ARTG5330 Visualizing on the Web: Art and Craft

Instructor Siqi Zhu

Class 1:35PM — 5:05PM Th Ryder Hall 301

Description

This course will examine the principles and techniques of visualizing information on the web. Using Ben Fry's information visualization pipeline as a basic framework, you will learn to operationalize data visualization problem solving, and learn to use Javascript libraries d3 to implement your solutions on the web.

Throughout the course, you will understand how various parts of the front-end web development environment (HTML, CSS, JavaScript) work with each other, and have the opportunity to explore each area of D3's functionality—data importing and refinement, DOM manipulation, SVG drawing, interactivity—through in-class exercises and assignments. As your final project, you will be able to explore a dataset of your choice and build a web visualization that communicates your unique insights.

Objectives

- Learn the fundamental concepts and principles of data visualization and visual analytics;
- Learn to use the d3 JavaScript library to visualize data in the context of front-end web development;
- Learn to generalize data visualization problems and develop strategies for self-directed problem-solving.

Tool Requirements

We'll use extensive use of JavaScript libraries, all of which are open source.

For front-end web development, you may use any IDE of your choice. The recommended one for this course is WebStorm, which can be downloaded at http://www.jetbrains.com/webstorm/download/. An alternative choice is Sublime Text.

You are required to sign up for an account on GitHub (http://github.com) and encouraged to become familiar with the Git workflow. This will facilitate the sharing of code.

You will need to install Git (http://git-scm.com/) and Python (https://www.python.org/) on your computer before the start of the class.

Course Resources

Course website: http://viztech.github.io

One-stop location for lecture slides, assignments, readings, and other content. Supple-

mentary material marked "Important" is essential information for the class, and should be reviewed carefully.

Course Github Account: viztech

Repository for all code used in class and for assignments.

Slack Channel: https://viztech2015s.slack.com

Useful for virtual office hours and group work

Office Hours

You will have approximately 20-30 minutes of time each week with the course instructor or TA to discuss issues related to class material and the assignments. Sign-up sheets will be posted.

Rules and Regulation

Attendance: You are expected to attend every class; missed classes will mean that you will miss valuable information. Unexcused absences can affect your grade.

Reading assignments and class activities: There will be regular reading assignments over the course of the semester, made available through the blackboard site. You are expected to actively participate in all activities during class – in order to do that, you need to complete all necessary readings before class.

Assignments: You are expected to keep a research journal of your work and progress throughout the semester, containing the assignments, reading reflections, visualizations and diagrams, a documentation of your project progress and other relevant information.

Integrity: you are requested to abide by Northeastern University's Academic Integrity Policy, which you can read at: http://www.northeastern.edu/osccr/academicintegrity/

Grading and Rubric

The class includes weekly assignments and a final project. In-class "finger exercises" are vital to your learning process, and your participation in them constitute an important part of your grade.

You are also expected to keep a research journal that captures your ideas, reading reflection, project progress, and additional research activities. Your journal will be reviewed at the end of the semester for its completeness, quality, presentation, and progress through the semester.

Participation	10%
Assignments	60%
Final project	30%

Weekly Schedule

Week 1 / Sep 11 Introduction and Overview of the Development Environment

Reading

"HTML Introduction." 2014. Accessed August 20 http://www.w3schools.com/html/html_intro.asp

Murray, Scott. 2013. Technology Fundamentals. In Interactive Data Visualization. Retrieved from http://chimera.labs.oreilly.com/books/1230000000345/index.html

Assignment 1

Download and install Git, Python, and WebStorm/Sublime Text; sign up for an account on github; complete Git finger exercise posted on Github by Sep 18.

Week 2 / Sep 18 Working with HTML/CSS/JavaScript; Intro to the Document Object Model

Reading

Lazaris, Louis. "Object-oriented CSS." 2011. Accessed August 20. http://www.smashingmagazine.com/2011/12/12/an-introduction-to-object-oriented-css-oocss/

Haverbeke, Marijn. The Document Object Model. In Eloquent Javascript. Retrieved from http://eloquentjavascript.net/

Assignment 2

Complete Assignment 1 and upload it to Github by Jan Sep 25.

