FIT5145 Assignment 1

Task 1: Unemployment Rate and House Prices

In the task, you are required to visualise the relationship between the unemployment rate, the house price index, and the population of different Australian states, and gain insights from how these relations and trends change over time using motion chart in python.

Steps did for processing the data and creating the motion chart for visualization

1. Read all the data file which is in csv and xlsx format using the python functions in the jupyter notebook.
2. Wrangle the data sets and format it in the required way for processing the data and creating a motion chart. In our case I have used melt functions to format the data for making it ready for merging with other data sets to display the motion chart.
3. Convert all the dates which is in string format in the unemployment rate, house price index and the population data to date format for displaying it in the motion chart and using that as a variable for displaying the chart.
4. Using merge function all the datasets are merged as one and made ready for feeding into motion chart.
5. Set up the motion chart format and pixels.
6. Define the x, y labels, scales and size of the bubbles of the motion chart accordingly. For us the x axis is the house price index, y axis is the unemployment rate and the size of the bubble is the population. This should be correctly defined and execute to get the motion chart.

Findings

1. What are the overall patterns across different states in Australia?

    - Considering population of all the states at our starting date 01/12/2005 the ranking of the states are as follows: NSW, VIC, QLD, WA, SA, TAS, ACT and NT and this ranking is sustained till the final date of 01/06/2015. (Refer to the charts given below)
    - House price index of all the states went high with respect to the increase in population in most of the states in a span of 10 years.

