

CS5044 - Information Visualization

P3 - Groupwork

Group Report

Introduction

The changing trend of adult education level in a country is influenced by many aspects, such as the economic strength of the country, investment in education and so on. With the passage of time, the role of education becomes more and more significant.

The level of adult (25-64) education actually reflects the educational level of the country's labor force, that is, the quality of the labor force. High quality will promote the development of the economy. As a result, countries continue to increase investment in education. For a country, education decides the future of a country and a nation, which is the most fundamental cause of a nation. Therefore, it is necessary to study the visualisation of the trend of adult education. This visualisation focuses on the trends of education levels in countries around the world in the past decade (2008-2017).

Data & Questions

The data we selected is about adult education level, which looks at the highest level of education completed by the 25-64 year-old population. There are three levels: below upper-secondary(BUPPSRY), upper secondary(UPPSRY) and tertiary education(TRY). The indicator is measured as a percentage of same age population. For those people who is upper secondary(UPPSRY) or tertiary education(TRY), the dataset also provides a percentage of men and women.

There are mainly five attributes, including educational level (SUBJECT), year (TIME), gender, country (LOCATION) and numerical value(VALUE). The time range of the raw data is from 1987 to 2017. In order to study the development trend of recent years more pertinently, we choose the data from 2008 to 2017.

Attribute	Description	Attribute Type	Expressive	Effective	Missing Values
LOCATION	Country or region	Categorical	Yes	Yes	No
SUBJECT	Education level	Ordered	Yes	Yes	No
TIME	2008-2017	Ordered	Yes	Yes	2008-2017
GENDER	Women or men	Categorical	Yes	Yes	No
VALUE	Percentage of 25-64 year-olds on this education level	Number	Yes	Yes	No

Table1: Attribute Types

Study and compare the differences in adult education levels in different countries at different times.

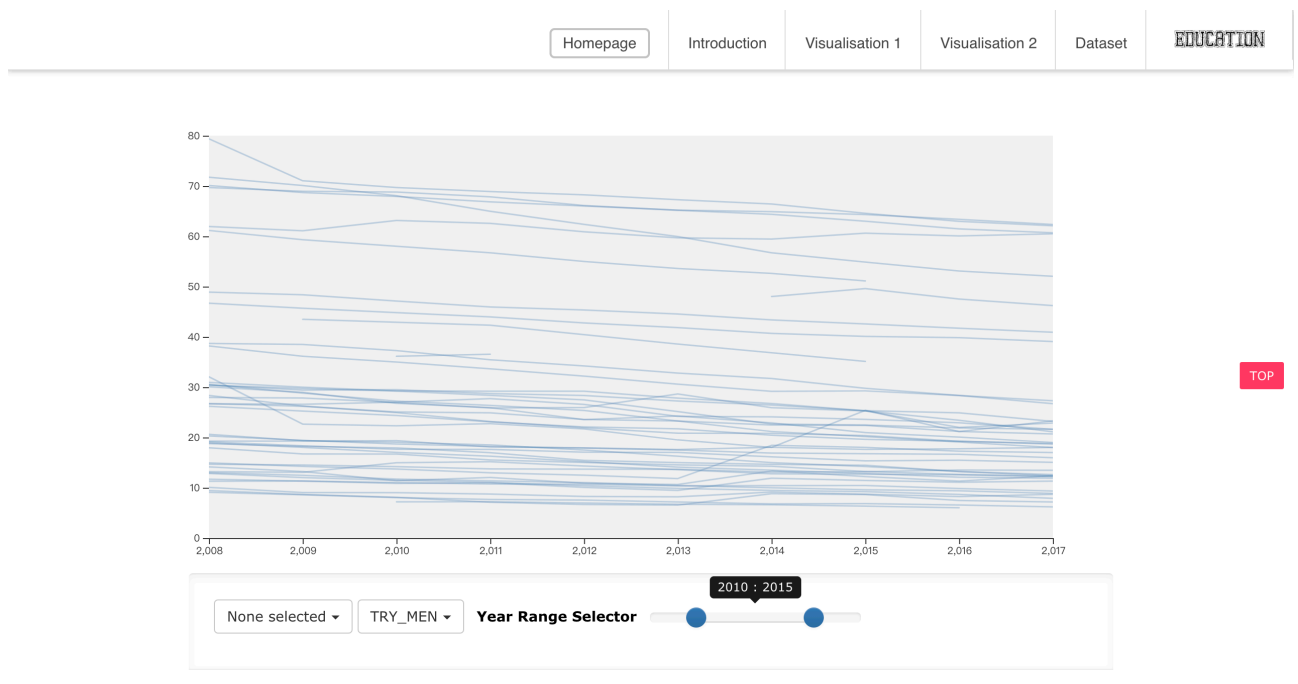
- (1) What is the changing trend of adult education level in the last ten years around the world?
- (2) What is the trend of gender change in adult education in a country in recent ten years?
- (3) What are the similarities and differences between different countries in terms of education level in the same period of time?

