Data visualization

Understanding why and how to present complex data interactively in an effective manner has become a crucial skill for any data scientist. In this course, you will learn how to design, judge, build and present your own interactive data visualizations.

Content

**Tentative course schedule**

Week 1: Introduction to Data visualization Web development
Week 2: Javascript
Week 3: More Javascript
Week 4: Data Data driven documents (D3.js)
Week 5: Interaction, filtering, aggregation (UI/UX). Advanced D3 / javascript libs
Week 6: Perception, cognition, color Marks and channels
Week 7: Designing visualizations (UI/UX) Project introduction Dos and don’ts for data-viz
Week 8: Maps (theory) Maps (practice)
Week 9: Text visualization
Week 10: Graphs
Week 11: Tabular data viz Music viz
Week 12: Introduction to scientific visualisation
Week 13: Storytelling with data / data journalism Creative coding
Week 14: Wrap-Up

Keywords

Data viz, visualization, data science

Learning Prerequisites

**Required courses**

CS-305 Software engineering (BA)
CS-250 Algorithms (BA)
CS-401 Applied data analysis (MA)

**Recommended courses**

EE-558 A Network Tour of Data Science (MA)
CS-486 Human computer interaction (MA)
CS-210 Functional programming (BA)

Important concepts to start the course
Being autonomous is a prerequisite, we don't offer office hours and we won't have enough teaching assistants (you've been warned!).
Knowledge of one of the following programming language such as C++, Python, Scala.
Familiarity with web-development (you already have a blog, host a website). Experience with HTML5, Javascript is a strong plus for the course.

Learning Outcomes

By the end of the course, the student must be able to:
- Judge visualization in a critical manner and suggest improvements.
- Design and implement visualizations from the idea to the final product according to human perception and cognition
- Know the common data-viz techniques for each data domain (multivariate data, networks, texts, cartography, etc) with their technical limitations
- Create interactive visualizations in the browser using HTM5 and Javascript

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Negotiate effectively within the group.
- Resolve conflicts in ways that are productive for the task and the people concerned.

Teaching methods

Ex cathedra lectures, exercises, and group projects

Expected student activities

- Follow lectures
- Read lectures notes and textbooks
- Create an advanced data-viz in groups of 3.
- Answer questions assessing the evolution of the project.
- Create a 2min screencast presentation of the viz.
- Create a process book for the final data viz.

Assessment methods

- Data-viz (35%)
- Technical implementation (15%)
- Website, presentation, screencast (15%)
- Process book (35%)

Supervision

Office hours: No
Assistants: No
Forum: No

Resources

Bibliography
Visualization Analysis and Design by Tamara Munzner, CRC Press (2014). Fee online version at EPFL.
Interactive Data Visualization for the Web by Scott Murray O'Reilly (2013) - D3 - Free online version.

Ressources en bibliothèque
• Interactive Data Visualization for the Web / Murray
• Visualization Analysis and Design / Munzner

Notes/Handbook
Lecture notes

Websites
• https://www.kirellbenzi.com

Moodle Link
• https://moodle.epfl.ch/course/view.php?id=15487