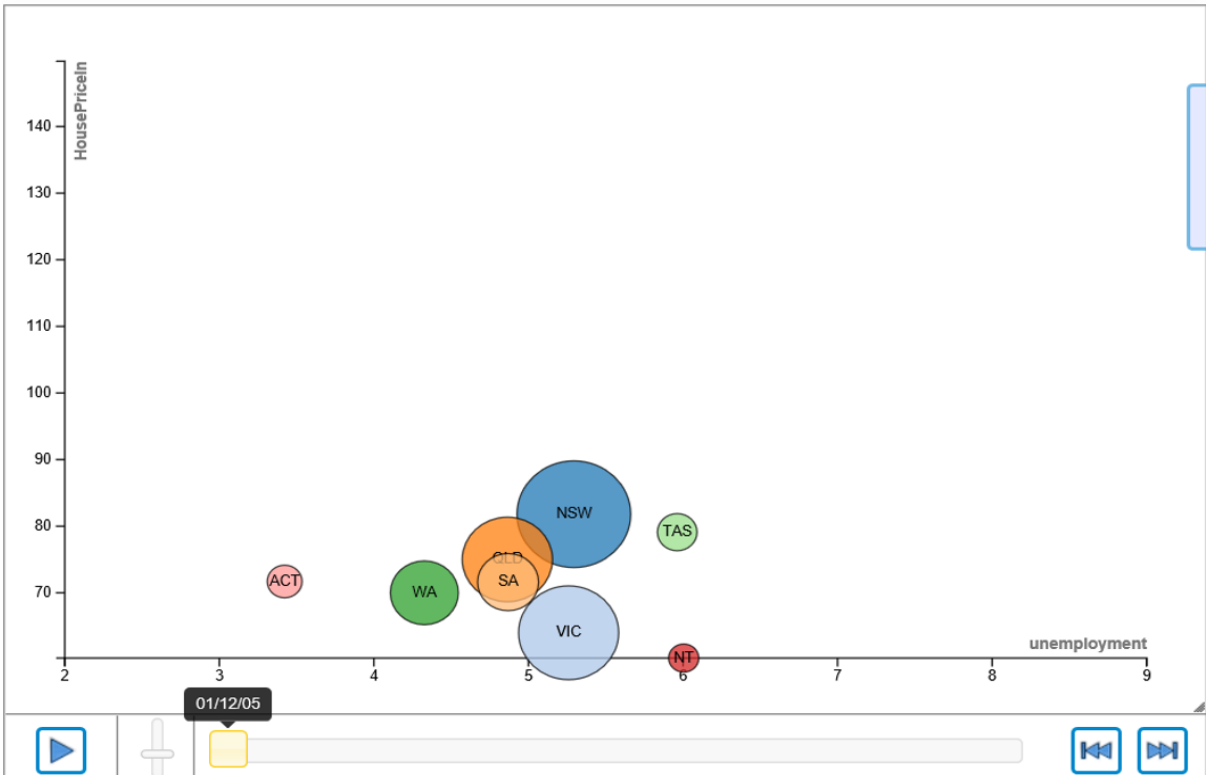

Fig1: Chart at 01/12/05

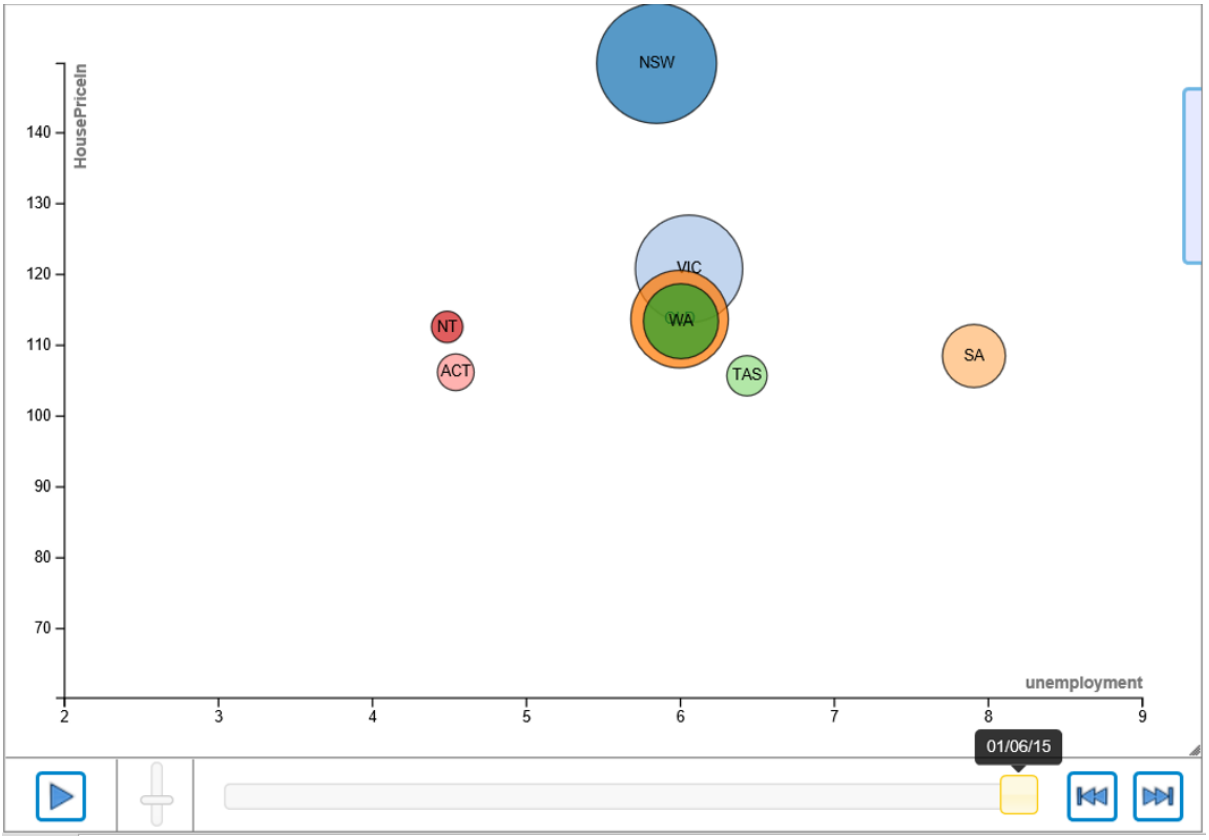

Fig2: Chart at 01/06/15

- One peculiar pattern what we can find is of the NT state: NT had the least house price and the highest unemployment rate at 01/12/2005 and after 10 years NT has the least

unemployment rate and SA has the highest. In this span of 10 years the unemployment rate of NT was jumping from high to low and vice versa many times. This can be clearly observed the figure 3 given below.