Extension question:

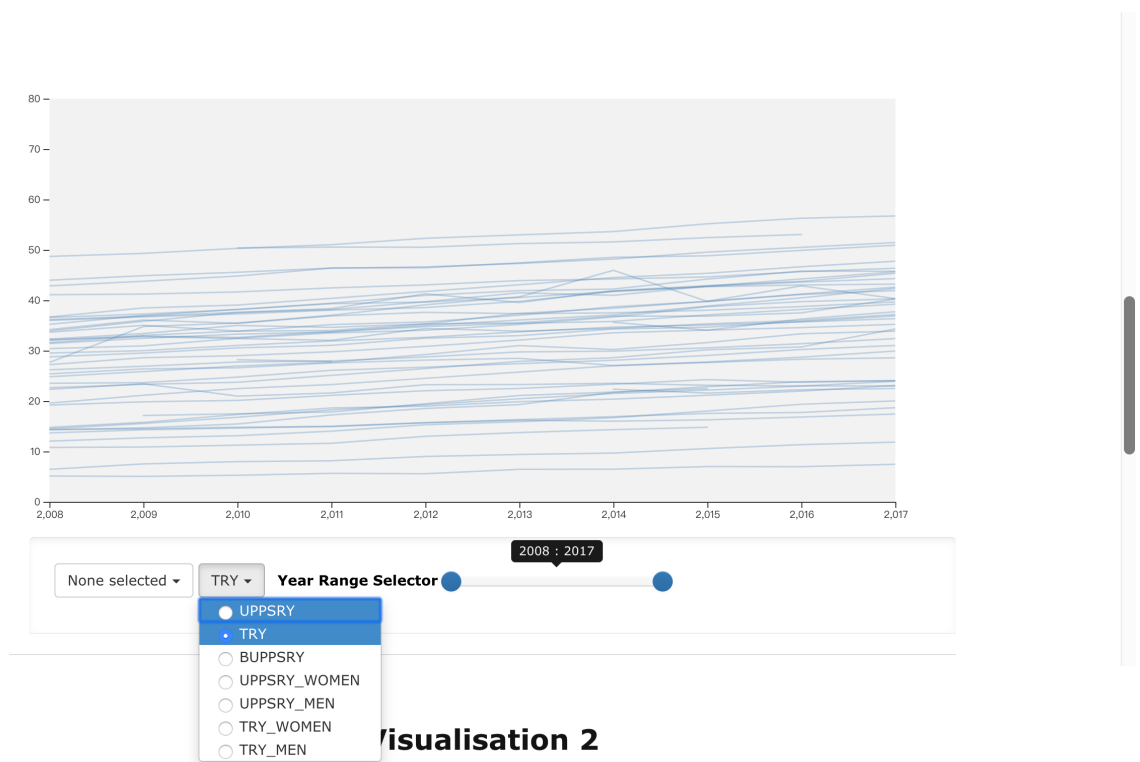
- (1) The comparison of the level of higher education in each country every year.
- (2) The similarities and differences of the changing trend of elementary, secondary and higher education in a country in recent ten years.

Description of Visualization

In the first visualization, the data of all the countries is shown as many lines. Three filters can be used to filter the data, including country, subject(education level) and time. Users can choose a period of time. The chart changes as the filter's selection. If the user don't choose any country, he can also check the data by placing the mouse over the line.

