

Study on Australian Population Growth and its Relationship with Immigration

- The User Guide of the
Visualization Website

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Fit5147 Data Exploration
Visualization

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Introduction

immigration issue is the hottest topic now in Australia. Australian borne people are becoming more focusing on population growth and the immigration rate. more than half of the citizens consider the 54% of the population growth rate is too much faster than their expectations. Although the multiculturalism is still the main stream among people, 32% of the people believe multiculturalism has failed, which lead to social division and the growing of dangerous extremism in Australia. 47% of the voters were in the favor of fewer short-term visa should be released and 46% believed that they prefer rejecting permanent refugees. Tony Abbott considered that the Visas should be released fewer because of the limited resources in cities until the public services is complete (Murphy 2018).

Because of the overcrowd cities and the rapid growth living cost, only 30% of the voters believe Australia needed more people. 90% of the people considered that Australia should train more local skilled people but not just absorbed the foreign workers. From another survey, more than half of the people in favour of keep increasing the total Australian population. However, the rural area in Australia is extremely lack of labour force. Government is considering absorbing the immigrant move from the overcrowded cities such as Melbourne and Sydney and provide more energetic to the regional areas. The concerns about resources and environment is the dominated problem that the Australian people are mainly considering about the immigrant (Wright 2019).

Overall, there are a lot of different voice about the immigrant question in Australia. This website is designed for those people who want to have a deeper realization about the Australia population and immigrant number growth, as well as those people who want to know the exact relationship between the population growth and the immigrant.

Design

The original design intention is because population growth is a dynamic topic. Population is changing with time. The topic that we are discussing has two focusing points: the population growth in Australia and its relationship with the immigrant number. The change visualization should be revealed for the past 4 decades. Moreover, I need to compare different states (areas) In order to explore the next question of immigration. The interactive visualization is very significant to show the different population growth for different locations. For the first sheet, a line chart will be designed to show the trend of the population changes by different locations. In the design sheet, user can click the drop-down menu to select different states or locations to see each year's population changes for these Areas. When you put the mouse on the x-axis, the line chart will show the population information in a floating box for that exact Year on each line. However, during the real design, the mouse cannot exactly locate to the specific year on the x-axis, the manifestations is changed. The design was changed to when you put your mouse on the line, the visualization will show the state name, its population, and its years.

For the second design sheet, I add the new data into the visualization originally. We have one pie chart showing the gender composition and one mirror bar chart to analysis the future trend of the population growth in the design sheet. At the top of the webpage, a drop-down menu for selecting the location and a drag strip is made to change year. However, the data with both gender and composition is very hard to obtain, I stop analysing the composition and continue analysing the immigrant growth situation. In the second sheet, I made a stack bar chart to compare the oversea born population and Australia born population.

In the final sheet, I wanted to make a world map with the immigrant born distribution. Moreover, I want to make bubble on the map, the bubble size will represent the population, which the bubble size will change as the user drag the timeline bar. However, the immigrant population data with born distribution do not have enough data. I made a flow map instead of bubble map.

implementation

```
<link rel="stylesheet" href="http://apps.bdimg.com/libs/jqueryui/1.10.4/css/jquery-ui.min.css">
<script src="http://apps.bdimg.com/libs/jquery/1.10.2/jquery.min.js"></script>
<script src="http://apps.bdimg.com/libs/jqueryui/1.10.4/jquery-ui.min.js"></script>
<script src="http://d3js.org/d3.v4.min.js"></script>
```

Figure 1 libraries used in this project

For the data visualization, I used D3 as libraries to make interactive data visualization. The reason for why I use such libraries to do these implementations is D3 can finish the interactive task easily and easy to find the model online. I also used the library jquery to make a time line drag bar. The benefit of using a drag bar is it can provide multiple choice for the user to select. They can select to view only one location or combine them all. Through doing comparisons they can get the information about the uneven population in Australia and have deeper search on population or continue to browse the website for getting the information about the immigration message if they are interested.