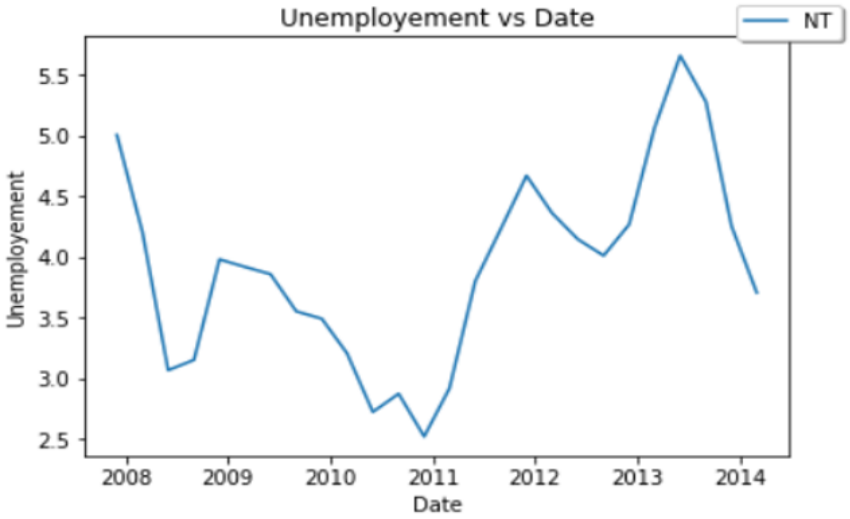

Fig3: NT unemployment rate variations

- At a certain point in the 10 years of time the house price index of WA went high than any other states and had low unemployment rate but late the HPI fell as the time went by. (Refer the fig4 below and fig2)