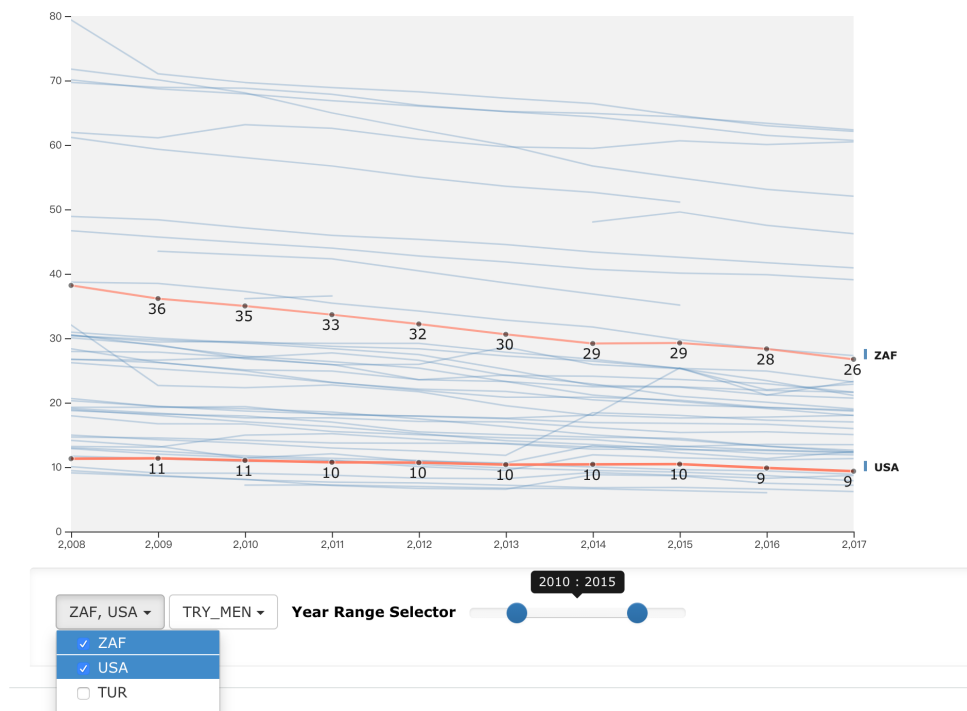


Initial Visualization 1
(All the tests are done by Chrome Browser)

