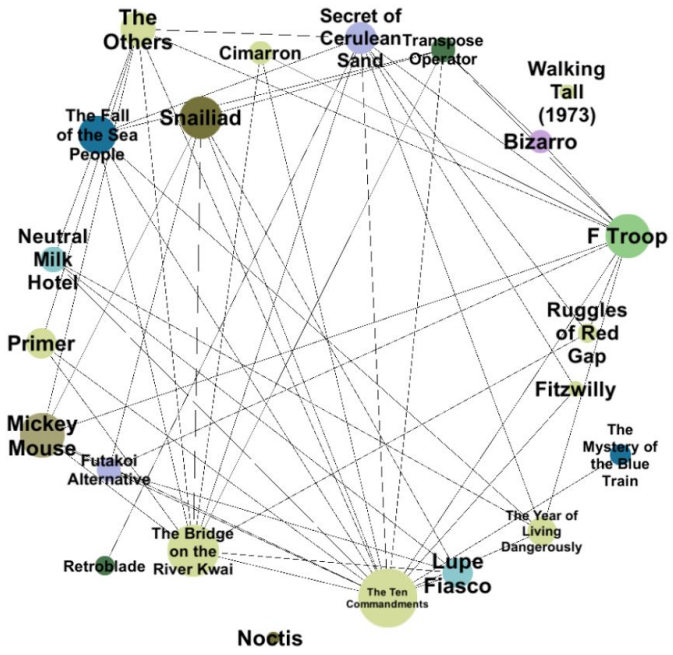


Executive Summary

Our Visualization compares the similarity of various pieces of media using the website TVTropes as a point of comparison. TVTropes catelogues various storytelling and character devices, tropes, and thus comparing two media against each other using tropes allows us to determine how similar two pieces of media are concerning plot, theme, and character. Our end results is a Network visualization created in Unity.

There were many difficulties in accomplishing this task. Many debates about specific implementations occurred, but a few steps provided a better idea of a finished product. An FDS Activity and Guerilla Testing allowed us to quickly prototype interactions, and test the visualization with users to allow for creating more effective interactions, such as added ability to click graphs, or a reset button for filtering.

In terms of techniques, three techniques played a large part in our project. Gestalt Principles of Visualization were key in the form of the visualization, which emphasizes position and connectedness as aspects of understanding. Secondly is Shneiderman's Visual Information Seeking Mantra, which emphasises a process of broad overview, panning and zooming, and filtering and isolating of relevant data. Lastly, the technique of FDS, Five Sheet Design, allowed for a rapid prototyping phase in which we were able to quickly assimilate disparate ideas of what the design should look and operate like.

Concept Background

Our visualization concept is based upon the website TV Tropes (tvtropes.org). Tropes are concepts or figures of speech shared across media, such as “death glare”. The media itself can involve film, music, anime, and many more different media types. TV Tropes allows you to search for different types of media, and in addition to the typical elements of allowing you to see a summary of the media, rate and review the media, and discover information about the category/genre of the media, it allows you to see what tropes can be found in the media.

We thought it would be very interesting to create a visualization that can allow you to see how similar different media items are based upon how many tropes they share. By the end of our process, we wanted to be able to quantify this similarity through line length based upon how many tropes are shared, conceptualize this in a bubble network visualization, display media type through color, illustrate similarity comparisons through a bar chart, allow for similar tropes between media items to be specifically observed through direct selection, and allow the user to filter the main visualization by selecting some or all of these specific tropes.

To accomplish this task, we used Google Sheets and Unity. Google Sheets served as a way to contain and organize our data, with the first row in the column in our spreadsheet being a title of a random media item from the TV Tropes website, and the rows below representing all the tropes contained in that media item. In total, our spreadsheet contained 21 media items of 9 different categories with hundreds of tropes in total. The data was imported into Unity after downloading the file as a CSV and using a text-parser to attain all the lines. Once we had all the data in a form that we could use, we filtered out all blank entries and created our bubble network visualization in C#.

Process Description

We wanted to be able to visualize what tropes different media items share. After coming up with the core concept, we decided to brainstorm through whiteboarding more specifics on what elements we wanted our visualization to consist of. Through our whiteboarding activity, we agreed that bubbles of different colors should represent different media items, that there should be another visualization aside from the core visualization we were thinking of that could show shared tropes between selected media items, and that distance should inform how closely related media items in our main visualization are, but we were very split on whether lines should or should not be used.

We were also unsure how to display the interactivity, and were debating between a pan and zoom approach or a multiple comparisons approach.

We entered our FDS activity with these conflicts and budding ideas in mind, and through this activity we were able to generate multiple ideas for potential interactions. In this activity, we each diagrammed a specific interaction and an even further in-depth focus of that interaction, and analyzed the results. We all agreed after the activity that distance should be an indicator of how many tropes are shared between media items, but were still conflicted on whether lines were a necessary element. We also agreed that we wanted to use multiple views to separate the overall layout and focus information, which would include the small comparison visualization discussed above as well as a new idea to compare most similar media items to a selected media item in bar graph form to provide the user an easy way to make quantitative comparisons. We could not decide whether our multiple views should be separated by lines or not.