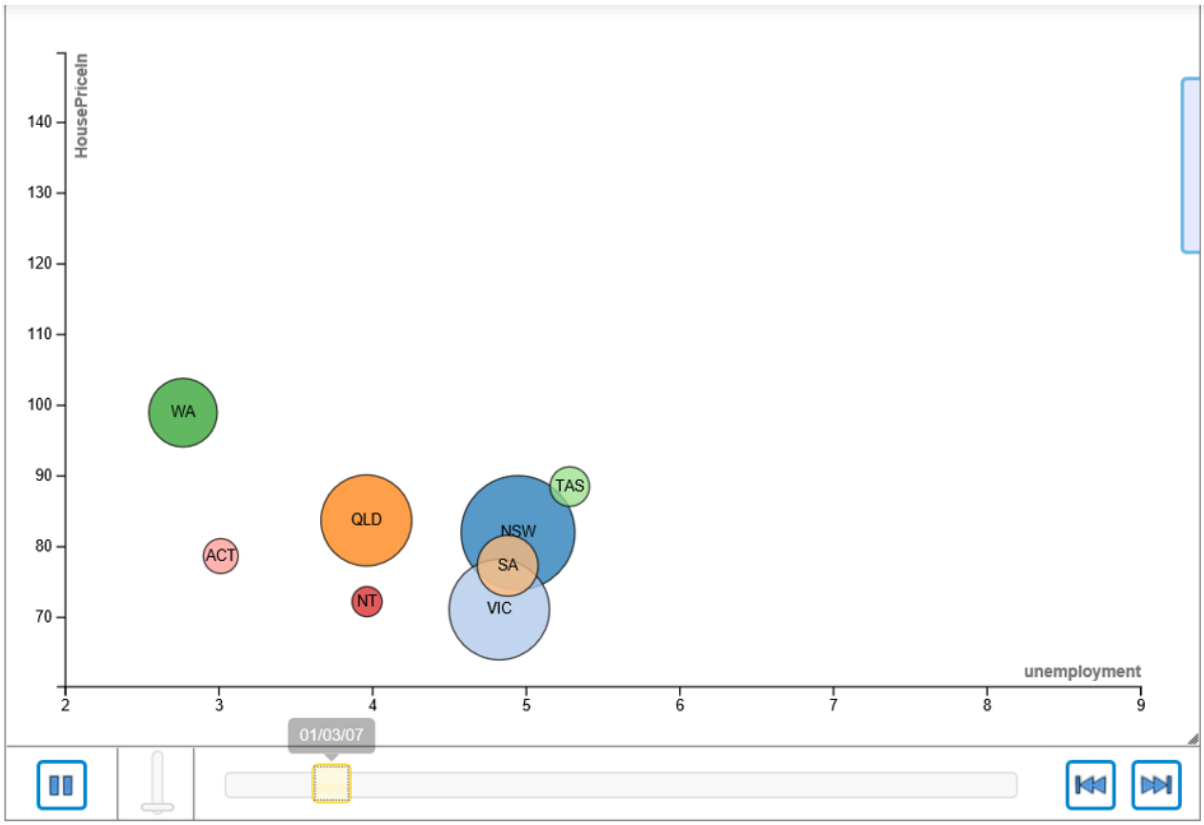

Fig4: WA when HPI was high

- In the year 2011 the house price index of most of all the states were almost the same for all the states and the states like SA, QLD, VIC and NSW had almost the same unemployment rate.

