Overview for today

- course structure
- course outline
- introductions
- discussion - defining infovis
- projects
- information visualization history
CPSC 601.28: course structure

• Details
  when: TR 9:30 to 10:45 am
  place: MS680A
  format: seminar
• Evaluation
  class participation 5%
  In class exercises 10%
  Class presentation 10%
  visual journal 10%
  course project 65%
• Contact information
  sheelagh@ucalgary.ca
  220-6055
  office MS680J or ilab MS680
• Office hours
  by appointment: email or phone to arrange one
  drop in for urgent requests (but no guarantees!)

class participation

• is essential
• 5% may seem small but ...
• contributing to general seminar discussion
• leading a discussion
• participating in crits
• providing response to peer presentations
In class exercises

**Purpose:**
- develop representation mapping skills
- create and recognize useful information visualizations

**Evaluation:**
- in combination all of these exercises are worth 10%
- Each exercise will have 2 parts.
  - Part 1 (innovation part) – sketch a possible representation of the given data set.
  - Part 2 (review skills, the ‘crit’) – in this case group discussion

**Structure:**
- Part 1 (innovation part):
  - creation in class of a visual representation of small data set
  - full marks will be awarded for doing this exercise
  - encourage creation, innovation, risk taking – ‘just do it’
  - sketches will be put on the wall at 10:20 sharp! (no names)
  - sketches will be collected in at the end of class and photographed to create a record
  - like a quiz in that you must be present and take part
  - not like a quiz in that you do not have to memorize facts
- Part 2 (review skills, the ‘crit’):
  - will walk around and discuss the sketches on the wall
  - can use criteria that have been taught in class
  - both the positive and negative aspects of the sketch
  - ideas triggered by sketches – perhaps most important
keeping a visual journal
This is both
a record of your own visual thinking – will show developing and changing idea about your project.
a visually annotated bibliography – this is where you show me that you have understood the readings

3 pages a week — may check at any time

collecting
- of images that others have created for information visualization and/or visual communication in general, can be copied, printed, scanned, or sketched and secured in your journal in some manner
- chosen because you liked/disliked them or because you can not figure out some else’s reaction

reacting
- why and which parts you like or dislike
- annotate your images, draw on them, write on them, look at them in different scales
- which parts might you use yourself, as is, with changes, or never!

generating
- keeping track of your developing ideas
- including, scribbles, sketches, math, and words

In class presentation
From the readings
- present a set of 3 or 4 papers
- lead a discussion about the topic
- possible discussion points
  - what is the main issue (theme) of the papers?
  - is it important?
  - does it relate to your project? If so how? If not why not?
- evaluation
  - understanding of the literature
  - quality of the explanation
  - peer response, discussion etc.
What is Information Visualization?

• Definitions from the OED
  • Information
    - The action of informing; communication of the knowledge or ‘news’ of some fact or occurrence; the action of telling or fact of being told of something.
  • Visualization
    - The action or fact of visualizing; the power or process of forming a mental picture or vision of something not actually present to the sight; a picture thus formed.
    - The action or process of rendering visible.

What is Information Visualization?

• Computer visualization is used widely in scientific and engineering disciplines to help people understand the systems they study, but has only recently begun to be applied to more general information types. Information Visualization focuses on the design and use of computer visualization techniques for the analysis, comprehension, and explanation of large collections of abstract information, including text corpora, networked information systems, and heterogeneous tabular data. (Marti Hearst)
What is Information Visualization?

• Information Visualization explores the use of visualization to understand information and information systems. … The key intellectual challenge is to develop the right "visual metaphors" for conveying information in the most effective way, and to implement systems for extracting and presenting the information. (P. Hanarhan)

What is Information Visualization?

• Information visualization is a new emerging field whose goal is the perceptualization of information. Information visualization differs from scientific and medical visualization in that the data to be visualized is inherently non-spatial. (Robertson)
What is Information Visualization?

- Information visualization in enables users to get information quickly, put it in a meaningful shape, and to make decisions in a relatively short time.

What is Information Visualization?

- Information visualization research is developing ways of visualizing information sources and data as a means toward helping people interpret and understand the information. In particular, it focuses on depicting large information spaces, which often contain more informational elements than there are pixels on the screen.
What is Information Visualization?

- Information Visualization is the use of computer-supported interactive visual representations of abstract data to amplify cognition. (Card et al.)

What is Information Visualization?

