Welcome

Welcome to the course website for i247, Information Visualization and Presentation.

Instructor

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TA

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Course Objectives

The goal of information visualization is the unveiling of the underlying structure of large or abstract data sets using visual representations that utilize the powerful processing capabilities of the human visual perceptual system. Information visualization is an exciting topic, and the last decade has witnessed the development of many interesting ideas about how to visualize abstract information.

In 1998 when Marti Hearst first taught this course, the field was very young, she knew every piece of work that had been done, and the course was a survey of the field. Now the field is very active and a survey or a history of all information visualization techniques would not be feasible nor particularly enlightening.

This course will take a critical stance towards the field of information visualization. Rather than survey existing approaches, we will analyze the factors contribute to success or lack thereof, as a means to determine how to devise future successful visualizations. Criteria for success in this analysis are either positive results from usability studies or wide adoption by the target user population.

This course will also have a focus on how to present information clearly and effectively.

There are many related topics that this class will not address. These include: scientific visualization, cartography, computer graphics, and visualization as an artistic enterprise.

Class Meetings

Class meets on Mondays and Wednesdays from 12:30pm-2:00pm in 202 South Hall. The format of the class will be a mix of lecturing, looking at visualizations, student presentations and in-class design and activities.

Grading

Grading will be 50% on assignments, readings, and in-class work and 50% on a final project. (See projects from last time for an idea of what they are like.)

Readings and Books

Readings will consist of one required text: Stephen Few's Now You See It, and a number of papers that will be accessible online or handed out in class.

Highly recommended but not required: Edward Tufte's The Visual Display of Quantitative Information.

Guide to using the Tableau software package:
The Beginner's Guide to Data Visualization.

O'Reilly's *Actionscript 3.0 Cookbook* can be read online here.

O'Reilly's *Essential Actionscript 3.0* is also good, but takes longer to get through. Access it online here.

Software

We'll be using the Tableau software package extensively. You will receive a code for accessing it; do not share this with others. It only works under windows, so Mac users will have to dual boot or use a designated lab machine. Access Tableau.
Tableau's data visualization software is provided through the Tableau for Teaching program.

Computer Accounts

If you are not an ischool student, see Roberta (roberta@ischool) in 210 South Hall.

Foundations

1. Wed, Jan 20 Introduction

No Readings

2. Mon, Jan 25 Types of Graphs and Visualizations

Readings

- Pages 1-17, Stephen Few's *Now You See It*, Analytics Press, 2009.

Assignments

- Download and install Tableau (must be registered for the course)

Links

- (FYI, not assigned reading) "A classification of visual representations", Lohse, Biolsi, Walker, Reuter, *CACM* 1994. pdf
- NYTimes on Climate Change: Cartoon, Photo Illustration, Information GraphicInformation Graphic, Information Graphic Information Graphic, Information Graphic, Combo Information Graphic, Interactive Graphic, Video

3. Wed, Jan 27 Data Types and Graph Types

Readings

- Pages 1-4, 29-34 of Chapter 1 of Colin Ware's *Information Visualization: Perception for Design*, Morgan Kauffman, 2004. (class handout)

Assignments

- Sign up for the class mailing list by sending email to*Majordomo@ischool.berkeley.edu* with the following command in the body of your email message:

  subscribe i247

Links

- Cars dataset, adapted from the ASA 1983 dataset. (Version used in class exercise.)

4. Mon, Feb 1 Guest Lecture: Jock Mackinlay: Tableau

Readings

- Guide to using the Tableau software package: The Beginner's Guide to Data Visualization.

References

- Images from Jock Mackinlay's lecture
- Tableau workbook from Jock Mackinlay's lecture

Links

- Example of Tableau being used for relief work in Haiti

Assignment

- Exploratory Data Analysis Due Friday Feb 26, 9pm.

5. Wed, Feb 3 Guest Lecture: Stephen Few: Dashboards

6. Mon, Feb 8 Data Visualization Tools

- Data Graph Demo - Data Graph Website
- Protovis Demo - Protovis Website
- Flex Example - Adobe Flex Website

7. Wed, Feb 10 Design Choices in Building Basic Graphs

Readings

- *Three Blind Men and An Elephant*, Stephen Few, 2007.
- Chapter 2 from *Now You See It*.
- *Graph Design I.Q. Test*, Stephen Few, 2009.

Related Materials

- Mackinlay's Ranking of Visual Encodings: Published Paper

Mon, Feb 15 No class

President's Day Holiday

8. Wed, Feb 17 Visual Perception

Readings

- Chapter 3 from *Now You See It*

9. Mon, Feb 22 Multivariate Analysis

Readings

- Chapter 12 from *Now You See It*
- *Polaris: A System for Query, Analysis, and Visualization of Multidimensional Relational Databases*, Stolte, Tang, Hanrahan, IEEE TVCG 8 (1), 2002.

10. Wed, Feb 24 Guest Lecture by Stephen Few -- Graphing and Basic Statistics

Readings

- Chapter 4 from *Now You See It*

11. Mon, Mar 1 Graphical Excellence

Readings

- Chapters 5 and 6 from *Now You See It*
- Chapter 1 from *Visual Display of Quantitative Information. Tufte.*

12. Wed, Mar 3 Talk by Ben Shneiderman, Information Visualization for Knowledge Discovery. 12:00pm - 1:00pm, Banatao Auditorium, Sutardja Dai Hall.

