

FIT5147 DATA EXPLOARATION AND VISUALISATION

Data Visualization Project

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Introduction

The dataset I'm utilizing consists information about the number of deaths that are happening in Australia as per the self-intentional harm cause. This include values from the year 2009 to 2018 for all the states in Australia.

In this project, I am building a visualization based on d3 and JavaScript to showcase the death that are happening in Australia. The audience intended for this project would be the Australian Government who would like to keep a count on the population every year across all the states.

The other intended audience would be the counsellors, therapists and psychiatrist from the mental awareness department. This information provided will help them to understand the states that are more likely to be prone to attempt suicide and cognize them with utmost responsibility.

The visualization will help the audience to grasp the information in an easier way. The geographical map will be an interactive map which also includes a server side that will aid in presenting the dataset in whole another view.

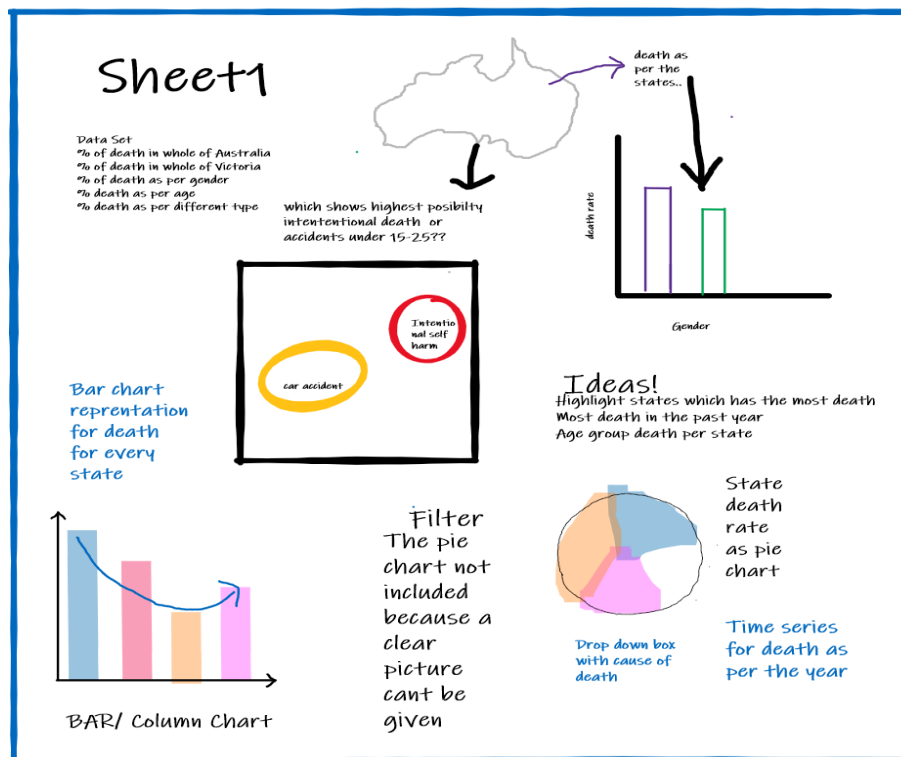
2.Design

The 5-sheet design methodology is selected with the main objective of creating a design . It delivers the entire process of designing and developing the model in a well-thought-out Process. It also stipulates a thriving solution for the visualization based from the information.

Throughout the 5-sheet various sketches are generated. Each sheet as an improvement made from the previous sheet's ideas. As we reach the final sheet(the fifth sheet) , it will contain the end design required by the client for making the application.

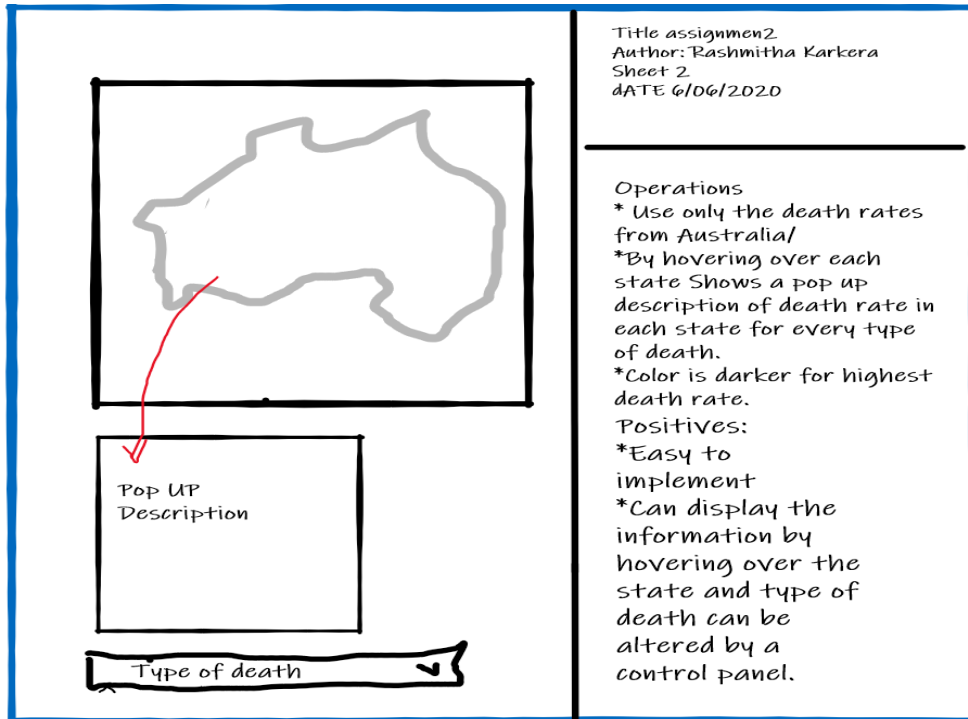
The following sheets showcase the designs made:

Sheet 01:

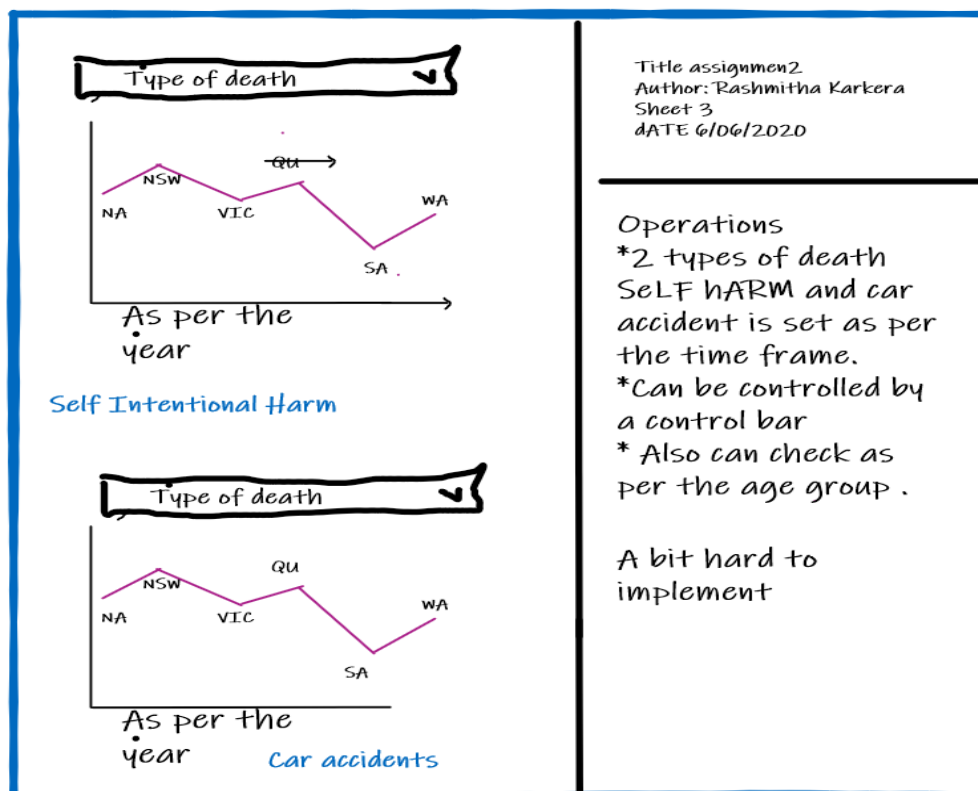


The initial sheet includes all the ideas that were gotten through brainstorming. These ideas are providing on the sheet as rough sketches. The main motive of this sheet is to include all the graphs that can be obtained from the brainstorming and how the dataset can be represented in the various ways for the understanding of the client. The sheet 1 includes, the bar graph, the pie chart, the time sheet, the dataset required for the visualization. It also includes ideas on how one can represent the dataset. Here after brainstorming we omit certain ideas by filtering ideas that are not required and is done by filtering. In my case, I have filtered out the pie chart because it doesn't include a clear picture of understanding the dataset.

