Interactive Data Visualization

General Course Information

Faculty: Daniel Deverell
Email: daniel.deverell@nyu.edu
Course Title & Number: Interactive Data Visualization, DATA1-CE9010001
CEUs: 3.5
Session Dates:
Class Meeting Location: Online Synchronous
Office Hours: By Appointment

Course Description:
How can we transform data into compelling and meaningful visuals and use visualization to tell stories and show patterns from data sets? Learn the basic steps of visualizing data, from spreadsheets to visual representations. Case studies are presented and examined through a technical and conceptual lens. Using programming, experiment with a wide range of visual approaches and create your own custom visualizations. Projects focus on creating interactive systems and interfaces that allow users to explore different layers and views.

Course Prerequisites:
This course is meant for those with little to no programming experience. It will introduce basic programming concepts and skills.

Course Structure/Method:
The course meets once a week, for 3.5 hours, for 7 weeks, online. We will spend about an hour working in JavaScript and computer science fundamentals. Remaining time will include explorations of existing visualizations, reading discussions, and presentations.

Course Learning Outcomes:
By the end of this course, students will be able to:

- Code a small web page.
- Determine common strategies to visualize data.
- Implement their own interactive data visualizations.

Communication Policy:
All email inquiries to the instructor will be answered within 72 hours.

Course Expectations:

This is a project-focused course, each weekly session will be focused on a different fundamental of data visualization, with the expectation that students will work on one project per week.

Classroom Expectations:

As graduate students, you are expected to conduct yourselves in a professional manner and engage and collaborate with your classmates in the Zoom meeting room. Here are our guiding principles:

- Dress as if you are in the classroom.
- Keep your microphone muted unless asking a question or engaging in discussion.
- Check your video and audio when entering your class session.
- Think background, minimize distractions around you.
- Look into the camera instead of looking at the screen.
- Type quietly, mute if necessary.
- Don't eat during a Zoom class session and refrain from engaging in any activity such as smoking, consuming alcohol, etc. that you would not engage in if the class was in person.

SPS classrooms are diverse and include students who range in age, culture, learning styles, and levels of professional experience. To maintain an inclusive environment that ensures all students can equally participate with and learn from each other, as well as receive feedback and instruction from faculty during group discussions in the classroom, all course-based discussions and group projects should occur in a language that is shared among all participants.

Required Technology:
A computer with internet access

Grading Strategy:
Participation (sharing examples of good visualizations, and contributions to reading discussions) 20%
Individual Presentations 75% (25% each, 3 weeks)

NYUSPS Policies:
NYUSPS policies regarding the Family Educational Rights and Privacy Act (FERPA), Academic Integrity and Plagiarism, Students with Disabilities Statement, and Standards of Classroom Behavior among others can be found on the NYU Classes Academic Policies tab for all course sites as well as on the University and NYUSPS websites. Every student is responsible for reading, understanding, and complying with all of these policies."

The full list of policies can be found at the web links below:
- University: http://www.nyu.edu/about/policies-guidelines-compliance.html
- NYUSPS: http://sps.nyu.edu/academics/academic-policies-and-procedures.html

School Grading Policies:

NYUSPS Career Advancement (non-degree)
http://sps.nyu.edu/content/scps/academics/noncredit-offerings/academic-noncredit-policies-and-procedures.html

Center for Student Accessibility

If you are a student who is requesting accommodations, please contact New York University's Moses Center for Students Accessibility (CSA) at 212-998-4980 or mosescsa@nyu.edu. You must be registered with CSA to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csa. The Moses Center is located at 726 Broadway on the 3rd floor.

Academic Integrity and Plagiarism Policy

All students are expected to be honest and ethical in all academic work. This trust is shared among all members of the University community and is a core principle of American higher education. Any breaches of this trust will be taken seriously. A hallmark of the educated student and good scholarship is the ability to acknowledge information derived from others. Students are expected to be scrupulous in crediting those sources that have contributed to the development of their ideas.

Plagiarism involves borrowing or using information from other sources without proper and full credit. Students are expected to demonstrate how what they have learned incorporates an understanding of the research and expertise of scholars and other appropriate experts; and thus recognizing others' published work or teachings—whether that of authors, lecturers, or one's peers—is a required practice in all academic projects. Students are subject to disciplinary actions for the following offenses which include but are not limited to:

- Cheating
- Plagiarism
- Forgery or unauthorized use of documents
- False form of identification

Use the link below to read more about Academic Integrity Policies at the NYU School of Professional Studies. Academic Policies for NYU SPS Students

Course Outline

Session 1, Introduction to our tools.

- Course introductions.
- Introduction to HTML, CSS, Javascript, D3 and how they all fit together. We deep dive into what the web technologies we will be using for the remainder of the course and how to use them
- HTML/CSS/Javascript template distributed and discussed
- Javascript: variables, truthy and falsey, arithmetic, strings

Session 2, Deep dive into D3. Beyond charts and data in art.

- Introduce D3 and begin coding with variables, truthy and falsey, arithmetic, strings
- Classic graphs (Bar graphs, Line graphs, Scatter plot, etc., and examples on the web)
- Data as Art. Inspiration data visualization vs explanatory vs analytical

Session 3, Filtering and interactivity.

- Using the power of computers to perform repeated tasks thousands or millions of times
- Using buttons, hover to achieve interactivity
- Using filtering of data to dynamically show different aspects the data
- CS: for-loops, while-loops, arrays, if/else statements,
- Line graphs and scatter plots exploration

Session 4, Using movement and transformation in charts. Design practices for interactivity.

- Applying movement and transformation in different charts to highlight comparisons in the data
- Managing events and using objects to help us build complex visualizations
- Pie Graphs exploration

Session 5, Multiple dimensions of data. Stacked area charts.

- How to use meta data and multiple dimensions of data
- Stacked area charts exploration

Session 6, Best Practices: Organizing your data. Choosing the best graph for your dataset.

- How to create clean code and why it's important
- Matching the visualization to the correct type of graph
- Using color
- Design Ethics in data visualizations
- Scatterplot exploration

Session 7, Beyond D3: Other tools to achieve interactivity with data.

- Introduction to various web and excel based tools that can be leverage to create interactive data visualizations
- Javascript tools
- Excel tools

At the discretion of the faculty, the syllabus may be modified to better meet the needs of the students and to achieve the learning outcomes established in the syllabus.