User Guide



Figure 2 Homepage

Figure one shows the home page of the website, it shows the title of the study which is “study on Australian population growth and its relationship with immigration” . If the user wants to explore more, they can click the navigation bar on the top right to select with kind of data visualization they want to see. The navigation bar is fixed on each page, which the users can jump to any other places when they are exploring any page.



Figure 3 Line chart for population growth

Figure 2 show the first page of the website. It is an interactive line chart about the population growth in Australia. You can select any states or areas in the drag-down menu, the line chart with show the correspond population to which location you have selected. Or you can select “All” to have an overview of the comparisons of all states’ population.



Figure 4 when you put your mouse on the chart

For this website, you can also acquire the accurate population and location information when you put your mouse on line chart. There are many points on the line and when you move your mouse on the point it will highlight and show the information in the floating box (Figure 3).



Figure 5 stack bar chart

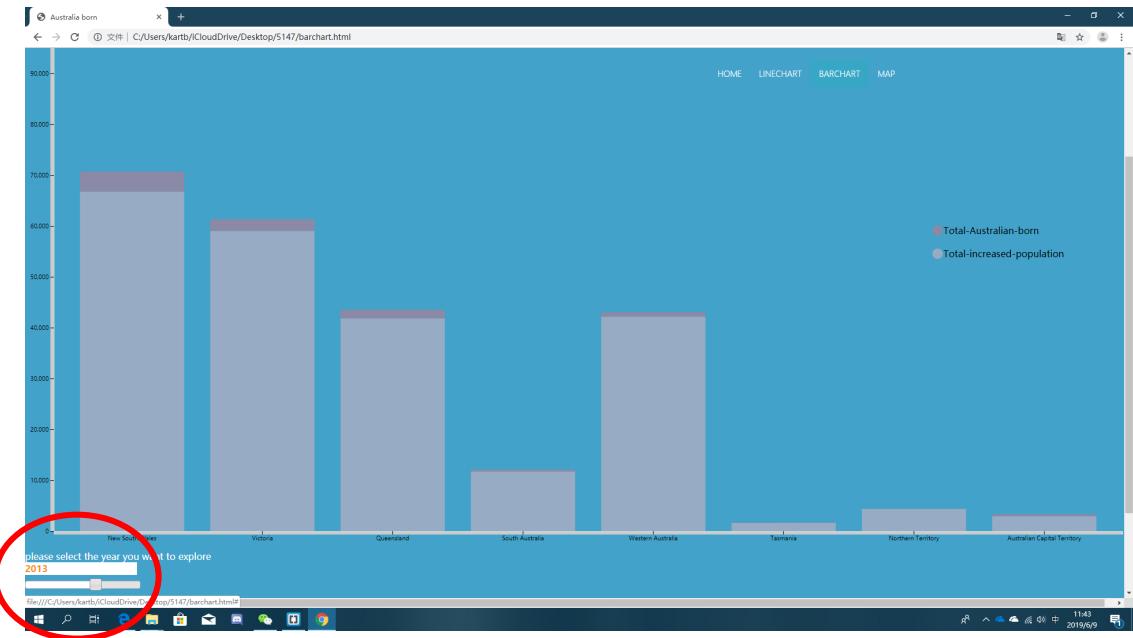


Figure 6 Drag the timeline bar

Then the user can click the bar chart bottom and jump to the next page. This page shows the stack bar chart with two groups: the Australian born people and the oversea born people. There is a timeline bar, when you drag the bar, different bar chart will show the different outcomes of the population (Figure 4 & 5).



