COM 480: Team Shakespirits, Milestone 2

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1 Project Goal

In this visualization project, we aim to display the features of Shakespeare's most renowned plays. The three main components we would like to show are the topics covered in the plays, the personalities of the characters within the plays, and the relationships among them.

2 Main Visualizations

2.1 Network of Relationships.

Description. In this part we want to show the link between the different characters of a play. The user selects the play they are interested in and the respective network of relationships will appear on the page. The user could see the relationship between two characters by hovering on the edges and a small description of the character appears on a small window upon clicking on a node. Moreover, the background of the network will change according to the selected play and the nodes are colored according to the character's gender (man, woman or neutral). The result can be seen in Figure 1.

Tools Needed. For this vizualization part we will need: *D3js*, a JavaScript library to display dynamics graphs; *Pandas* library from Python to do the preprocessing and to create the json file used for creating networks; *Anychart*, a JavaScript charting library used to create interactive charts.

2.2 Topics Covered in Shakespeare's Plays.

Description. A few number of topics are covered throughout a play, however their intensity may differ in each new scene. We are especially interested in analyzing the evolution of the following four topics in each play: love, family, power and war. To visualize the evolution of the aforementioned topics throughout each play, we plan to create a beeswarm plot. If a player speaks about a topic in a scene, they will be represented by a circle on the plot which will be colored according to the topic they are mentioning. The radius will vary based on the number of sentences the player expresses about a particular topic. In some cases, it may happen that the player covers multiple topics in the same scene. In that case, the circle will be multicolored. Hovering on a circle of the plot will display the name of the player as well as the sentences they spoke in a scene in which one of the four topics is mentioned. Figure 2 shows our vision.

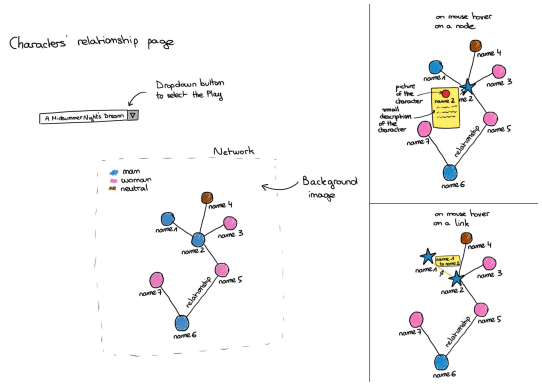

Figure 1: Example of character relationship network visualization.

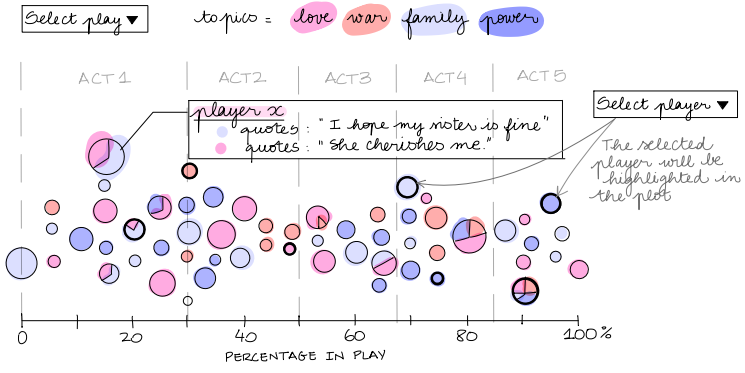

Figure 2: Example of the topic evolution visualization for a play.

Tools Needed. Python's spaCy and empath natural language processing libraries will be used for detecting the topics in each sentence uttered by a player in the data. For the visualization, we will use Javascript's D3.js library.

2.3 Personality Profiles of Characters.

Description. For each play, we decide to pick the top few characters and visualize their personality as extracted from the lines said in the play. Thus, we decide to create something akin to word clouds for each character. The design can be seen in Figure 3 with words separated spatially and by color on branches according to how we classify words. Each branch will represent one of four categories: "negative emotion," "positive emotion," "nouns," "verbs". We choose these four categories because positive and negative emotion are strong opposites that can be found through sentiment analysis and thus their respective sizes already offer a lot of insight into the characters personality. Nouns and verbs can be found through part-of-speech tags and can easily show what topics the characters talk about which is representative of their desires and personality. Each "leaf" of each branch will contain one of the words from the word cloud that falls under the category that the branch represents.

Tools Needed. For this visualization, we use Python's spaCy library for natural language processing to help create the corpus for each character and use tools for sentiment analysis and part of speech tags. Then, we will need JavaScript's D3.js library to be able to add the visualization to our web-page and include interactions like drop down menus.

3 Extra Visualization Ideas

For the character relationship part, we would like to add a button that can allow the user to select the kind of relationship he want to see (friend, enemy, family,...). We also would like to create small quizzes related to our project such that the user can test his knowledge about Shakespeare and his work. Finally, we would like to expand on the character personality section by extracting more specific personality traits, perhaps based on famous personality theories like the big 5: extroversion, agreeableness, openness, conscientiousness, neuroticism. However, this would require more machine learning. The idea would be to create a visualization as shown in Figure 6 in the Appendix.

