Data Visualization – CS 271: Topics in Data Visualization

1. **Course.**

Data Visualization – CS 171: Topics in Data Visualization

2. **Course Level.**

Graduate

3. **Course Description.**

"This course covers advanced topics in data visualization. Over the course of the semester, we will examine seminal works and recent state-of-the-art research in information visualization, scientific visualization, and visual analytics. Students are encouraged to bring in ongoing or related research. Topics covered in this class include interaction, storytelling, evaluation, color, volume rendering, vector field visualization, visualization in sciences, big data visualization, uncertainty visualization, and visualization for machine learning. Students will work on a semester-long visualization project that will allow them to visualize their own data sets. We will take a structured approach on how to read, analyze, present, and discuss research topics. Furthermore, we will employ peer-feedback and formal design critiques to analyze each other's work." (source)

4. **Module Topic.**

The Ethics and Politics of Data Visualization

5. **Module Author.**

Marion Boulicault

6. **Tags.**

data visualization [CS]
design [CS]
big data [CS]
disability [phil]
feminist theory [phil]
stereotypes [phil]
ethical design principles [both]

7. **Module Overview.**

In this module, we discuss the ethical and political dimensions of data visualization. The module sets the stakes by beginning with a discussion of the social and epistemic power of data visualization in today's world. It then focuses on a set of commonplace principles for effective data visualization. The political and ethical dimensions of each principle are considered and debated. Finally, the students are asked to expand on the meaning of 'effective' by brainstorming alternative data visualization principles that center the ethical and political dimensions.

8. **Connection to Course Material.**

The course teaches technical skills, strategies, and principles for effective data visualization. The module examines the ethical and political dimensions of these skills, strategies and principles. For example, one of the suggested strategies for effective data visualization is to 'reduce cognitive load' for the audience. As part of the module, the Embedded EthiCS TA leads a discussion about one way cognitive load could be reduced: taking advantage of (and therefore potentially reinforcing) problematic commonplace existing stereotypes, such as using the color 'blue' to indicate male and the color 'pink' to indicate female. By highlighting examples like these, the module provides a lens and set of tools for identifying and analyzing the ethical dimensions of the technical practice of data visualization.

9. **Module Goals.**

- Provide students with philosophical tools to think critically about the ethical implications of data visualization design choices.
- Introduce the idea that "data do not speak for themselves" and must always be considered and evaluated with respect to the context in which they are generated and used.
- Teach students how to think about the effects of design choices on marginalized groups, particularly people with disabilities.
- Give students access to resources for feminist and community-based data visualization principles and practices.

10. **Key Philosophical Questions.**

1. Can data visualization ever be "objective" and what do we mean by "objective"?
2. What are some of the ethical dimensions of commonplacedata visualization design principles?
3. Why does attending to context matter when creating and evaluating data visualizations?
4. How can we draw on work in disability studies and feminist theory to craft ethical data visualization principles?

11. **Key Philosophical Concepts.**

- Feminist theory
- Objectivity
- Disability studies
- Ethical design principles
- Context

12. **Assigned Readings.**

- Lundgard, Alan, Crystal Lee, and Arvind Satyanarayan. "Sociotechnical Considerations for Accessible Visualization Design."