Figure 7 Highlight the whole bar

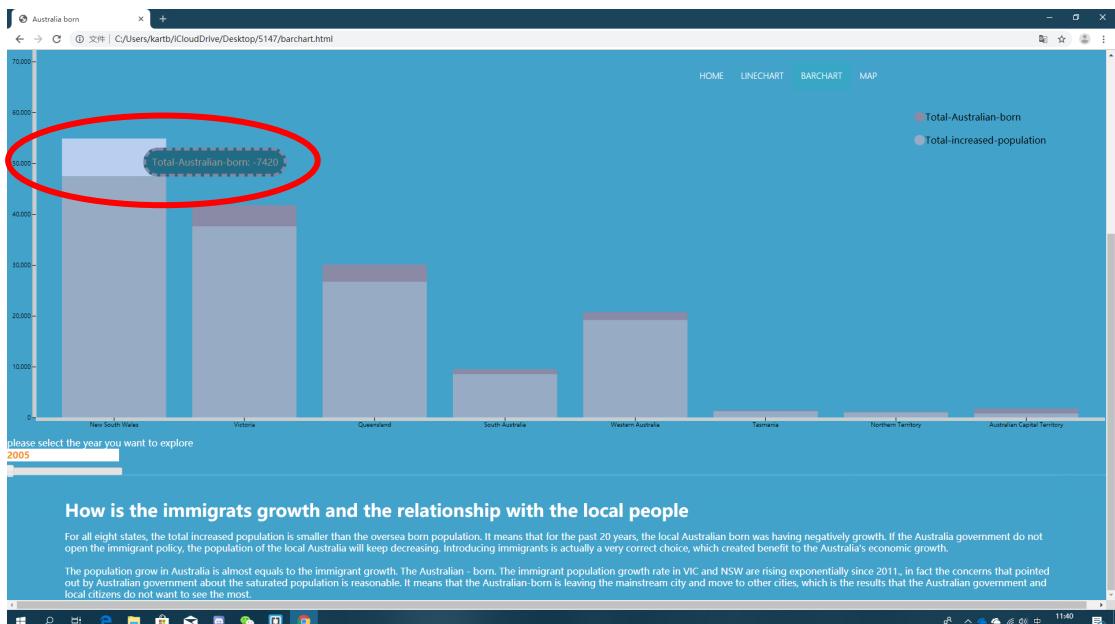


Figure 8 highlight the Australian born population

When the user moves their mouse on the bar, the bar will highlight all and show the floating box with the information about the total-increased population and total oversea born population in Australia, which can show the relationship very clearly (Figure 6). Moreover, when they move their mouse on the top section of the bar, the floating box will only show the total Australian born population number (Figure 7). The reason for making such interactive visualisation is to explore the relationship between immigrant and the population growth deeper.

