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INFORMATION
TECHNOLOGY

FIT3179 Data Visualisation

Week 10: Interactive Data Visualisation

GROUP OF EIGHT AUSTRALIA

Student Evaluation of Teaching and Units (SETU)

Please provide feedback.
Take 5 minutes to fill out the SETU form on Moodle.

Visualisation 2 Critique Assignment

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Post URL to your visualisation on forum
— by Saturday Week 10 or 11.

Review/critique visualisation posted after yours.
— Week 11 or 12

5 minutes.
Constructive critique about all aspects.
Most important aspects first.
Do not describe What, Why, How, Who, Domain, etc.

Visualisation 1 Feedback

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Generally good results!

Some selected aspects to be discussed in lecture today.

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Lecture Overview

- Why add Interactivity in visualisation?
- Manipulation and change: Munzner textbook chapter 11

Readings

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- Required reading:
  - Textbook *Visualization Analysis and Design*: **Chapter 11: *Manipulate View***

- Optional readings:
  - Heer and Robertson, 2007, Animated Transitions in Statistical Data Graphics

Too much Data!

With big datasets, there is too much data to present easily

Visualisation experts noted this and considered different ways to address the problem. *Ben Shneiderman (1996)* suggested that data should be visualised with:

"*Overview first, zoom and filter, then details-on-demand*"

This is Shneiderman's mantra. Read VAD, section 6.7.

Why add interactivity?

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We add interactivity to make data easier to understand. We can also use interactivity to improve the *story* of the data.

- Generally we want to add interactivity because:
  - Reduce the cognitive load of the user
  - To cater for extra dimensions in the data
  - To more easily facilitate macro/micro readings
  - To add extra meaning
    - Narrative for the user
    - Information discovery

Reducing Cognitive Load

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- We experience cognitive load when we have to process more than our brain can easily handle (VAD 6.5.1)
  - Our long-term memory is very good and unlimited, but our working-memory (or short-term memory) is very limited.
  - Once the cognitive load (or working-memory) is exceeded, the user loses ability in decision making and knowledge acquisition.
- Focus and context principles can help us to deal with this
  - Reducing the number of unique elements and allow the user to group items helps.
- Visualisations in general allow us to tap into visual thinking (VAD 6.5)
  - Munzner describes this as ‘eyes beat memory’
  - Change blindness (VAD 6.5.3)

Why add interactivity: *Extra dimensions*

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- To cater for extra dimensions in the data
  - Sometimes there are too many dimensions to a data set to display nicely
  - For example, you may have values for things, but also have a time dimension
  - Interactivity may allow you to scroll through time to see changes

Why add interactivity: *Better Macro/Micro reading*

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- To more easily facilitate macro/micro readings
  - Macro readings should always be evident
  - However micro readings may be difficult
  - Interactivity can allow exploration of data of the viewers interest
  - They can create their own secondary narratives and draw their own meanings

Why add interactivity: *Add extra meaning*

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- To add extra meaning
  - Interactivity may also draw out extra meaning to data
  - It might allow data difficult to make meaning be more easily accessible
  - It may also juxtapose data in a different way
  - Moving things around on a visualisation for example may allow different comparison to happen

Interactive Visualisation Examples

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- Google Maps
- http://www.gapminder.org/tools/
- http://caleydo.org/tools/lineup/
- http://usmigrationflowmapper.com
- http://www.poppyfield.org/
- http://co2.digitalcartography.org/
- http://britains-diet.labs.theodi.org
- http://www.nytimes.com/interactive/2014/06/05/upshot/how-the-recession-reshaped-the-economy-in-255-charts.html?_r=0&abt=0002&abg=0

Interactivity: *Select and navigate*

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- What can be changed with interactivity?
- Can these changes be grouped?
- How can a selection be
  - created?
  - manipulated?
  - visualised?
- What types of navigation exist?
- > Munzner textbook chapter 11

▪ Manipulate View: Textbook chapter 11

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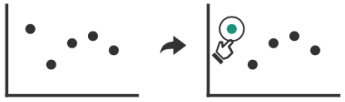
Manipulate

Change over Time

Select



Navigate

Item Reduction

- *Zoom*
  Geometric or *Semantic*

- *Pan/Translate*

- *Constrained*

Attribute Reduction

- *Slice*

- *Cut*

- *Project*