- Information Visualization is a form of external cognition, using resources in the world outside the mind to amplify what the mind can do.
The power of the unaided mind is highly overrated. Without external aids, memory thought, and reasoning are all constrained. But human intelligence is highly flexible and adaptive, superb at inventing procedures and objects that overcome its own limits. The real powers come from devising external aids that enhance cognitive abilities.

(Norman, 1993, p. 43)

Why do Information Visualization?
Mis-interpretation is common

Anscombe's Quartet

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N: 11.0
mean X's: 9.0
mean Y's: 7.5
standard error of slope estimate: 0.1
sum of squares: 110.0
regression sum of squares: 27.5
residual sum of squares of Y: 13.8
correlation coefficient: 0.8
r squared: 0.7
regression line: Y=3+0.5X
John Snow
1854

- Discovered cause of a cholera epidemic through visualizing the data in conjunction with a map


Influencing Hospital Management

Florence Nightingale
English nurse, 1858

Florence Nightingale - Notes on Matters Affecting the Health, Efficiency and Hospital Administration of the British Army (1858)
Course outline

• Week 1
  • Tuesday (Jan 13)
    • Introduction, History of Information Visualization
  • Thursday (Jan 15)
    • 1st in class exercise (January 15th)

• Week 2
  • Tuesday (Jan 20)
    • A semiotic perspective, Bertin
  • Thursday (Jan 22)
    • A design perspective (Tufte, Kidd)

• Week 3
  • Tuesday (Jan 27)
    • Proposals (January 27th)
  • Thursday (Jan 29)
    • A cognitive perspective (Ware)

• Week 4
  • Tuesday (Feb 3)
    • A cognitive perspective (Ware)
  • Thursday (Feb 5)
    • 2nd in class exercise

• Week 5
  • Tuesday (Feb 10)
    • Representation #1 – relational data
  • Thursday (Feb 12)
    • Representation #2 – online social activity

Reading week

• Week 6
  • Tuesday (Feb 24)
    • Representation #3 – temporal data
  • Thursday (Feb 26)
    • Representation #4 – linguistic data

• Week 7
  • Tuesday (Mar 3)
    • Representation #5 – additional data relationships
  • Thursday (Mar 5)
    • Representation #6 – multi-dimensional data
Course outline

• Week 8
  • Tuesday (mar 10)
    • Framing infovis
  • Thursday (mar 12)
    • 3rd in class exercise

• Week 9
  • Tuesday (mar 17)
    • Presentation #1 – screen real estate
  • Thursday (mar 19)
    • Presentation #2 – layering, ZUIs

• Week 10
  • Tuesday (mar 24)
    • Interaction #1 – basics, overview
  • Thursday (mar 26)
    • Interaction #3 – animation

• Week 11
  • Tuesday (mar 31)
    • Interaction #4 – web
  • Thursday (apr 2)
    • Interaction #5 – collaboration, distributed

• Week 12
  • Tuesday (apr 7)
    • guest
  • Thursday (apr 9)
    • guest

• Week 13
  • Tuesday (apr 14)
    • Interaction #6 – collaboration, co-located
  • Thursday (apr 16)
    • Evaluation
The project

*Projects must be approved*.  
- A normal information visualization project will consist of creating a visual representation for your chosen project’s information and implementing this with interaction methods. The onus will be on the student to propose a project and to get it approved.

Total project is worth 65%

Break down:
- Project proposal 5%
- Project implementation 40%
- Project report 10%
- Project presentation 10%

The project

Project proposal: Due in class Tuesday Jan. 27th.

Written part - keep it short
- topic area
- data/information source
- visualization problem being explored
- your direction
- hand in soft and hard copy

Presentation - very short, max five slides
- tell the class about your intended project
- hand in .ppt file
The project

Project implementation: Due April 17th, 12:00 midnight.
   It has to work. I can not give grades for what might have been. But it
   can be a prototype, you must be able to demo.

Project report: Due April 20th at 12:00 midnight
   - Format - like a conference paper
     • abstract
     • introduction – problem description
     • related work
     • your approach
       - what you did and why
       - how you achieved it
       - what difficulties you ran into
       - how you resolved them
     • conclusions/future works/ ideas

The project

Project Presentation: tentative date April 23rd
(20 minute presentation, 10 minute questions )
• include one or more videos – must show interaction,
• hand in both videos and .ppt file.
The purpose of computing is insight, not numbers.
(Richard Hamming, 1962)