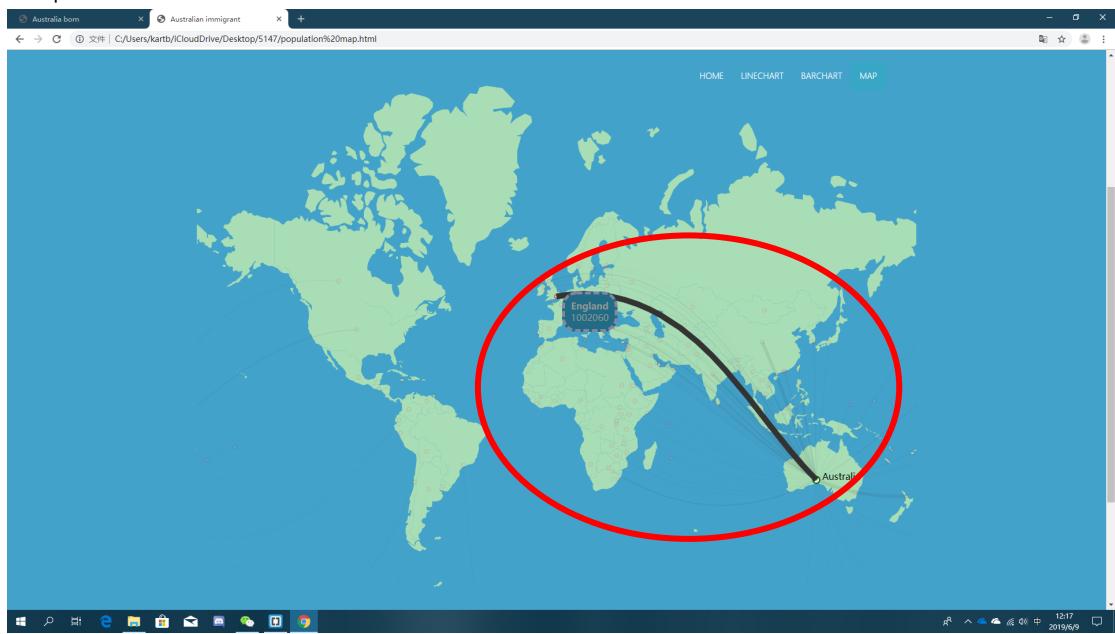


Figure 9 mouse on line

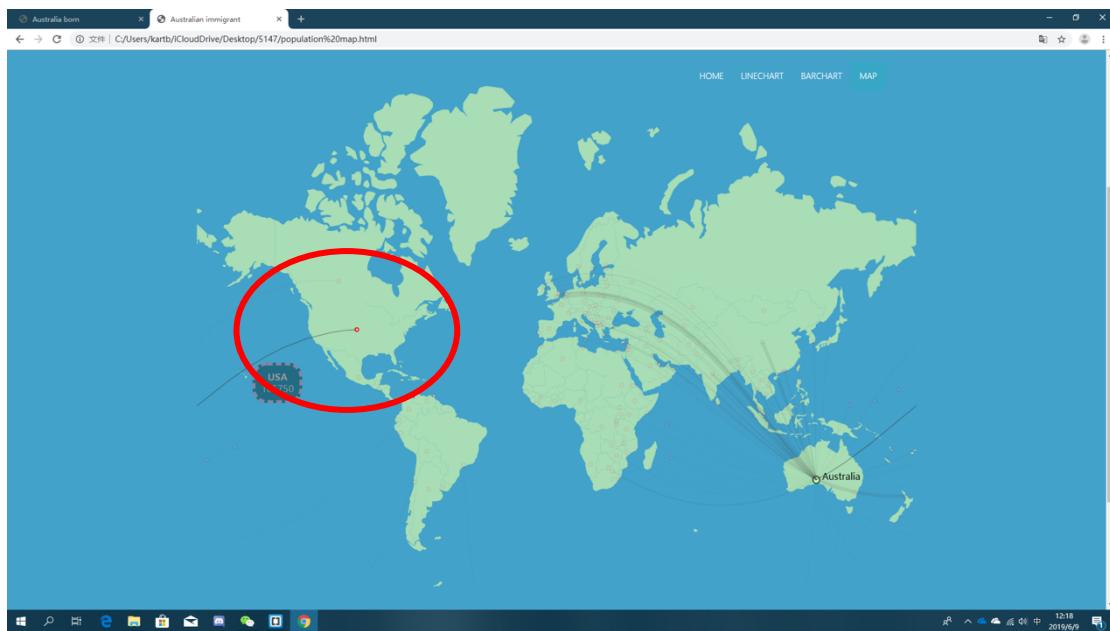


Figure 10 mouse on point

For making some prediction on the future how does the immigrant will affect the Australia population growth, I make a flow map to show the move path of different oversea born immigrant. The line is hided default, but when you move your mouse on the line, the moving path will be highlight, and the immigrant number that from this country is calculated by the Australia government will be shown in the floating box (Figure 8).

Moreover, the immigrant number of different countries is quite distinct which result in the line size is extremely different. If the path is too narrow, the user can select the country point to check the migration path and its calculated population (Figure 9).

Conclusion

I believe I have gained a great achievement on this assignment. I never studied D3 before, but I used 10 days to finish this visualization. If the main request for this project is only for data visualization and interactive, I think I finished this mission not bad. However, website design is quite challenging topic, because you are not only need to reach the clients expectation but also need to design perfect UI. To be honest, finishing the function is not the most difficult task but how to design the website is quite challenging and take time.

If there is something I can improve, I think there are two aspect. First of all, I want a more complete dataset. In the 5-design sheet, for exploring the data deeper, I made a lot of design on the data visualization but was quitted because of lack of data. Secondly is the UI design. I was imaging a very perfect user interface before implementation. However, a lot of them cannot be achieved because of lack of UI design experience and color knowledge. If I have chance to have a website design project mission in the future, I want to achieve these two tasks better.

Reference

Murphy, K. (2018). "Australians growing more concerned over immigration – Guardian Essential poll." from <https://www.theguardian.com/australia-news/2018/apr/24/australians-growing-more-concerned-over-immigration-guardian-essential-poll>.

