**CMSC 436 / 636: Data Visualization**

### Assignment 4: Seeing Changes in Temporal Data

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**Part 1 Design**

**Task Description**

The task I wanted to explore was the find that since the first day of TBI, what is the first day symptoms happening after.

Because for different patients, when the first TBI happened, there are several symptoms accompanied with. When we have the overview of all the data into a matrix, we can see the changes of the symptoms.

**Dataset Attribute description**

The data base is categorical data and quantitative data. There are 41 patients with more than 5600 encounters as the rows. There are 34 columns of categories as, PatientID, Gender, Age, Age\_Group, Age\_TBI, Days\_From1stTBI, Date of Injury, Type of Injury Code, EncounterID, Encounter\_date, Encounter\_Source, Provider\_Specialty, Provider\_type, Product\_Line, TBI\_encounter\_flag, WarRelated\_flag, PRE\_max\_days, POST\_max\_days, Stress, PTSD, Speech, Anxiety, Depression, Headache, Sleep, Audiology, Vision, Neurologic, Alzheimer, Cognitive, PCS, Endocrine, Skull\_inj, NON\_skull\_inj. PatientID, Gender, Age, Age\_Group, Age\_TBI, are the basic information of the patient, like ID number, Gender F/M, Age, Age\_group 18 to 24, Age at the TBI happening. About EncounterID, Encounter\_date, Encounter\_Source, Provider\_Specialty, Provider\_type, Product\_Line, TBI\_encounter\_flag, WarRelated\_flag, PRE\_max\_days, POST\_max\_days, all of these are encounter information and doctor information. The rest are the symptoms.

**Mapping tasks and Data needs**

In this visualization, we are focusing on our task to visualize the changes before and after the TBI. So it means we would like to use these attributes: PatienID, Days\_From1stTBI, and 16 symptoms (from Stress to NON\_skull\_inj). PatientID is a integer number to show who is the owner of the encounter. Days\_From1stTBI shows when this encounter happened. And symptoms are Boolean value to show if this symptoms happens on the encounter day.

**Encoding Choice Comparison**

For PatienID, we can just use P1, P2 etc. as the represents of the patients, showing on the visualization as a row. The first of day of encounter set as a white column. As for the symptoms, there are 16 categories and we are using the same amount of hues for each of them. The luminance can present the time of the encounters, which means if the happening encounter is far from the first day, it would be darker. If on the same day more than one symptoms happened, there will be a split of the squares.

**Part 2 Implementation**

**Data Processing**

In order to give out a good visualization, the data need to be processed. I sorted the data by PatientID and Days\_From1stTBI in the excel sheet0. And the excel sheet0 was given to Matlab to make into json file. Because savejson is not included in the Matlab tools, I put it in my folder, in case of use.

**Data Visualization**

The whole table is presented as a matrix with the patient name on the left. And the background is gray and for each symptom is presented with different hue as give by <https://sites.google.com/a/umbc.edu/datavisualization/assignments/assignment-4-temporal-data-visualization>. Cell splitting is based on the x axis position which means there will not be overlapping, there are at least 2px difference.

**Critical Evaluation**

1. No color luminance added. Because the background is already gray, if the luminance added, the color will be so different from the original. It seems introduced more categories which is a misleading rendering.
2. I did not present all the matrix but adaptive to the window size. It means if users open the visualization, they may not see all the values because of the screen size. If they want to see all of the matrix, they can always zoom out and refresh the window. Whenever one can see the whole matrix, they will see very dense information. That is why I did not choose to show the whole matrix at first.
3. Does it show "temporal" changes? Good part of it is, it does show the temporal changes of each patient. And for different patient their regular symptoms are well presented. The user can easily tell that the changes for individual patients.
4. how many items can the design show on a 24-inch monitor? Depends on how much the designer wants the user to see. I chose to make the visualization to be adaptive to the window size. I prefer not to show the whole matrix as mentioned in 2.
5. Does the design address “change” task? Yes, as we all voted, this design is focusing on the change as mentioned in Part1
6. Is the design visually pleasing? I would say no… I am not a fan of it.