Summary of the Design

In this assignment, I want to visualize the geographically distribution crashes on Victoria roads and study the key factors causing these crashes. Therefore, the main two components in dashboard are:

1) Crashes geographic distribution respectively in Melbourne and Victoria, which contains the figure Number of Crashes in Victoria and Melbourne Crashes Map.

2) Crashes reasons analysis, which contains figure Crashes Reasons.

1 Figure – Number of Crashes in Vitoria

Firstly, I download the main csv file from DATA VIC [1]. In this sheet, I want to visualize the crashes distribution in Victoria especially in the Statistical Area Level 2 (SA2) division. Therefore, I downloaded SA2 ESRI Shapefile from the official website of the Australian Bureau of Statistics (ABS) [2], and used a smoothing tool [3] to reduce its size. Then, I connected this shp file with the geojson file of the VicRoads crashes downloaded from DATA VIC [1] and made the map. Here I used step colors to quantify the number of crashes and represented each number according to its SA2 region. By hovering the mouse in different SA2 regions, you can see different numbers of crashes in the corresponding regions, and thus clearly figure out which areas have relatively more crashes.

2 Figure – Melbourne Crashes Map & Melbourne Crashes Density Map

Apart from geo-visualizing the crashes in Victoria, I am interested in the crashes' situation in Melbourne. Hence, I geographically plotted these crashes in Melbourne using the filter on the field - Lga Name, and used colors and sizes to respectively show the type and the severity of the crashes. By hovering each data point, you can view the detailed information of the corresponding crash. As we can see, most crashes are small accidents caused by collision with vehicles and happened in the central region of Melbourne, while few fatal accidents happened in the outskirts of the city. And due to the overcrowding of data points, I separately plotted a density map of the crashes in Melbourne, which clearly demonstrates the geographic density of these crashes. Besides, I added the year of these crashes to 'Pages', where you can see the changes of the crashes in each year by dragging the little circle on the 'Accident Year' bar. You can find that the fewest crashes happened in 2019.

3 Figure – Crashes Reasons

Finally, I tried to explore the crucial reasons behind the crashes. I have plotted the number of crashes vs light condition, alcohol, road geometry and found nothing attractive. Most crashes happened by day, and are little affected by road geometry and non-alcohol related. However, I subsequently found that most crashes happened on arterials and local roads, in speed zones with limits 50~70 km/hr, and especially during rush hours when people are preparing to go to or leave the office (at 8 am and 5 pm). By plotting the cross bar chat and grouping some fields, we can see the detailed relationships. Therefore, we can conclude that most crashes happened on urban roads during rush hours, and the traffic police should timely go to these roads to divert traffic streams in order to avoid crashes.

Appendix - Data Source

1 DATA VIC
URL: https://discover.data.vic.gov.au/dataset/crashes-last-five-years
File: Crashes_Last_Five_Years.csv and Crashes_Last_Five_Years.geojson

2 The Australian Bureau of Statistics –
URL: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1270.0.55.001July%202016?
OpenDocument
File: 1270055001_sa2_2016_aust_shape.zip

3 Mapshaper (for smoothing Shapefile)
URL: https://mapshaper.org
File: SA2_2016_AUST (including all the files in 1270055001_sa2_2016_aust_shape.zip)