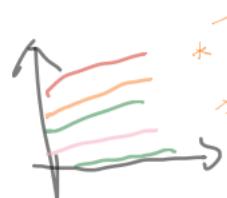
Wright, S. (2019). Australians do not want any more migrants: ANU poll. THE SYDNEY MORNING HERALD. Sydney.

Appendix

Sheet 1 : Brain storm

Sheet 1 - BRAIN STORM

① How population growth in Melbourne & Aus?



* Tendency?
* Time line? More??

• Make prediction

↓
more data!!
- Gender composition
- Age composition



* Distribution?
* Changes?



Affect?



Overseas born?

Born Rate:
Local people
vs
Resident

Immigrant ↑



Industry

Composition

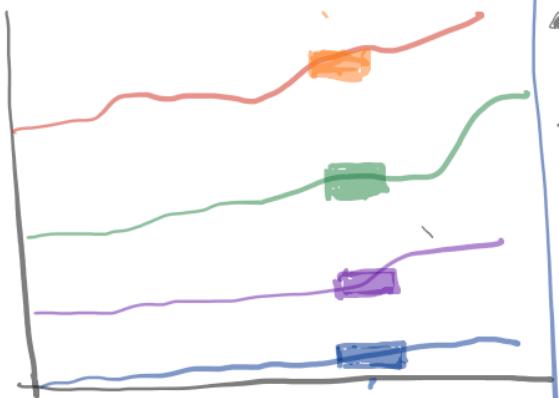
- Financial?
- Industry?
- Food?

② How the migration the affect Aus population growth?

Sheet 2.3.4 - Initial Design

Layout

Area ▾



Focus:

- ggvis
- RCharts

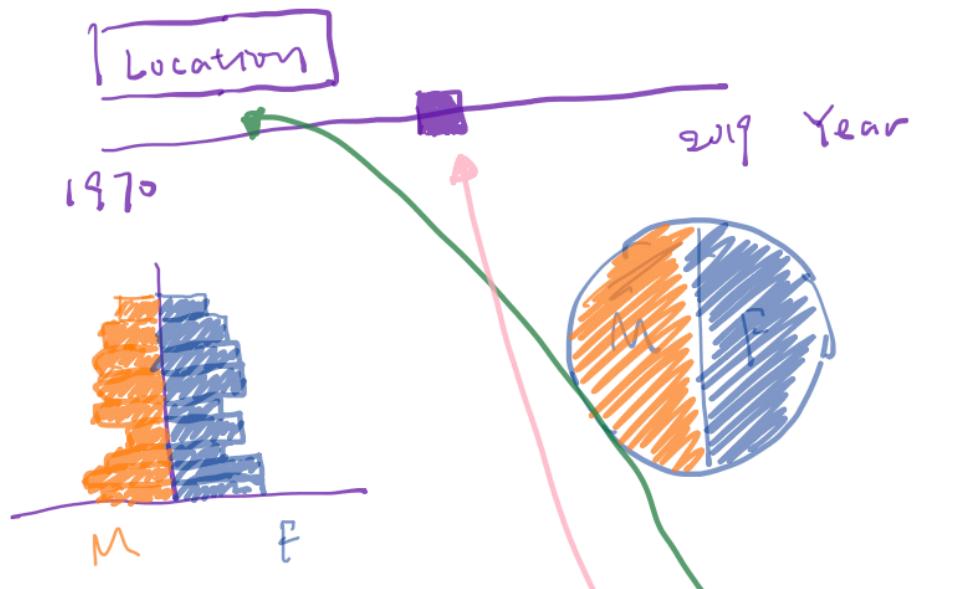
Operators:

- Drag down to select different area in Ans
- check every data in the chart
- Zoom in

Add & Disadvantage

- You can only select one location to check the tendency
- But also can select multiple locations to compare them,
- Moreover, you can zoom in to check the more detail information.