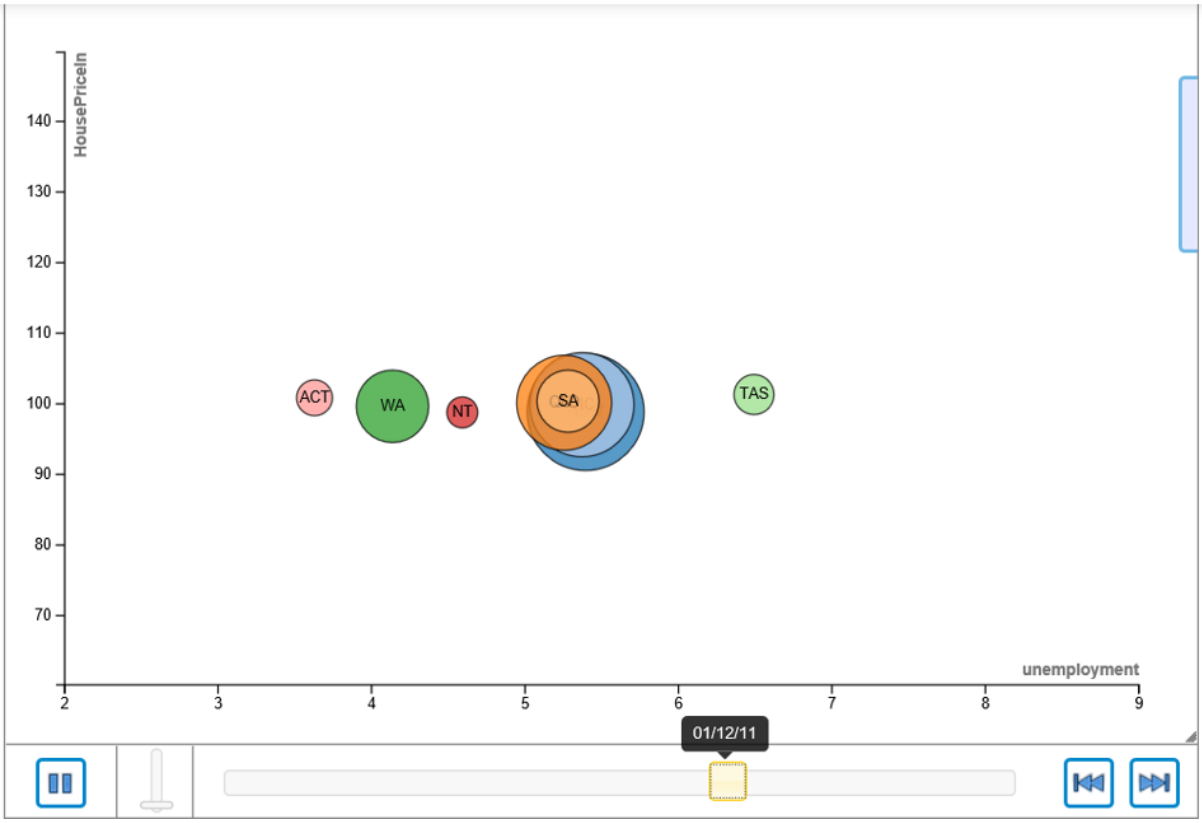

Fig5: States merging

2. Is there any relationship between unemployment rate and the house price index?

    - The unemployment rate and house price index over the 10 years kept fluctuating for every state.
    - At some point when house price index was high the unemployment rate was low and when HPI was low the unemployment rate was high. Also, there were cases when both were high and low at the same time. The figures below will give a sample variation between HPI and unemployment rate for state SA which is quite the same pattern for almost all the states.

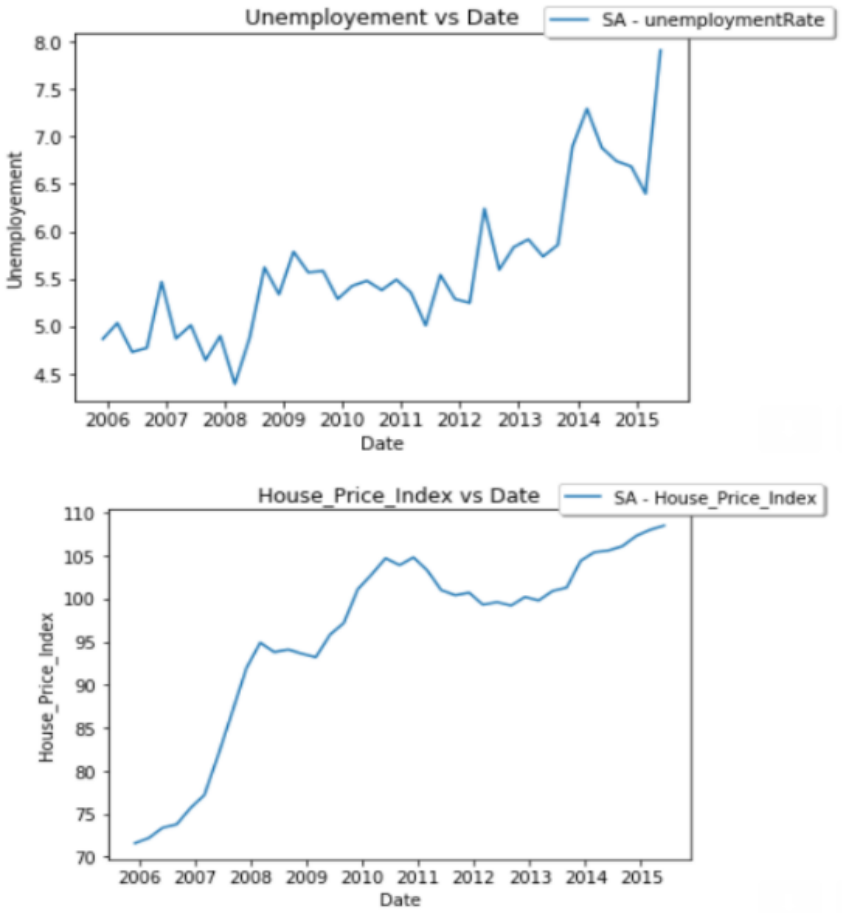

Fig6: HPI and Unemployment rate

3. Which state has high unemployment rate and high house price index (you may point out different period of time)? How about low unemployment rate and low house price index?

