Northeastern University

HW1

EECE 5642 Data Visualization

Homework 1
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Due Date: **11:59 pm Feb. 4th**
Submission: Canvas

1. Visualization Design (50/100)

In this part, you will find, analyze and visualize a quantitative dataset from Internet, discuss the visualization results, and address some questions. Please provide at least three different visualization types to show the data. You may compare the different visualization results and explain the pro and con according to the visualization principles you learned from the class. The dataset you find from the Internet should not be too simple (>6 cases and >12 Variables). But it is not necessarily over complicated. All the datasets should be reported along with complete original source information (authors, links, owners, years, etc.). For example:
http://www.idvbook.com/teaching-aid/data-sets/
https://www.springboard.com/blog/free-public-data-sets-data-science-project/
https://www.dataquest.io/blog/free-datasets-for-projects/

Your HW package will include (1) the data in a readable format, (2) all the visualization results, comparisons and evaluations, and (3) write-up of the analysis.

Your analysis and discussion may at least address the following questions: 1. What is the task, goal, or question of the data? 2. Data dimensions? Data types? Data format and style? 3. What information do these visualization show? 4. Which visualization type is good/bad in your opinion? 5. Any suggests for improvements?

Hint: Try to find Many Eyes alternatives by Google.

2. Visualization Critique (20/100)

In this part, you will provide a visualization critique on the "Zoom into the Human Bloodstream". Every year the National Science Foundation (NSF) holds a *Science and Engineering Visualization Challenge*. The First Place of Information Graphics category in 2008 is a visualization work--"Zoom into the Human Bloodstream". The details of this visualization are available at

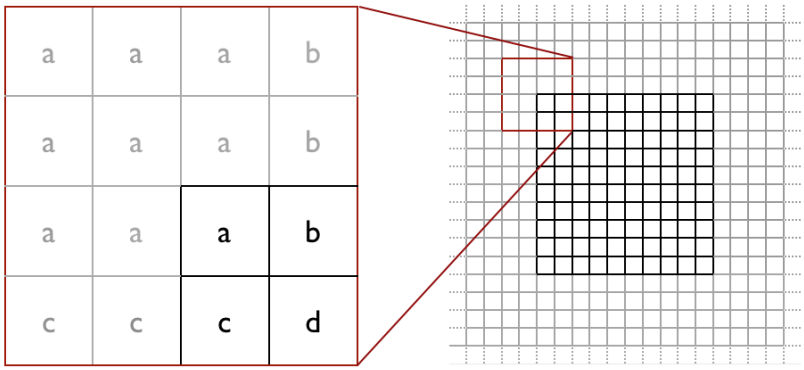
https://www.nsf.gov/news/special_reports/scivis/vizzies_winners_2008.jsp

You may want to find the original high-resolution image by searching "Zoom into the Human Bloodstream" in Google image search (the first retrieval result with 740x2960--492k label).

Please answer the following questions in your critique. 1. Who is the intended audience? 2. What design principles does the visualization utilize? 3. Do you like or dislike this visualization? Why? 4. What can you imagine from the visualization? 5. What do you think about the color used in the work? 6. Can you suggest any improvements?

3. 2D Convolution (20/100)

In this part, you will compute a 2D convolution of a pre-defined filter with 2D data (For this problem, we **do not flip the Kernel** as the most common way in CV community). The boundary conditions are handled by bleeding the values when a convolution kernel falls outside of the data table, shown as the following figure.



Fill out the following result matrix by considering the above boundary solution. Some results are already given for your double check. You will compute the results for A, B, C, and D respectively. Please provide detailed calculations. Only showing the final answers without details will not get the full score.

Filter

-2	3	-1
4	-1	2
0	5	3

Data

8	6	-2	3
1	6	4	5
3	2	-4	11
10	-1	7	1

Result

61	68	46	A
38	8	B	119
C	32	67	5
D	75	2	67

Hint: 1) Note the padding way; 2) there may exist wrong numbers in above results by purpose.

4. Comments and Suggestions on the Course (10/100)

In this part, you will provide your comments and suggestions on this course. For example, what kinds of topics out of our syllabus you might be also interested in? What kinds of skills you want to learn from this course? What are some ways we should consider improving the training programs associated with this course? How do you think the homework could be improved? How can this course help your major study in your field?