Sheet 2.3.4 Initial Design



Focus:

- GoogleVis
- gvisMerge

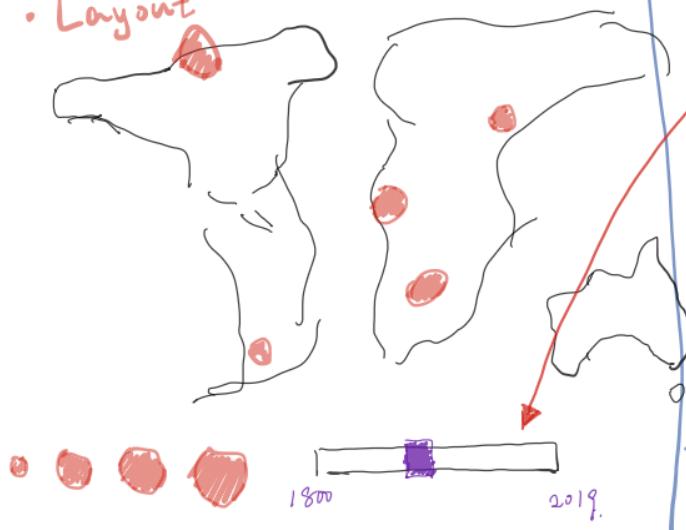
Advantage / Operators:

- Because of the big dataset, using plot or line to show the trend but detail is not clear. Use shiny to show dynamic gender and age composition.

- select different area
- select different time.

Sheet 2 .3.4. Initial Design.

• Layout



operations:

- Drag the button on the bar
- Maps will show different size of the immigrant and the location that they borned.

Discussion:

- Better show the trend of migration
- Size of the specific borned location of the migration.

Focus:

► Animated Map

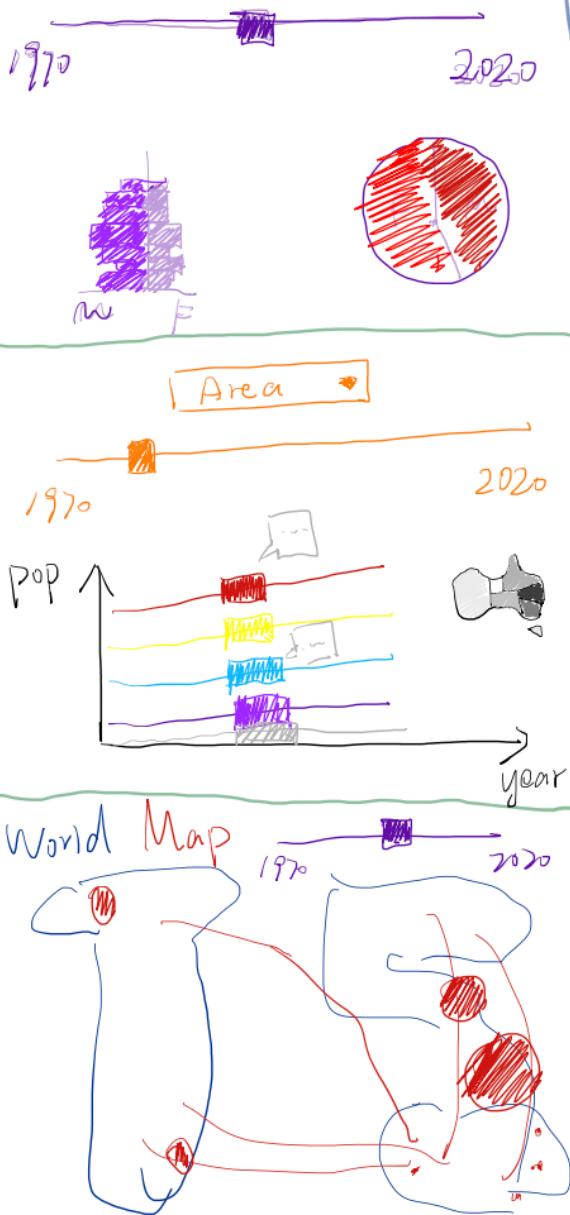
- aggregate.

Improved:

Can show the path is better.

Sheet 5

Layout: (Description)



Description:

- 3 pages of Shiny Web site.

Software:

- Using R
- ggplot
- Many required package

Estimates:

Workload:

Almost 12-15 days

Others

N/A.