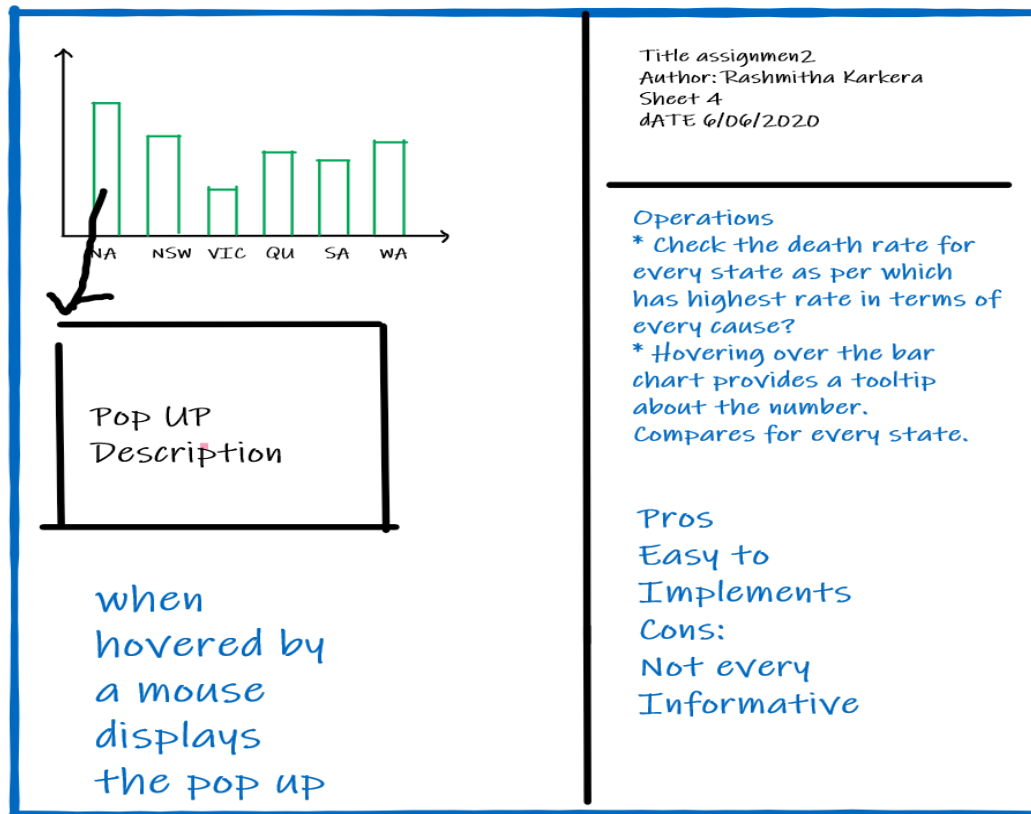
Sheet2:



Sheet3:



Sheet 4:



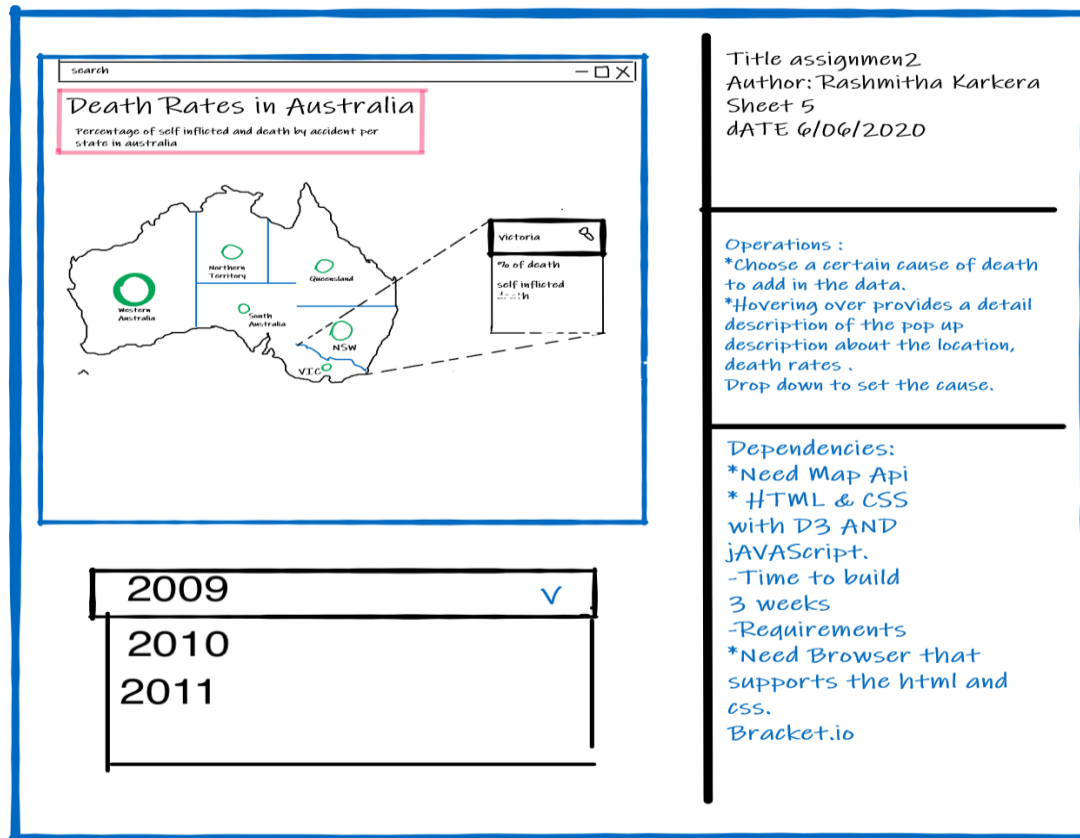
For sheet 2, 3 and 4:

The 2nd sheet showcases the proposal for the design. Here we have considered the geographical map, with a drop down consisting the various causes of deaths. On clicking the drop-down button as per the option provided it would display the death rates of various states when the mouse is hovered over it. A pop-up description about the state shows the details. This may be hard to implement because the available dataset doesn't satisfy the criteria for the dropdown information.

The sheet 3 , includes alternative idea where we have made use of time series to represent the data for every for 2 type of death namely , self-intentional death and car accident. The time series shows the growth/regress in the rates for every state. This design is a bit hard to implement and includes additional dataset.

The 3rd sheet displays the idea sketched as a bar graph for understanding which state has the highest rate in terms of certain cause of death. A pop description box is displayed when the mouse is hovered over n individual plot showcasing the rates per se. The graph is plotted by comparing the numbers for every state.

Sheet 5:



The fifth sheet consists of the realization design. This design represents the final idea and how its user interface looks like at the end. It is the final plan that's needed to be implemented.

For the design, I have provided with a drop-down box to navigate for every year for navigational purpose.

- Initially a certain drop-down box is set up that will help the user the year for which he/she wants to check the number of deaths for the states of Australia.
- When the user chooses the respective year, the geographical map shows the state which has the maximum deaths in the choropleth form. Here the darkest shade represents the maximum number of death and the lightest shade represents the least number of deaths.
- Also, there is an option of displaying the information of death as per the state, by hovering over each state. On hovering, a pop-up description box is set up to provide certain numbers.
- The web application developed is supported by a browser.
- It also shows the data analysis done for every state.
- For the developing of the application we are using D3, JavaScript and HTML.
- The completion time is estimated around 3 weeks.

3. Implementation

For the purpose of implementation of the application, we make use of d3.js libraries. The dataset is in excel sheet format; it is then converted into json format for loading the data in the server. A certain data wrangling is done manually in the excel sheet for removing the unwanted information and utilizing only the ones that are needed.

The application consists of the two parts.

1. backend
2. front-end

1. Backend - Here all the coding is done. The functions, data loading, organizing the data are done in the backend. It also depends on the how the user wants the application to look like in the User Interface, accordingly the changes are made. In this project we have utilized 4 files in which 2 are dataset files, the others are HTML & JavaScript

2. The user interface (UI) will have the final product of what's done in the backend. The functions used to create the map, the drop-down commands and calling of information on changing the year is portrayed in the User Interface.

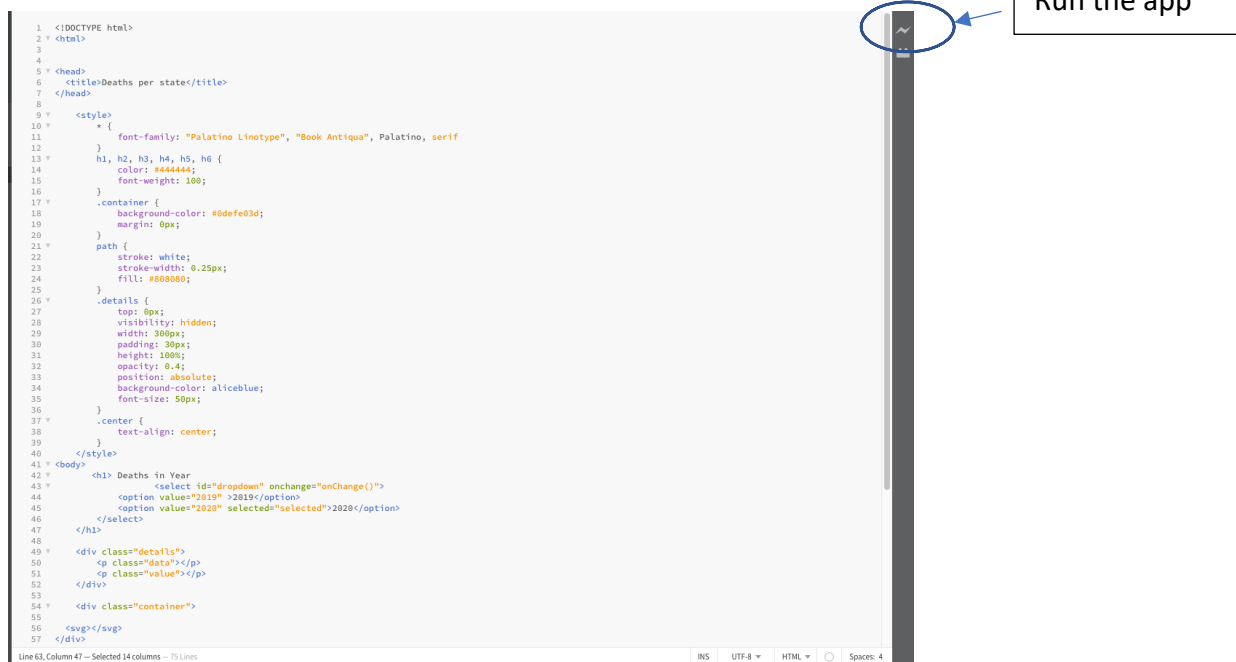
No	Library Used	Description
1	D3.js	The D3.js is a JavaScript based library used for the purpose of creating visualization for the document driven data.
2.	D3-scale-chromatic	This is utilized for the mapping the colors to the map as per the values of the colors.
3.	d3-interpolate	This provides many ways of blending between two values. The values maybe strings, colors , numbers ,etc.

