Spring 2025

Course Assignments for Information Visualization (TNM111) Spring 2025

Assignment 4

The deadline for this assignment is Monday, Mar 3rd, 2025 (at 23:59).

Task 1 *Network Visualization*

In this assignment, you will implement an interactive interface, including node-link diagrams and various controls, using existing libraries to visualize the interactions between characters in the movie franchise Star Wars.

Dataset

The dataset for this assignment contains the social network of Star Wars characters extracted from the movie scripts. If two characters speak together within the same scene, they have been connected. By visualizing the network we can find meaningful patterns and connections.

In the "Assignment 4" folder on Lisam, you will find the **starwars-interactions.zip** file. The file **starwars-full-interactions-allCharacters.json** contains the social network extracted from all episodes, and the other files **starwars-episode-#-interactions-allCharacters.json** are the social network for each individual Star Wars episode.

The json files contain **Nodes** and **Links**, and the attributes are explained as follows:

Nodes represent characters:

- *name*: Name of the character.
- *value*: Number of scenes the character appeared in.
- *colour*: A color value is suggested within the source dataset to differentiate the main characters. However, you are free to use other color mappings of your choice.

Links represent connections between characters:

- *source*: zero-based index of the character that is one end of the link, the order of nodes is the order in which they are listed in the "nodes" element.
- *target*: zero-based index of the character that is the other end of the link.
- *value*: Number of scenes where the "source character" and "target character" of the link appeared together.

You can find the original dataset on Kaggle if you wish to learn more about the dataset:
`https://www.kaggle.com/datasets/ruchi798/star-wars`.

Implementation

In this assignment, you are allowed to use any programming language of your choice and any necessary libraries. Feel free to take a look at the iVis webpage, under Visualization Tools and Libraries, to find some resources: `https://ivis.itn.liu.se/courses/resources/tools.html`

Your visualization tool should at least contain the following:

- A node-link diagram to visualize the character relationships. You can find inspiration from, e.g., *D3 Force Layout.* `https://www.d3indepth.com/force-layout/`
- Two instances of the node-link diagram to support visual comparison of two network states.
- A control panel where you place controls for interactions, e.g., sliders, drop-down menus, and anything that you find necessary. You can decide the layout of the control panels and the diagrams as you see fit.
- Support brushing and linking of network node representations, e.g., by clicking on a node in one diagram, this node is highlighted, and the same node in the other diagram is also highlighted if detected.
- Display details-on-demand with tooltips for both nodes (character name + value) and edges (node character names + value).
- For the last feature, you will implement at least **one** of the two alternatives below. Of course, feel free to try implementing both features if you want.
  - Option 1: Support interactive filtering of the network data concerning edge weights, e.g., display the nodes and/or edges (links) between nodes depending on the edge weight filter, as selected dynamically by the user using, for example, range sliders and additional controls (e.g., checkmarks to enable/disable filtering for the edges and the respective nodes separately). Use the **starwars-full-interactions-allCharacters.json**-file for this task.
  - Option 2: Support interactive filtering of the diagram concerning episodes, e.g., instead of representing the episodes 1-7 data, represent only episodes 2-3, as selected dynamically by the user using, for example, range sliders or checkbox controls. Use the **starwars-episode-#-interactions-allCharacters.json**-files for this task, and note that the same character may have different indices in different episode files.

Submission

Your submission should contain a zip file with your code, instructions on running it if needed, and a PDF containing a short description of your implementation and how you interpret the data with it.

For the seminar session, please prepare a few slides to briefly explain your implementation, e.g., how you implemented it and the motivations behind the design and interactions.

Please prepare a ZIP archive with your implementation and a report (PDF), and upload it as a submission to Lisam by the given deadline! Also, do not forget to include screenshots of your implementation. If you have questions you can contact your lab assistant, Zeyang Huang (zeyang.huang@liu.se) for class A, or Peilin Yu (peilin.yu@liu.se) for class B.
You will have to present your work on Tuesday, Mar 4$^{\text{th}}$, from 13:15-15:00, K21 (Class A) and K22 (Class B).
Note: Any kind of plagiarism is not acceptable!