- The table shows the high and low HPI and unemployment rate of each year and its corresponding state.
- By looking at it we can see that for most of the time NSW has the highest HPI from the recent years, WA and QLD in between 2006 and 2009.
- From 2013 to 2015 TAS and ACT has the low HPI and in previous most of the years NT had the low HPI.
- For most of the years TAS had high unemployment rate and low rate for NT and ACT where NT has the least unemployment rate in 2015.
  (This data is generated from the python code attached with the file sourcing the final result csv file)

Date	High HPI State	Low HPI State	High UR State	Low UR State
01-12-2005	NSW	NT	NT	ACT
01-03-2006	TAS	NT	TAS	ACT
01-06-2006	WA	NT	TAS	ACT
01-09-2006	WA	NT	TAS	ACT
01-12-2006	WA	VIC	TAS	NT
01-03-2007	WA	VIC	TAS	WA
01-06-2007	WA	NT	TAS	ACT

01-09-2007	WA	NT	TAS	ACT
01-12-2007	WA	NT	TAS	ACT
01-03-2008	QLD	NT	TAS	ACT
01-06-2008	QLD	NT	SA	ACT
01-09-2008	QLD	NT	SA	ACT
01-12-2008	QLD	VIC	SA	ACT
01-03-2009	QLD	VIC	NSW	ACT
01-06-2009	QLD	VIC	NSW	ACT
01-09-2009	QLD	NSW	QLD	NT
01-12-2009	QLD	NSW	NSW	NT
01-03-2010	WA	NSW	TAS	NT
01-06-2010	QLD	NT	TAS	NT
01-09-2010	QLD	NSW	SA	NT
01-09-2010		NT		
01-12-2010	TAS	NSW	QLD	NT
01-03-2011	TAS	NT	QLD	NT
01-06-2011	VIC	NT	NSW	NT
01-09-2011	VIC	NT	SA	ACT
01-12-2011	TAS	NT	TAS	ACT
01-03-2012	NT	SA	TAS	ACT
01-03-2012	ACT			
01-06-2012	NT	TAS	TAS	WA
01-09-2012	NT	TAS	TAS	ACT
01-12-2012	NT	TAS	TAS	NT
01-03-2013	NT	SA	TAS	ACT
01-06-2013	NT	TAS	TAS	ACT
01-09-2013	NSW	TAS	TAS	ACT
01-12-2013	NSW	ACT	TAS	ACT
01-03-2014	NSW	ACT	TAS	ACT
01-06-2014	NSW	ACT	TAS	ACT
01-09-2014	NSW	ACT	TAS	NT
01-12-2014	NSW	ACT	SA	NT
01-03-2015	NSW	ACT	QLD	NT
01-06-2015	NSW	TAS	SA	NT

4. What is the performance of the most populated states like NSW and VIC?

   Referring to fig 1 and fig 2 given above we can see that during 2015 VIC had the second lowest HPI and NSW had the highest. The unemployment rate was almost the same for both the states at this time. By the end of 2015 NSW and VIC were top 2 states with high HPI and they both had a similar unemployment rate.