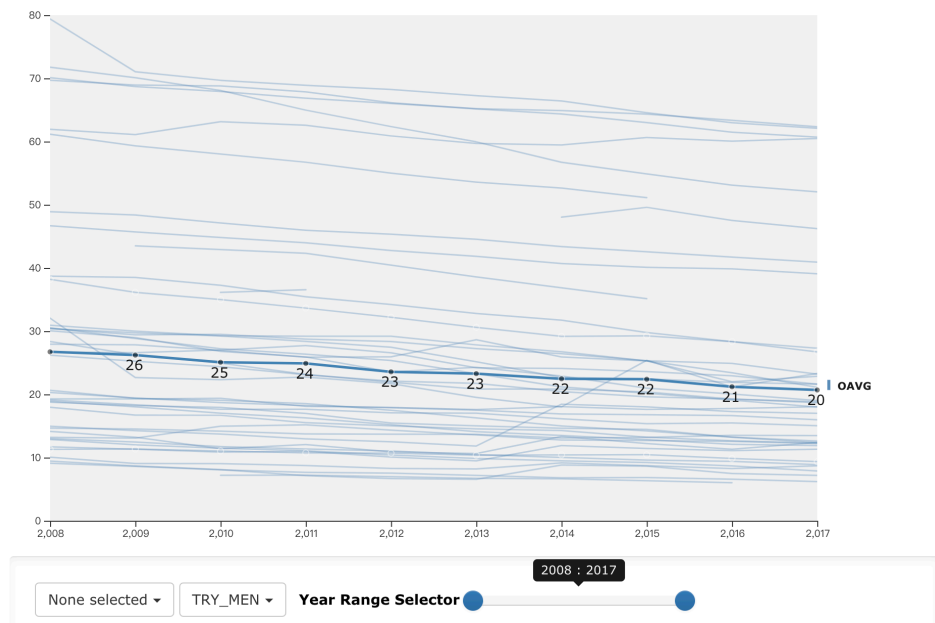


Visualisation 2

Choose Subject and Time as the Filters



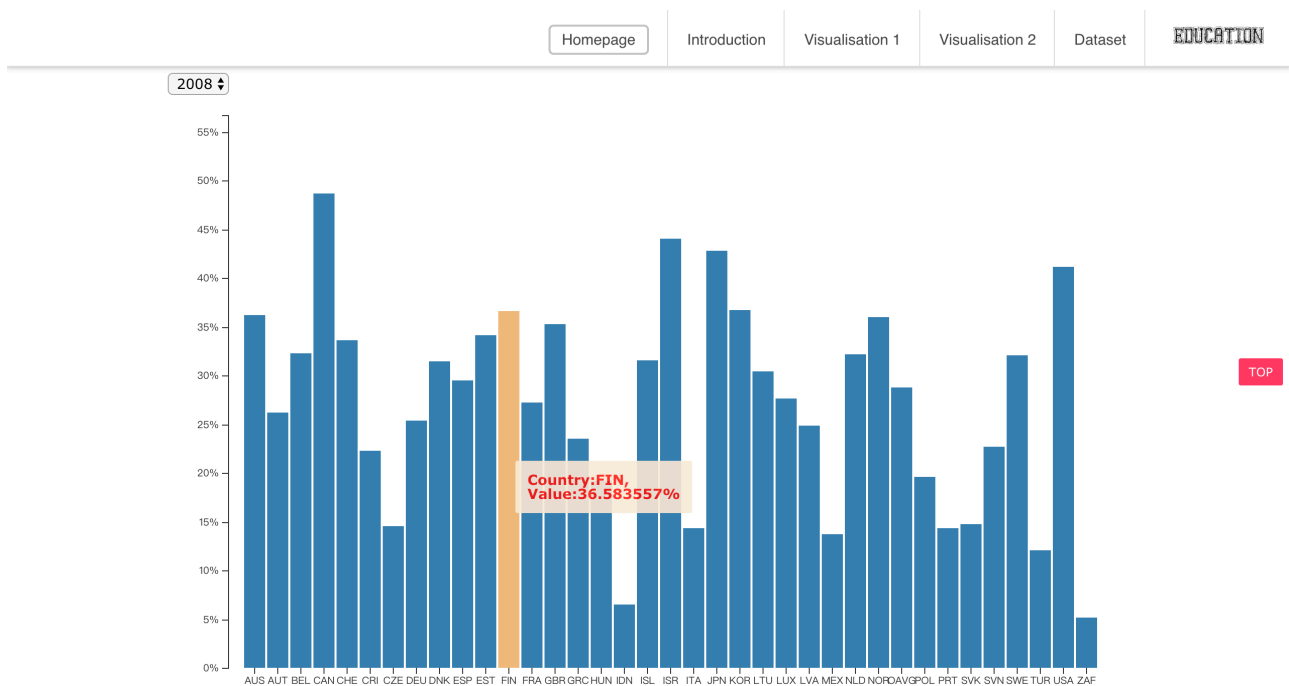
Choose Specific Countries, Subject and Time as the Filters