13. Mon, Mar 8 How to Critique a Visualization

Assignment 2

- Visualization Critiques Due Wednesday, March 17th, 9pm.

14. Wed, Mar 10 Graphical Integrity

Readings

- Chapter 2 from *Visual Display of Quantitative Information. Tufte.*

Interactive Visualization

15. Mon, Mar 15 Interactive Visualization

Readings

- The Eyes Have It: A Task by Data Type Taxonomy for Information Visualizations, Shneiderman, Proc. IEEE Conference on Visual Languages, Boulder 1996.
- (optional background) Space-scale diagrams, Furnas & Bederson, CHI 1995.

Wed, Mar 17 Discuss Class Projects

Mon, March 22 and Wed, March 24 No class

Spring Break Holiday

Mon, Mar 29 Discuss Class Projects

Wed, Mar 31 Discuss Class Projects

Mon, Apr 5 Multidimensional Interactive Visualization

Readings

(Read at least one of these)

- Understanding research trends in conferences using PaperLens, Lee et al., CHI'05 extended abstracts. website
- Network Visualization by Semantic Substrates, Shneiderman & Aris, IEEE TVCG 2006.
- Multidimensional Detective, Inselberg, IEEE Infoviz Symposium, 1997.
- Stephen Few on Parallel Coordinates, Business Intelligence Network, Sept 2006.
- The attribute explorer, Tweedie et al. CHI 1994.

Links

- PaperLens video
- NVSS video
- Influence (Attribute) Explorer Video

Wed, Apr 7 Distortion Techniques

Readings

- A review and taxonomy of distortion-oriented presentation techniques, Y.K. Leung and M.D. Apperley, ACM Transactions on Computer-Human Interaction, Vol. 1, No. 2, June 1994, pp. 126-160.

Mon, Apr 12 3D in Visualization

Readings

- Evaluating the effectiveness of spatial memory in 2D and 3D physical and virtual environments, Cockburn and McKenzie, CHI 2002.

Wed, Apr 14 Animation

Readings

- Animation: From Cartoons to the User Interface Bay-Wei Chang, David Ungar, UIST 1993.
- Animated Exploration of Graphs with Radial Layout, Ping Yee, Danyel Fisher, Rachna Dhamija, and Marti Hearst, in IEEE Infovis Symposium, San Diego, 2001
- (optional) Animation: Does It Facilitate? Barbara Tversky, Julie Morrison, Mireille Betrancourt, International Journal of Human Computer Studies, v57, p247-262. 2002.

Class Projects

Mon, Apr 19 In-Class Mid-Term Presentations

(15 min. each plus 5 min. for questions)
1. British Invasion (Michael Porath, Alex Smolen)
2. Thermostats (Becky Hurwitz, Daniel Perry)
3. Energy Viz (Jin Young Baik, Prateek Kakirwar, Janani Vasudev, Gopal Vaswani)
4. Recovery (Ben Cohen, Mike Lissner, Connor Riley)

Wed, Apr 21 In-Class Mid-Term Presentations

(13 min. each plus 3 min. for questions)
1. Aging (Karen Braverman)
2. Twitterbugs (Sean Carey, Carol Chen, Yo-Shang Cheng, Anjana Dasu)
3. MeLo (Karen Nomorosa, Nathan Yan, Niranjan Krishnamurthi)
4. KidOoDL (Annette Greiner, Nat Wharton, Mieke Leyssen)
5. Paper Maps (Joyce Tsai)

Mon, Apr 26 Visual Analytics

Wed, Apr 28 Guest Lecture: Aaron Marcus: Information Visualization for Energy Conservation

Mon, May 3 Final Project Presentations

(15 min. each plus 5 min. for questions)
1. MeLo (Karen Nomorosa, Nathan Yan, Niranjan Krishnamurthi)
2. Paper Maps (Joyce Tsai)
3. Thermostats (Becky Hurwitz, Daniel Perry)
4. KidOoDL (Annette Greiner, Nat Wharton, Mieke Leyssen)

Wed, May 5 Final Project Presentations

(13 min. each plus 3 min. for questions)
1. Twitter Superstars (Sean Carey, Carol Chen, Yo-Shang Cheng, Anjana Dasu)
2. Energy Monitor (Jin Young Baik, Prateek Kakirwar, Janani Vasudev, Gopal Vaswani)
3. Recovery (Ben Cohen, Mike Lissner, Connor Riley)
4. Aging (Karen Braverman)
5. British Invasion (Michael Porath, Alex Smolen)

Mon, May 10 Final Project Poster Session

Assignments

Assignment 1

Exploratory Data Analysis
Due Friday, February 26th, 9pm.

Assignment 2

Visualization critiques
Due Wednesday, March 17 at 9pm.

Final Project

Project Guidelines

Milestones:

- March 29: In-class project pitch
- April 2: Project proposal due. (Turn in earlier to get feedback sooner.)
- April 5: Receive feedback on proposals.
- April 19 and 21: In-class "mid-term" demonstrations.
- May 3 and 5: In-class final project demonstrations.
- May 10: Poster session open to everyone. Final paper and deliverable due.