4 Functional Project Prototype

The link to our website can be found here. The overall structure of our website will be as follows: Our home page contains a brief biography of William Shakespeare and an outline of the famed comedy and tragedy masks that are used so often in theater. We fill the masks with bubbles, each representing a character in Shakespeare's plays, sorting them accordingly depending on whether the play they appear in is a comedy or tragedy. We also color code them according to the play title. Then, we have one tab for each of the visualizations described above. Our network visualization will be situated in the "Character Relationships" tab, the topic visualization will be under "Play Topics", and the character personalities visualization will be in the "Character Personalities" tab. Finally, the ideas we mentioned if time allows will fill tabs accordingly and we will also create a "Quizzes" tab where the user can take fun quizzes related to our project. We will also have a small section about our team in the tab "About us".

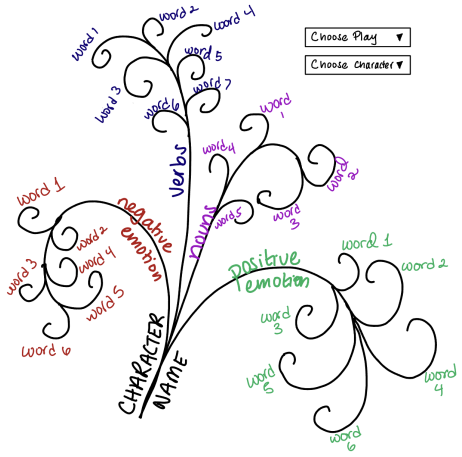

Figure 3: Example of the personality through words visualization for a character in the play.

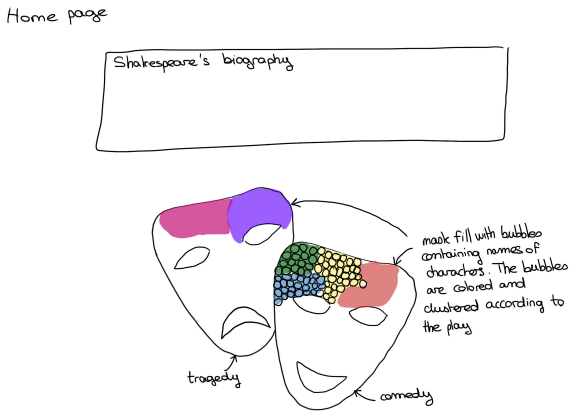

Figure 4: Vision for the visualization and structure of our home page.

A Extra Visualization Figures

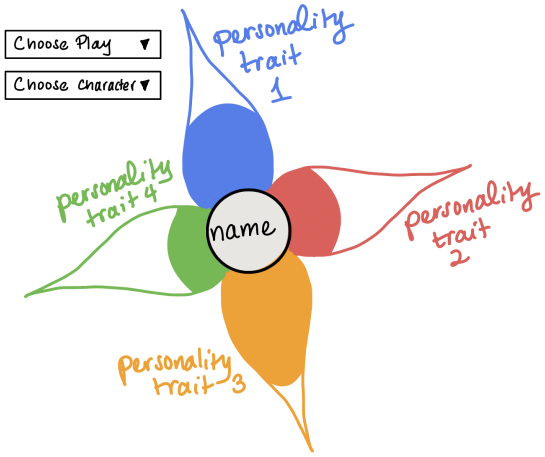

Figure 5: An extra idea for personality visualization. Each character has a flower and each petal represents a personality trait. The extent to which a character's petal is filled in represents how much they exhibit that personality trait.

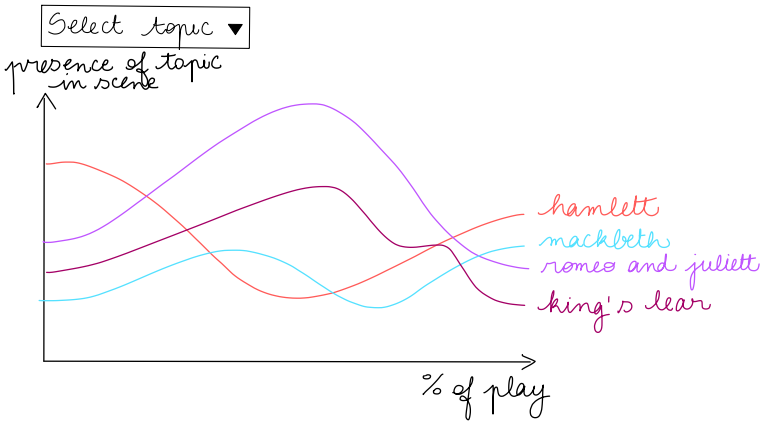

Figure 6: An extra idea for topic visualization. The user will select a topic of his choice (love, family, power or war) and a line plot will be displayed to compare the evolution of this topic in every Shakespeare's plays.