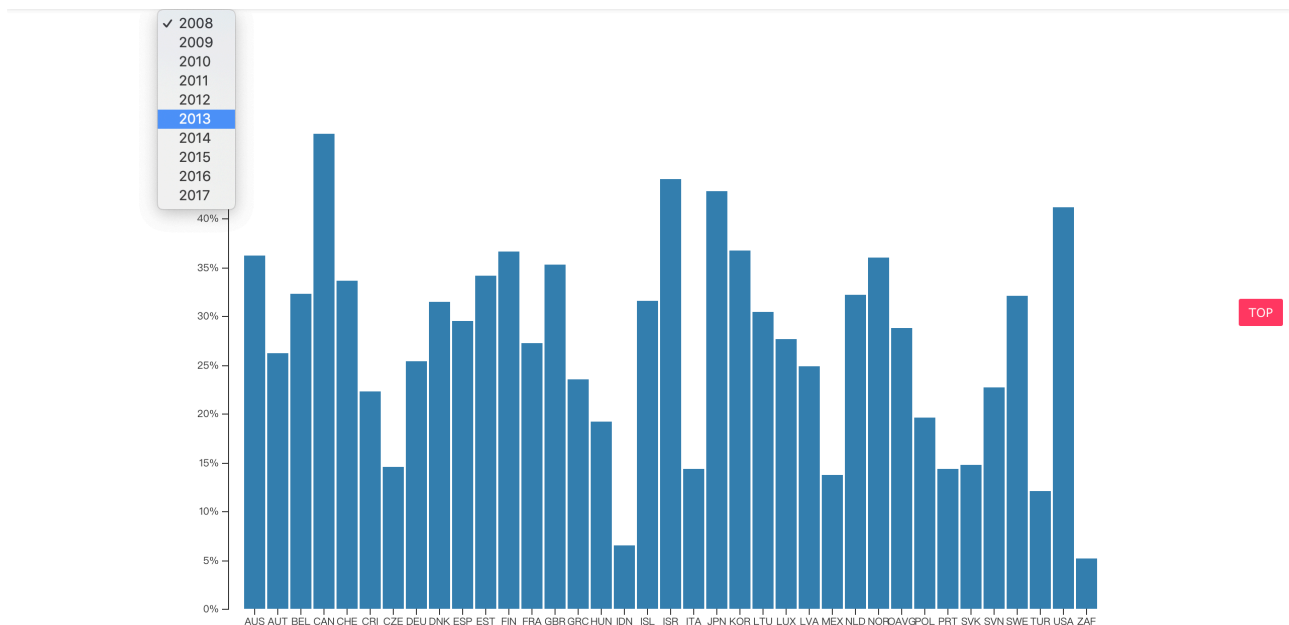
TOP

Check the Data by Placing the Mouse Over the Line

The second visualisation shows the proportion of tertiary education in different countries. The specific year can be selected. User can see the specific data by placing the mouse over the histogram.



Check the Specific Data by Placing the Mouse Over the Histogram



Choose the Specific Year as the Filter

Implementation

The logic of the first graph is much more difficult than the second. We added three attributes to each line, including 'subject', 'country' and 'whether it is be selected'. In each interaction event, filter for different attributes. In terms of time filter, we used a trick, clip-path, to reduce the development difficulty.

The second graph is a bar chart. The data is processed because the quantity of country is too many to put in the X-axis. In this case, we only took countries that had TRY data for 10 years.

Insight From the Visualization

These two graphs can answer the questions before. In the first graph. It can be seen that the global adult education level shows an obvious upward trend. Besides, there are significant differences in the values of adult education level between different countries. With observing the second graph, the proportion in each country has an upward trend. Since both of our visualizations have user interaction, especially the first one has three filters, more conclusion can be observed with the further explore.

However, our project still has many limitations. First of all, the further implementation of gender difference contrast visualization is not implemented. In addition, too many lines on the chart mixed disorderly. It is not easy to click and identification. Last but not the least, if time is enough, we will give another filter to the second visualization to realize more interactive.

Link

<https://kz37.host.cs.st-andrews.ac.uk/cs5044-p3/index.html>

<https://yh45.host.cs.st-andrews.ac.uk/cs5044-p3/index.html>

Reference Links

Link	Comments
https://github.com/d3/d3/wiki	D3 official document
https://www.d3-graph-gallery.com/graph/line_filter.html	Filter reference
https://github.com/d3/d3/wiki/Gallery	D3 gallery.
http://bl.ocks.org/d3noob/8952219	Bar chart reference
https://bl.ocks.org/mbostock/4015254	<clipPath>Tutorial
https://bl.ocks.org/d3noob/4db972df5d7efc7d611255d1cc6f3c4f	D3 line chart
https://bl.ocks.org/johnnygizmo/531991a77047112b7ca89f78b840fba5	Multiple Checkbox Filtering
https://css-tricks.com/almanac/properties/c/clip/	<clipPath>Tutorial
https://www.urbanfonts.com/free-fonts_page-665.htm?fonts_order=az	Education logo