4. User Guide

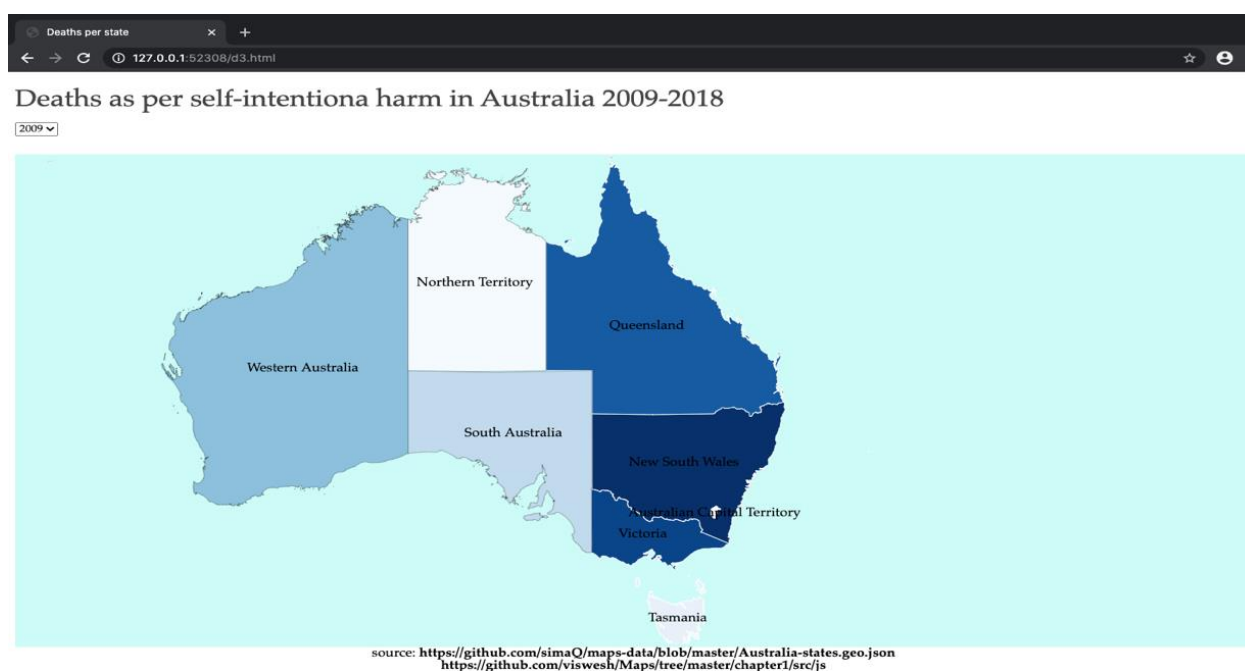
I have made use of brackets.io for developing the visualization.

The following are the step by step instruction of using the application.