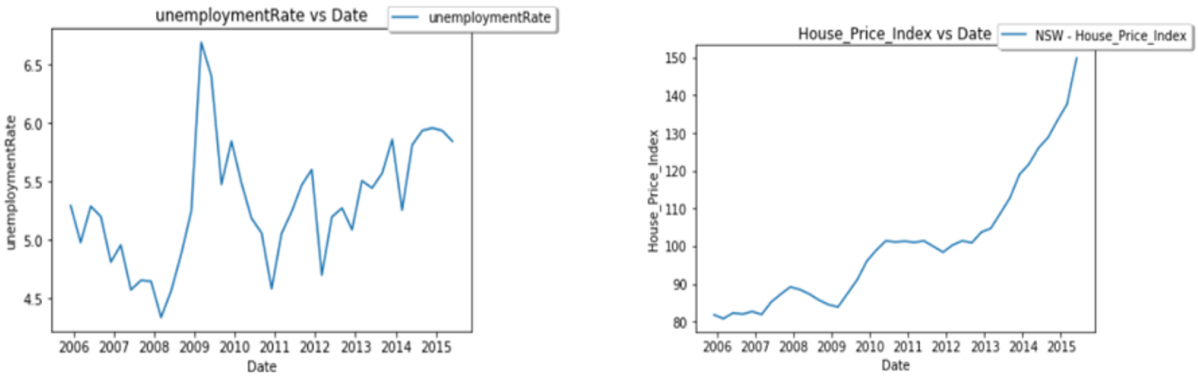

Fig7: NSW UR and HPI variations

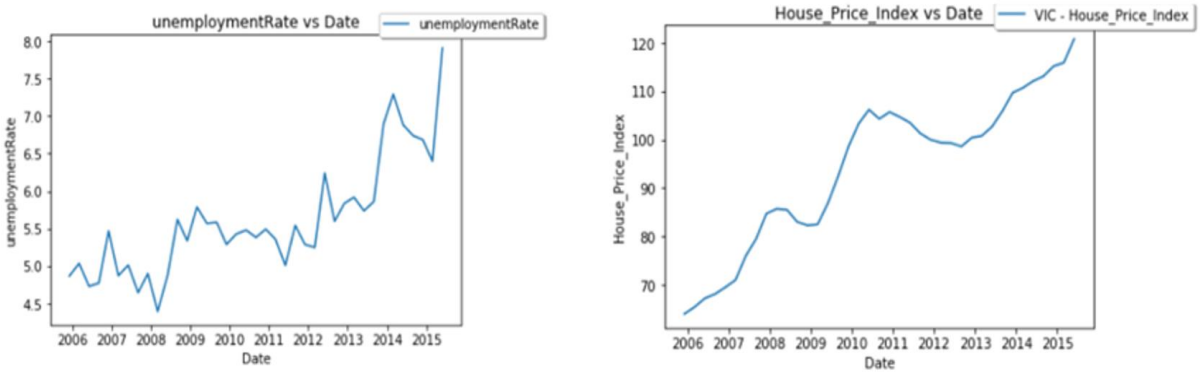

Fig8: VIC UR and HPI variations

- By looking at the above charts we can see that for NSW the unemployment rate had a high variation between 2008 to 2011 and the small variations was constant over the years too, but it came to a low value in 2015 comparing to 2009.
- Considering VIC the unemployment rate kept fluctuating between 4.2 and 6 from 2005 till 2013 but it reached the all-time high of 10 years by 2016.
- The house price index of both NSW and VIC kept on rising over the years as the population was increasing in the states and these values are at all time high for the 10 years between 2005 to 2015

Task 2

For this task the data files are taken data from the gapminder website then formatted and filtered the records to another excel sheet only for the data we are focussing for visualization. The datasets are of world population, co2 emissions and GDP. For our data visualization we are just focussing on the gulf countries comparing it with few Asian countries, USA and Australia.

Findings

- Referring to the motion chart we can see that as the technology developed and the industries boomed the CO2 emissions around the world especially the Arab countries increased a lot.
- During the 1940s to 1970s the Arab countries like Qatar, Kuwait, UAE all had a peak CO2 emissions rate and the GDP was also booming. But the CO2 emission rate went down but still higher than the rest of the countries like USA, UK, Russia and Australia
- The Asian countries like India and China had least CO2 emissions and GDP irrespective of their population over the years.
- Singapore has the least CO2 emissions over the years and have a strong GDP.
- The Arab country with the least CO2 emissions rate over the years is Bahrain.

