CMPM 290A F2018
Immersive Analytics

Homework Packet 2

Part 1. <u>Select a project and teammates for your final project</u> – Decide by 11/6

Before class on Tuesday, November 6th, you will have selected a project to work on, along with one or two teammates. (Each team will be composed on two or three people.) You can contribute to more than one project, but you must commit to one main team. Your project will involve working with researchers and professors who use various forms of visualization to analyze data and communicate results.

Biological pathway viewer
PI Daniel Kim, UCSC Biology
https://dkim.sites.ucsc.edu/

Intergalactic medium visualization
PI Joe Burchett, UCSC Astronomy & Astrophysics
http://www.joeburchett.com/

Slave trade database
PI Gregory O'Malley, UCSC History
https://campusdirectory.ucsc.edu/cd_detail?uid=gomalley

Behavioral ecology visualization
PI Barry Sinervo, UCSC Ecology & Evolutionary Biology
https://web.pbsci.ucsc.edu/research/eeb/sinervo/index.php/en/home/

Rule-based modeling and biological simulation
PI Walter Fontana, HMS Systems Biology
https://fontana.hms.harvard.edu/research; https://kappalanguage.org/

Connectome visualization
PI Olu Ajilore, UIC Psychiatry
https://brain.uic.edu

Behavior economics modeling
PI Kristian Lopez Vargas, UCSC Economics
https://kmlv.github.io/research/

Cancer Genome Atlas & transcriptome sequencing data
PI Angela Brooks, UCSC Biomolecular Engineering
https://brookslab.soe.ucsc.edu/

3D visualizations of ancient Egyptian sites
PI Elaine Sullivan, UCSC History
https://campusdirectory.ucsc.edu/cd_detail?uid=easulliv

Molecule VR visualization
PI Jessie Lopez, PhD student in Zahler Lab, UCSC Molecular, Cell & Developmental Biology
http://bio.research.ucsc.edu/people/zahler/

Part 2. <u>Survey vis techniques & identify analysis tasks</u> – Present in class 11/15, hand in 11/18

You will read and summarize relevant articles that present visualization tools related to your project. You will provide a comprehensive survey of these articles by November 18th, and also present your initial findings in class on November 15th. For this presentation, you will describe the main *analysis tasks* that your project will support. You will identify these tasks by: a) talking with the PI of the project, b) surveying visualization literature and/or domain literature, c) referring to the taxonomy provided in the Munzner textbook.

- What data are you working with?
- What does the PI want to do with the data?
- Does he or she have an initial idea of how to visualize the data?
- If so, what are the reasons for visualizing it?
- If not, what has prevented him or her from doing so?
- Which specific analysis tasks will your visualization enable?
- Who will use the visualization software? How generalizable is it to other researchers in the same field? In other fields?

A write-up of between 10-20 pages and your slide deck are due 11/18. The write-up should include references and summaries of relevant previous work. (You will revise and extend this write-up for your final write-up due at the end of the quarter.)

Part 3. <u>Choose primary interactive visualization ideas</u> – Discuss in person 11/27 and 11/29

Now that you have surveyed the literature and identified the main analysis tasks, you will sketch out your ideas for your visualization software. Your project must have a practical component and a speculative component. These can be combined in a single application, or you can develop separate applications. The "practical" component must focus on the needs of the PI of the project, and you must explain how your visualization will enable specific analysis tasks. The "speculative" component is more open-ended, and you can explore new techniques that involve, for example, 3D representations, VR technologies, interactive storytelling, or novel interaction techniques.

- You are free to use whichever software framework will help you achieve your goals. Unity, A-Frame, Three.js, D3.js, etc.

- Given the short amount of time, it probably makes sense to focus on a single dataset, or even just part of the dataset, rather than attempt to make your software work with any data. That is, I want you to focus on supporting analysis tasks, rather than on cleaning up data or dealing with scalability issues.

- You will probably be able to perform a rigorous evaluation of your software, but you will explain your design decisions as clearly as you can, and to get feedback from your PI regarding the utility of your approach.

Part 4. <u>Software Demos</u> – Present during class 12/6 (we will meet in E2-258)

You will present your final projects in class during the last week of the quarter. All deliverables (PDF of write-up, images of the project, link to working software, and source code) must be archived on GitHub (or another git repo) between Friday, December 14th and Tuesday, December 18th.