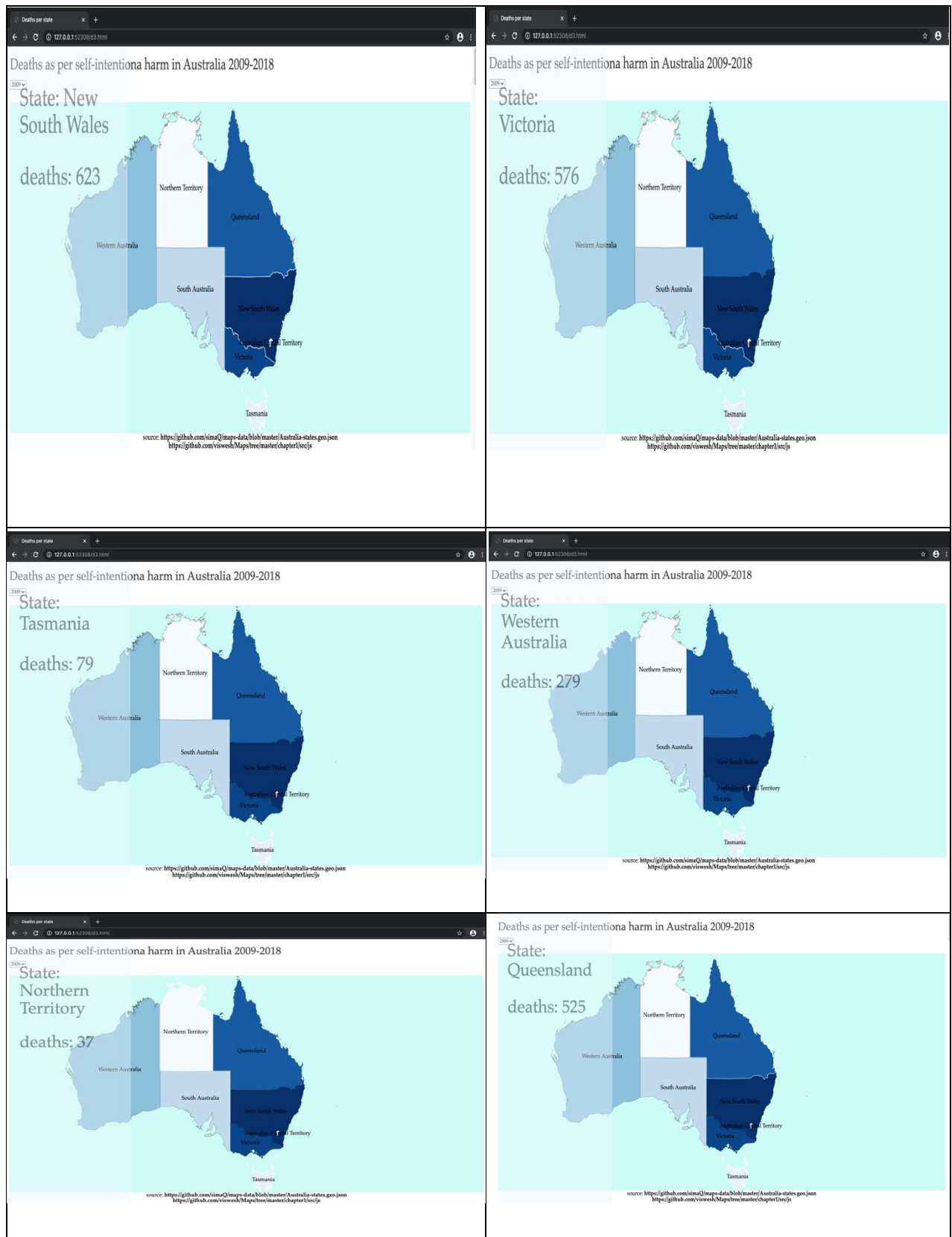
- 1) The first step is for the user to select the “lightening” button in bracket.io . It is shown as below:



- 2) It directs to web browser which is displayed as follows:

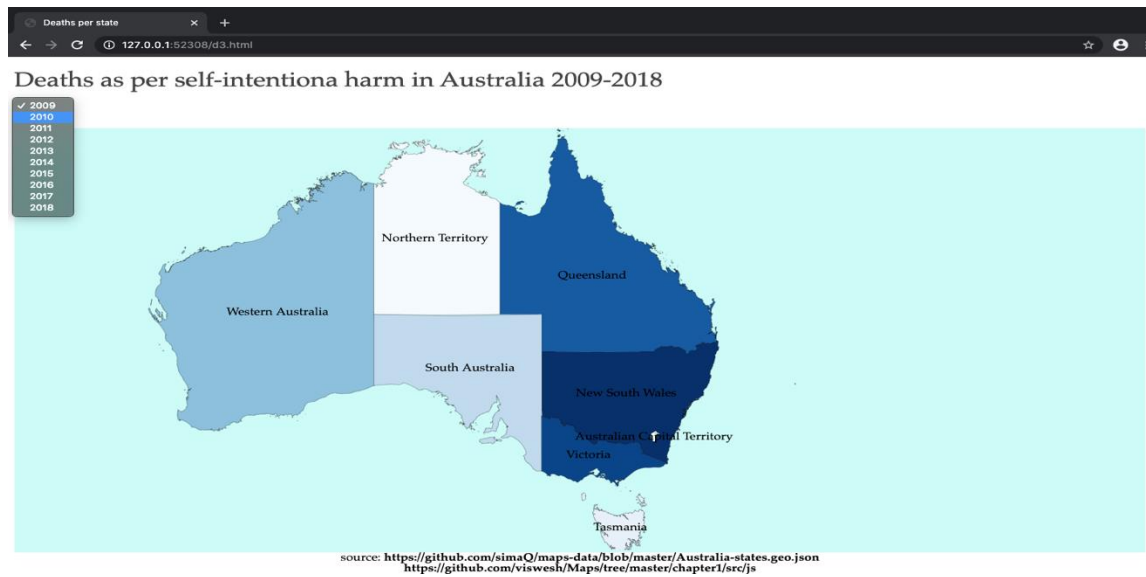


3). When you hover the mouse over the states it will display the deaths as per the states

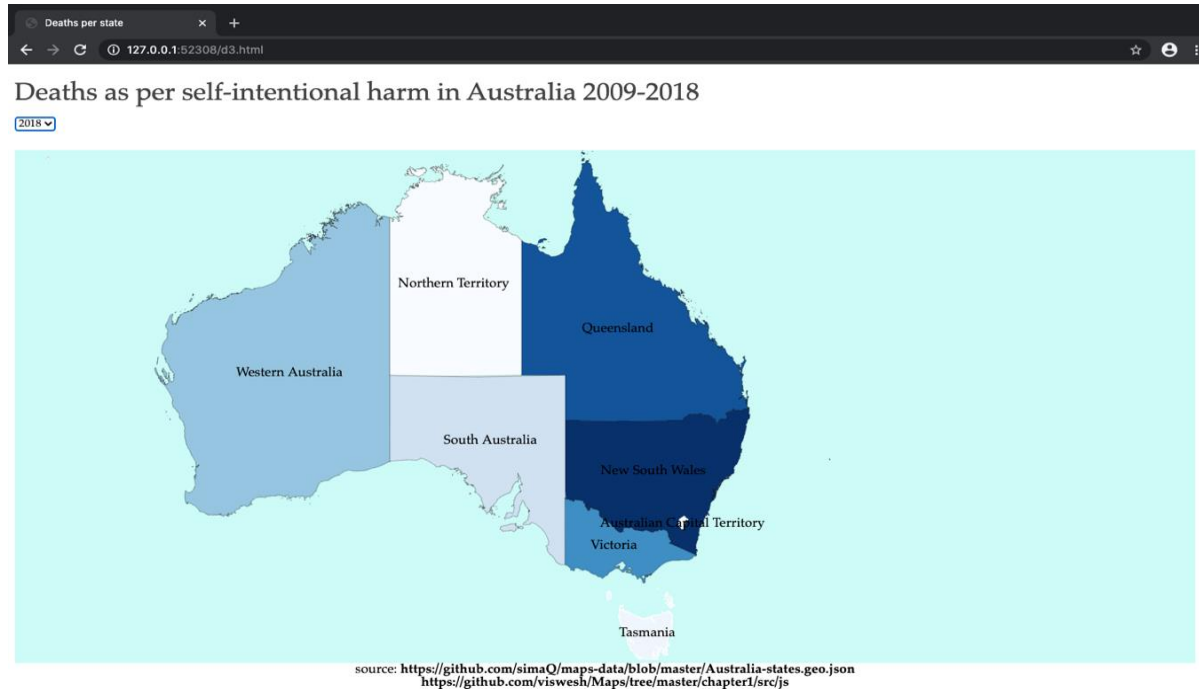


The above tables display the various data obtained for the year 2009.

