers.
2) Customised popup message when users hover or click a filtered point on map which shows the name of this point with related pictures. If users click the point, the popup message will stay stable until they click the close icon to close the message.
3) A search box that allows users to search for specific locations they would like to visit. The results of this search box are limited in Melbourne.
4) Two customized layers on the map: free tourist tram and open space Allow users to change colours of these two objects and water.
5) The style of map can be changed between: Normal, Light and satellite.
6) A customised navigation box which lets users to find routes between A and B points by clicking on map directly. Four travelling strategies are provided: public transport, driving, walking and cycling.
7) The navigation box is also equipped with address searching functionality so users can find routes between two specific addresses.
8) There is a navigation control tool that enables users to zoom in/out and twist the viewing angle of the whole map. Locating functionality is also provided by which users can know their current locations.
9) A button to get the user's current location.
10) When zoom level reaches a point, the buildings on the map are shown as 3D.

Justification of features:

1) Melbourne has been the most livable city in the world for many years, therefore it is not a surprise that many tourists would like to visit the city of Melbourne. As most tourists have limited time for touring, we are aiming to use filters to let users focus on the type of attractions they have the most interest, shown by customised markers on map.
2) Each marker has a customised popup message with name and related image of the point. Most points are encapsulated with their thumbnail photos. If a point's photo is not found, it

will show a default one. The reason is that generally tourists would choose the attractions relying on pictures highly during travelling. Also, if a user wants to compare different points, they can click on points and keep the popup message stable until they click the close button.

3) As our visualisation is targeting tourists, a functionality that searches a specific location is a priority. Even though we have provided 10 categories of featured points for them, it is more flexible and personalized if users can find a desired point to visit without jumping to any other navigation app like Google Map. In addition, it can only search the location in Melbourne as the map is limited in it. If a user tries to search a location out of Melbourne, a notice will show near the search box.
4) This feature has taken colour-blind people into consideration. It can let users change the colour of objects: water, free tourist tram or open space, targeting different groups of people by their needs. Users also can use this feature to highlight these objects to get a better view of the relation between them and POIs.
5) The style of the map can be changed regarding users' requirements and preferences. For example, they may like to change to light when they zoom in the map on a large scale.
6) Users may want to find routes between any two points on the map. It is handy that our map provides navigation functionality for them while they are travelling. Multiple transportation methods are available to fit their requirements.
7) This is a basic functionality equivalent to any navigation apps.
8) Useful tools for users to locate themselves and have a detailed view of the map.
9) Users can explore the map based on their own location by using this tool.
10) 3D buildings are shown for the purpose of aesthetics.

2. Summary

What we found interesting is that there are lots of approaches to represent the information extracted from the dataset. In this assignment, we mainly focused on presenting the geographical data which can only be visualized clearly on a map. It is worth mentioning that maps showing on desktop can supply more advanced cartographic interactions. Also, a bigger screen is always easier for people to visually understand the data because there is more space to aesthetically distribute all information; therefore, our platform chosen to present our visualization is an HTML page.

Our cartography is based on the ***design principles*** presented in lectures. It has moderate data intensity for users to gain enough information they need by showing in an aesthetically pleasing way. We tested many times to ensure the integrity is highly correct with real life. And the correspondence is suitable for users to get the idea of current tourists attractions in Melbourne.

The data on our map can be interacted through hovering, clicking, zooming and dragging arbitrarily. In addition, the implementation of the functionalities such as filtering the interested objects, searching a specific location, changing the colours of objects and displaying/providing the

routes between chosen points by chosen transportation method suggests how highly interactivity our data works.

The pattern we have taken advantage of is that points, lines and polygons are easier to be recognized by our brains; hence, we combined them together to provide effective data-user communication. Moreover, according to ***Gestalt Laws***, humans are able to group similar elements and understand patterns in order to simplify the complicated datasets by our visual system. Besides, classification also tends to help people to perceive the spatial patterns, which associate raw data into groups and represent each of them with a unique symbol. For example, the method of object classification is based on the figure and ground pattern, which allow users to identify the interested objects by highlighting colors, outlines or labels. As our topic is tourism, the attributes we would like to emphasize are some attractive spots in Melbourne, dot map fits our needs where the colors and filters are used, and the highly recommended spots are underlined by bigger marks for easy identification.

Furthermore, we found that some regularities are existing while users are browsing the data. Generally, the user's ***visual movement*** is accustomed to follow the "Z" pattern, which means the common visual priority starts across the top from left to right and down to bottom left then across to right, or they are prone to be attracted by larger, colored elements. Therefore, ***visual hierarchy*** is considered to be an important principle in our map design. We have put the boxes and elements in the corners so users can focus on the main spots on the map while those tools help them to retrieve the information they want. Our eyes obtain limited information at the same time; therefore, the title and main functions are put at the upper left corner to emphasise the information.

The size of POI icons is also designed by ***Visual hierarchy***. Icon of Must Visit is larger than normal attraction types as they are recommended by our map. Icon of Cafes And Restaurants is smaller than other types and they only show when users zoom in the map. It is because they have massive numbers and users only need to search them in a small area.

We also try to improve the ***Data-Ink Ratio*** for our website. The icon on each filter button will appear only if users click the button to show the specific POI group. Using this function avoids the unnecessary information of invisible POI groups. It also can present each icon's information without a legend. A prompt - "Please search the place only in Melbourne" will appear when users try to search the location out of Melbourne. Besides, some users can improve the data-ink ratio manually by changing map to Light style if they think that default map supplies some information they don't need. Satellite style can show massive extra information on a map with very low ink.

As the colour perceived differs from different people because of the ***photoreceptors sensitivity***, we have added a functionality to change the colours of objects like water, free tram route and open space for those who are colour-blind. It is more personalised and engaging, targeting different groups of people. We choose these objects since they are highly relative to the POIs as visitors are more likely to choose attractions near these objects.