- The top 5 countries with the high CO2 emissions rate in the 21st century are Qatar, Kuwait, UAE, USA and Saudi Arabia and for GDP Qatar, Kuwait, Singapore, UAE and USA. Refer chart below.

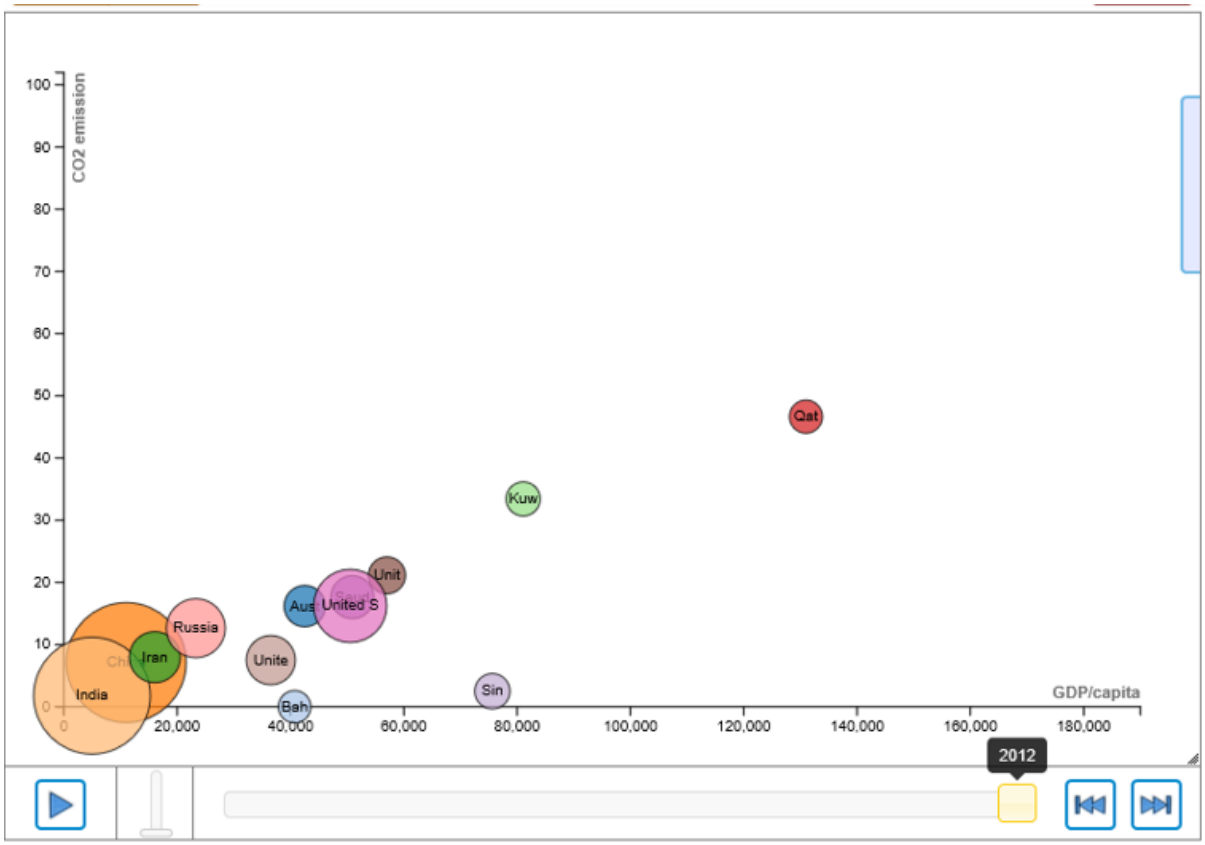

Fig9: Countries at 2012

References

www.gapminder.org