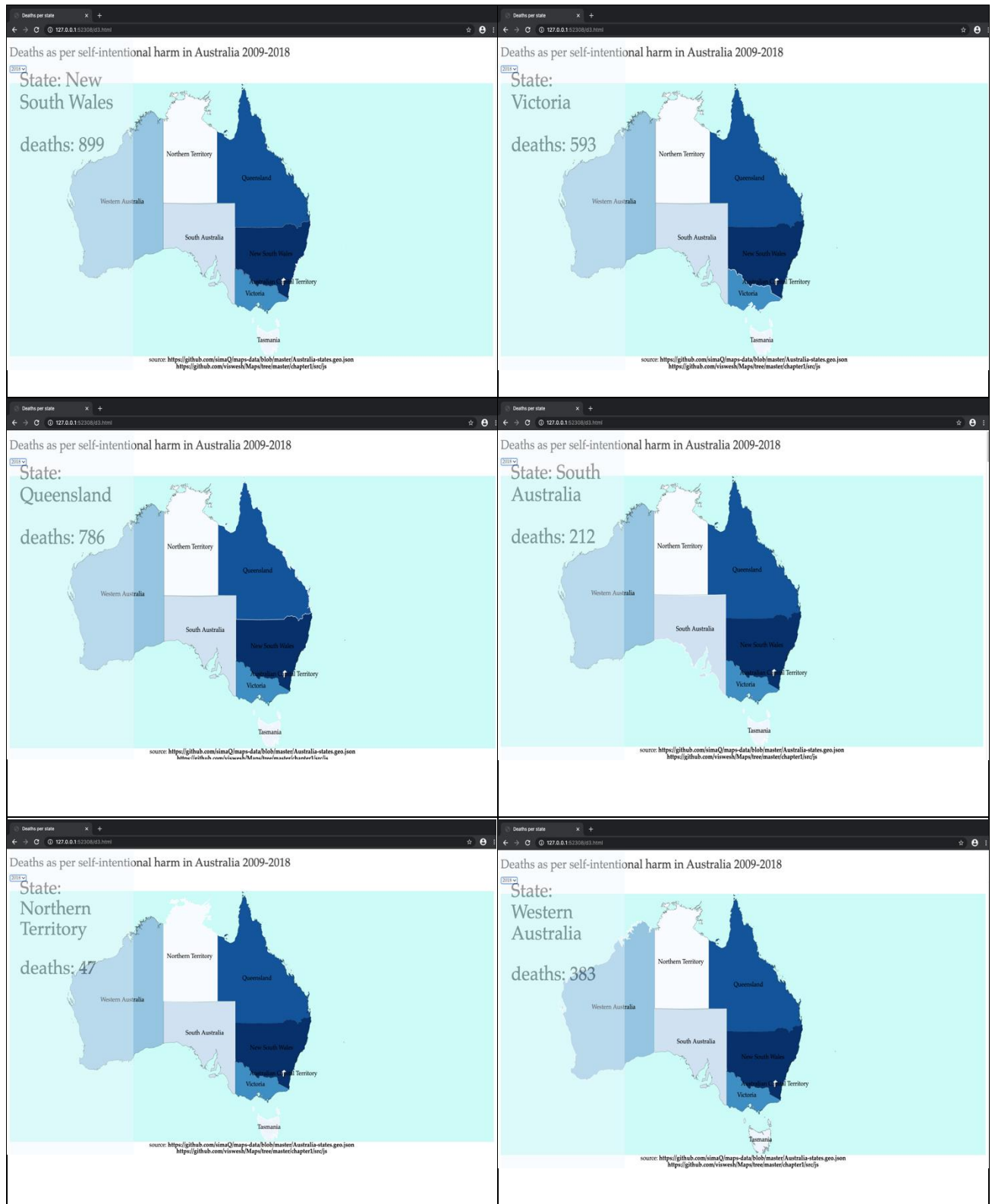
4)The next step is to SELECT any year from the drop down box.



5)The map will display the choropleth map as per the year 2018.



6) Same as step 3 we , will be able to see the death number as we hover over the states. Also, in the year 2018 we can see that Victoria considerably has reduced number whereas New South Wales still is on Number1 position. Also, Queensland seem to have some increase in number.



5. Conclusion and Reflection

In this assignment, I have gained knowledge about using D3.js. It helped me do analysis for the dataset. In addition to it, I learnt the process about how the web application is developed and how the packages are utilised to conduct animations and visualization. I have learnt about d3 functions and their uses. The application taught me how to create the front end (User interface) and the back end. I also have learnt to link the backend to the front end. This assignment helped me understand the HTML, JAVASCRIPT in-depth. The use of colours, font size, creating a map has made learning from the assignment very interesting. Coming to the audience, I'm quite hopeful I'm able to provide them with the statistics about the death numbers as per every state in Australia from the year 2009-2018. In total, the building process of this application understood the different uses of D3.js, on how these can be utilised for the purpose of generating visualization and animations, formatting the text data in an understandable form using SVG and CSS, throughout the building of the application.

6. References

Viswesh Retrieved from <https://github.com/viswesh/Maps/tree/master/chapter1/src/js>
 Retrieved from <https://github.com/simaQ/maps-data/blob/master/Australiastates.geo.json>
 A) Tabular data: -Includes both textual and number data 1962 Rows & 11 Columns. Australian Bureau Of Statistics. (2019, 9 25). Australian Bureau Of Statistics. Retrieved from 3303.0 - Causes of Death, Australia, 2018:
<https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3303.02018?OpenDocument>
 B) Tabular data: -Includes textual and number data / Has 13 tables Australian Bureau Of Statistics. (2019, 9 25). Australian Bureau Of Statistics. Retrieved from 3303.0 - Causes of Death, Australia, 2018:
<https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3303.02018?OpenDocument>