Week 3 / Sep 25 JavaScript Basics; Intro to DOM Manipulation Using jQuery and D3

Reading

Haverbeke, Marijn. Values, Types and Operators; Program Structure; Functions. In Eloquent Javascript. Retrieved from http://eloquentjavascript.net/

Assignment 3-A

Download and complete Assignment 3, Part A

Week 4 / Oct 2 Drawing with SVG: an Introduction

Reading

Murray, Scott. 2013. Drawing with Data. In Interactive Data Visualization. Retrieved from http://chimera.labs.oreilly.com/books/1230000000345/index.html

http://www.jeromecukier.net/blog/2012/05/28/manipulating-data-like-a-boss-with-d3/

Week 5 / Oct 9 Importing Data; Joining and Selection

Reading

Bostock, Mike. "How Selection Works." 2013. Accessed August 20. http://bost.ocks.org/mike/selection/

Bostock, Mike. "Thinking with Joins." 2013. Accessed August 20. http://bost.ocks.org/mike/join/

Haverbeke, Marijn. Objects and Arrays. In Eloquent Javascript. Retrieved from http://eloquentjavascript.net/

Assignment 3-B

Download and complete Assignment 3, Part B. Upload to Github by Oct 16.

Week 6 / Oct 16 Drawing Scatterplots; Scales and Axes

Reading

Murray, Scott. 2013. Scales; Axes. In Interactive Data Visualization. Retrieved from http://chimera.labs.oreilly.com/books/1230000000345/index.html

Bostock, Mike. "Object Constancy." 2013. Accessed August 20. http://bost.ocks.org/mike/constancy/

Week 7 / Oct 23 Animation, Transition, and the General Update Pattern

Reading

Bostock, Mike. "General Update Patterns." 2013. Accessed August 20. http://bl.ocks.org/mbostock/3808218

Bostock, Mike. "Path Transitions." 2013. Accessed August 20. http://bost.ocks.org/mike/path/

Assignment 4-A

Download and complete Assignment 4, Part A.

Week 8 / Oct 30 Layout vs. Representation: Intro to d3.layout

Reading

Murray, Scott. 2013. Layouts. In Interactive Data Visualization. Retrieved from http://chimera.labs.oreilly.com/books/1230000000345/index.html

Assignment 4-B

Download and complete Assignment 4, Part B. Upload Assignment 4 to Github by Nov 6.

Week 9 / Nov 6 Spatial Representation: Intro to Mapping and d3.geo

Reading

Bostock, Mike. "Let's Make a Map." 2013. Accessed August 20. http://bost.ocks.org/mike/map/

Dona, Peter H. "Map Projection Overview." 2000. Accessed August 20. http://www.colorado.edu/geography/gcraft/notes/mapproj/mapproj.html

Davis, Jason. "Maps." (n.d.) Accessed August 20. http://www.jasondavies.com/maps/

Assignment 5

Download and complete Coding Assignment 5, and upload it to Github by Nov 13.

Final Project

Schedule an instructor check-in to discuss your final project

Week 10 / Nov 13 Force Layout and Its Applications

Reading

Bostock, Mike. "Use the Force." 2013. Accessed August 20. http://vimeo.com/29458354

Assignment 6

Download and complete Coding Assignment 6, and upload it to Github by Nov 20.

Week 11 / Nov 20 Advanced Interactive Patterns (Zoom, Scroll, Brush)

Reading

Page, Wilson. "An Introduction to DOM Events." 2013. Accessed August 20. http://www.smashingmagazine.com/2013/11/12/an-introduction-to-dom-events/

Murray, Scott. 2013. Interactivity. In Interactive Data Visualization. Retrieved from http://chimera.labs.oreilly.com/books/1230000000345/index.html

Assignment 7

Download and complete Coding Assignment 7, and upload it to Github by Nov 27.

Week 12 / Nov 27 Day after Thanksgiving; No Class

Office hour will be available on Slack.

Week 13 / Dec 4 Review and Q&A; Tooling Session for Final Project

Reading

Storz, Emivly. "An Introduction to Full-stack JavaScript." 2013. Accessed August 20. http://www.smashingmagazine.com/2013/11/21/introduction-to-full-stack-javascript/

Week 14 / Dec 11 Final Review