USC School
of Cinematic Arts
Media Arts + Practice Division

IML 422
Information Visualization

Spring 2014
4 units
Thursdays, 1:00 – 3:50 pm
SCI L105

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Office Hours TBA

COURSE DESCRIPTION

The growing "data deluge" has brought with it a demand to make information more readily understandable through forms of visualization. From the often dazzling graphics published by The New York Times to complex simulations created by scientists, the visual display of information has expanded exponentially in the last decade, as has the array of software applications designed to facilitate visualization for non-experts. ManyEyes, for example, enables users to import data sets and then create various kinds of graphic representations of the information, while Processing offers an easy-to-use tool for rendering information in visual and interactive forms.

The expanding field brings with it new demands for teaching the critical interpretation of this information, as well as a critical approach to the use of applications for rendering data in visual forms. This course offers an overview of specific forms of information visualization within a historical context, as well as an introduction to several prominent information visualization tools. It explores the interest in what has been dubbed "cultural analytics," and both the tremendous potential and pitfalls of the visual. Finally, the course articulates a working definition of data visualization literacy, and offers a set of guidelines for the critical interpretation and production of visual information. The goal for the course is to at once survey a broad cultural landscape while offering very specific tools for analysis and creativity.

COURSE QUESTIONS
The Information Visualization course asks following questions:

- What are the "genres" of information visualization?
- What are the esthetic and cognitive principles of information visualization?
- Where do art, design and scholarship overlap in the creation of information visualizations?
- What are the critical perspectives required for analyzing and assessing information visualizations encountered in everyday and scholarly media?

REQUIRED MATERIALS

- Now You See It: Simple Visualization Techniques for Quantitative Analysis, Stephen Few, 2009.
- Excerpts or single essays in reader: • Beautiful Visualization: Looking at Data Through the Eyes of Experts, Julie Steele and Noah
- Iliinsky, O'Reilly, 2010, excerpts. • "Color and Information," Edward R. Tufte, in Envisioning Information, 1990.

- Database Aesthetics: Art in the Age of Information Overflow, Victoria Vesna, editor, 2007, excerpts.
- "Media Visualization: Visual Techniques for Exploring Large Media Collections," Lev Manovich, 2011.
- Science Is Fiction: The Films of Jean Painleve, Marina McDougall, editor, 2001, excerpts.
- "Visualization Criticism – The Missing Link Between Information Visualization and Art," Robert Kosara, 2007.
- Visualizing Data: Exploring and Explaining Data With the Processing Environment, Ben Fry, 2008.
- All other readings are either provided as a URL or posted on the course wiki.

ASSIGNMENTS

- **Media-Rich Blog Posts**   30%
- **Visualization Exercises (In-Class)**   30%
- **Collaborative Visualization Project**   20%
- **Final Project and Presentation**   20%

Media-rich Blog Posts. Each student will be asked to write at least five 400-500 word formal reviews of visualizations discussed in class or discovered independently. They will be posted to the course website, and should include links, images, and, where appropriate, video.

Visualization Exercises. Students will be asked to experiment with five visualization tools, and to create a simple visualization with each tool. This will be an in-class exercise.

Collaborative Visualization Project. Working in groups of three, students will investigate a particular topic, and create a visualization of it.

Final Project and Presentation. Each student in IML 422 will create a final visualization project related to individual research and interest. This visualization will be presented to the class in a formal session at the conclusion of the semester, with an articulation of the project's historical and conceptual context.

POLICIES

Fair Use
Fair use is a legal principle that defines certain limitations on the exclusive rights of copyright holders. The IML seeks to apply a reasonable working definition of fair use that will enable students and instructors to develop multimedia projects without seeking authorization for non-commercial, educational uses. In keeping with section 107 of the Copyright Act we recognize four factors that should be considered when determining whether a use is fair: (1) the purpose and character of use, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use upon the potential market for or value of the copyrighted work. In general, we regard the reproduction of copyrighted works for the purposes of analysis or critique in this class to be covered by the principle of fair use.

Citation Guidelines
All projects will need to include academically appropriate citations in the form of a Works Cited section, which covers all sources, in order to receive a passing grade. The Works Cited is either included in the project or as a separate document, as appropriate to your project. The style we use is APA 5th edition and you may refer to these guidelines: http://owl.english.purdue.edu/owl/resource/560/01/

Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Statement for Students with Disabilities
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday.

Emergency Plan
In the event that classes cannot convene at the university, all IML courses will continue via distance education. Specifically, the IML portal and course wikis will be deployed to enable faculty-student interaction (asynchronously and also via virtual office hours), complete syllabi, course readings and assignments, software tutorials, project assets, parameters and upload instructions, peer review processes and open source alternatives to professional-level software used in the IML curriculum. Further details are available on the course wiki.

Disruptive Student Behavior
Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

WEEKLY SCHEDULE

The following weekly schedule is subject to change. Please consult the course wiki for the most current information, assignments and due dates.

Week 1
What Is Information Visualization?
How do we define information visualization? What are its uses and types? And what is meant by the "information problem"?

Week 2
Historical Context
When did people begin to visualize information? This session examines the rich history of information visualization, with a discussion and presentation of the work of William Playfair, Jacques Bertin, John Tukey and Edward Tufte.

Week 3
Thinking With Our Eyes: Information Visualization and Perception
What do we need to know about visual perception to understand and create effective visualizations?

Week 4
Case Studies: Ernst Haeckel and Jean Painlevé
Ernst Haeckel was a German biologist who discovered and named many new species, attempted to map all life forms, and created some of the most stunning visualizations of the life forms he discovered. Jean Painlevé was a French marine scientist and filmmaker who created a fascinating collection of films examining the behaviors of undersea creatures.

Week 5
Cinema and Early Visualization Studies: Muybridge and Marey
Cinema's pioneers were also scientists interested in visualizing time and motion. This week's class looks at the work of Muybridge and Marey.

Week 6
Genres of Information Visualization
This week's session focuses on the differing types and objectives of information visualizations, including comparative analyses, time series, part-to-whole analysis, deviation analysis, distribution analysis and multivariate analysis.

Week 7
Creating Visualizations: What Is the Process?
This week, we look to the practice of Ben Fry to learn how to create visualizations: Parse, filter, mine, represent, refine and interact.

Week 8
Lab Session: Introduction to Google Refine, Google Fusion and Many Eyes

Week 9
Storytelling in Information Visualization
Focusing on the ideas suggested by Mattias Shapiro, we will examine the ways in which a question, plus visual data and context can render a story.

Week 10
Data + Space
A discussion of techniques and screening of projects involving data representation and physical space including tangible data, way finding and augmented reality.

Week 11
Data, Art and Aesthetics
Field Trip! California Science Center and Natural History Museum

Week 12
Lab Session: OpenHeatMap, TimeFlow and Gephi
This lab session explores the use of color in mapping, visual timelines and a tool for

visualizing statistical information.

Week 13
Cultural Analytics
This week's session focuses on the work of Lev Manovich and the Software Studies Initiative at UC San Diego to consider tools for the analysis of massive amounts of visual media, and the evolution of what's being called "cultural analytics."

Week 14
Critiquing Visualizations
Students present their final projects and discuss them in class.

Week 15
Critiquing Visualizations
Students present their final projects and discuss them in class.

FINAL EXAMINATION
Final Project Submission