The next part of our process was our Guerrilla Usability Testing, and we hoped to use this opportunity to clarify the questions we had and make sure our current ideas could be backed by evidence from user testing. We created an introductory script and a list of 5 tasks. We had 6 total participants (3 from class and 3 outside of class), and took notes on what the participants were saying and how they were responding to the tasks we had made. We did our testing on a low-fidelity powerpoint prototype that contained some interactivity in that it contained hyperlinks that linked to slides based upon user clicks. After completing our Guerrilla Usability testing, we created a summary sheet of our notes so that we could look for recurring elements that were both positive and negative.

In doing this, we learned that people were finding that lines between media items were helpful indicators of connection, which was something we were concerned about before our testing. We also learned that clicking on a bubble was intuitive for the users to do. Color was something that some users found confusing. These issues have lead us to believe that a key of some sort listing our what media items different colors represents would make these elements much more clear to the user.

When we asked users to find trope similarities between Superman and Wonder Woman (two media item examples), almost every user attempted to click the comparative bar graph in the upper-right corner, and as a result we immediately made clicking on a media item on this graph functionally able to show similarities between that item and the one currently selected.

The cast button was not immediately obvious in our visualization; two users thought it “was a label” or a title. Furthermore, once the cast was made, the shift into a filtered view was too dramatic: the connection between the two selected works was undone, meaning the side focus graphs disappeared. Additionally, through the deselection, the connection from the cast left the question of, as one user put it, “How do I go back?” There was no implemented way to go back and edit filtering information or the compared works.One of the most promising solutions to fix the overall process was to make the filtering dynamic by clicking tropes and having the filtering occur as a result. Not only does this preserve the connection between the current selected works, it also allows for the use to go back and edit their search criteria without having to go back to square one.

Following our Guerrilla Usability Testing, we created a Google Sheets spreadsheet where we each entered 7 different media items and all their corresponding tropes. We used C# programming in Unity to turn our data into our actual visualization concept. Some key features of this process were creating the ability to navigate with the WASD keys, zoom with scroll, view a collapsable key upon opening the visualization, select a bubble to view a comparative bar graph showing all the media items the bubble shares tropes with and how many of each it shares, and selecting another bubble to hide the bar graph and bring up a trope comparison feature showing the specific shared tropes and allowing for the ability to filter the overall visualization by these tropes. One problem we ran into was how to mathematically distance media items from each other when they were closely related to two disparate media items. Rather than manually try to find an overarching top-down algorithm by which to sort, we instead solved this problem by having each bubble dynamically adjust itself away or toward each of the other bubbles based on their similarity values, which lead to our finished interactive product.

After showcasing our visualization in class, the main issues we encountered and fixed were to create a “back” functionality instead of relying on deselecting bubbles, as well as a link to TV Tropes to definitions and information on each trope that the user is interested in. Occlusion was found to be a small problem for some media items, but we were unable to fix this in the time allotted given how we were mathematically comparing tropes to each other.

Evaluation

Our final product exhibits many of the features we originally envisioned as concept goals, but also has some significant differences due to time constraints and difficulty in implementation. In terms of positive achievement, we met many of our goals. The

network design of our visualization is effective at conveying connections between pieces of media from different genres. The ability to rank media by similarity through tropes was a great success, and was the primary focus of our initial concept goals. Our method of implementation of this ranking was through the connections between bubbles, as well as the length of those lines. The techniques we primarily employed to convey these connections and similarities were twofold. First, the bubbles themselves used the concept of Gestalt Principles to convey similarity between various media bubbles (Were). Position was used as a measure of similarity, whereby more similar works tended to be closer together. As position is one of the most effective gestalt principles, this was an obvious choice. Our debate on whether or not to include lines followed the usage of these principles as well. We debated on if adding lines, a form of Connection in terms of Gestalt Principles, would improve our visualization, even though we were using position already. After doing the Guerilla tests, we determined that Connectedness was an important indicator of similarity to our participants, and thus the second aspect of the design was employed.

Beyond the indication of similarities for the media bubbles, we followed Shneiderman's Visual Information Seeking Mantra in our capabilities to allow the user to manipulate the data (Heer and Shneiderman). Our visualization starts in a general, unfiltered overview, allowing the user to see a big picture, and glance for areas of interest. The visualization furthermore allows for panning and zooming in order to gain better understanding of specific connections. This zooming function also helps mitigate an unfortunate side effect of our visualization: Occlusion. As the bubbles have limited space, the media titles overlaid upon them tend to overstep the bounds of the bubble, and overlap with other data. Zooming allows for better scaling, and reduces the overlap of these items. Upon clicking a button, Details-on-Demand are revealed, detailing ranked similarities of other works, and a list of tropes the work contains. A filtering system is implemented when comparing tropes, and when selecting a media item. Non-connected media items are removed when clicking a media bubble, and when a trope is clicked, this is pared even further to connected works containing a specific trope. This filtering of extraneous data is another hallmark of Shneiderman's process. Additionally, these Details-On-Demand utilize Multiple View Displays, through the inclusion of an additional bar graph and trope selection.

During production, we used the FDS method in order to help design our system and come up with project goals. By using multiple design iterations of brainstorming sheets and quick, paper visualizations, we were able to design a more robust system (Roberts). It was through this method we settled on our Details-On-Demand containing Multiple View Displays, and also how we consolidated competing design ideas. Seeing

how an implementation may look like was beneficial in envisioning a final product, and allowed us to make large focus changes before any large scale effort was put into the project.

External Link

https://kcgoodso.itch.io/tvtropes

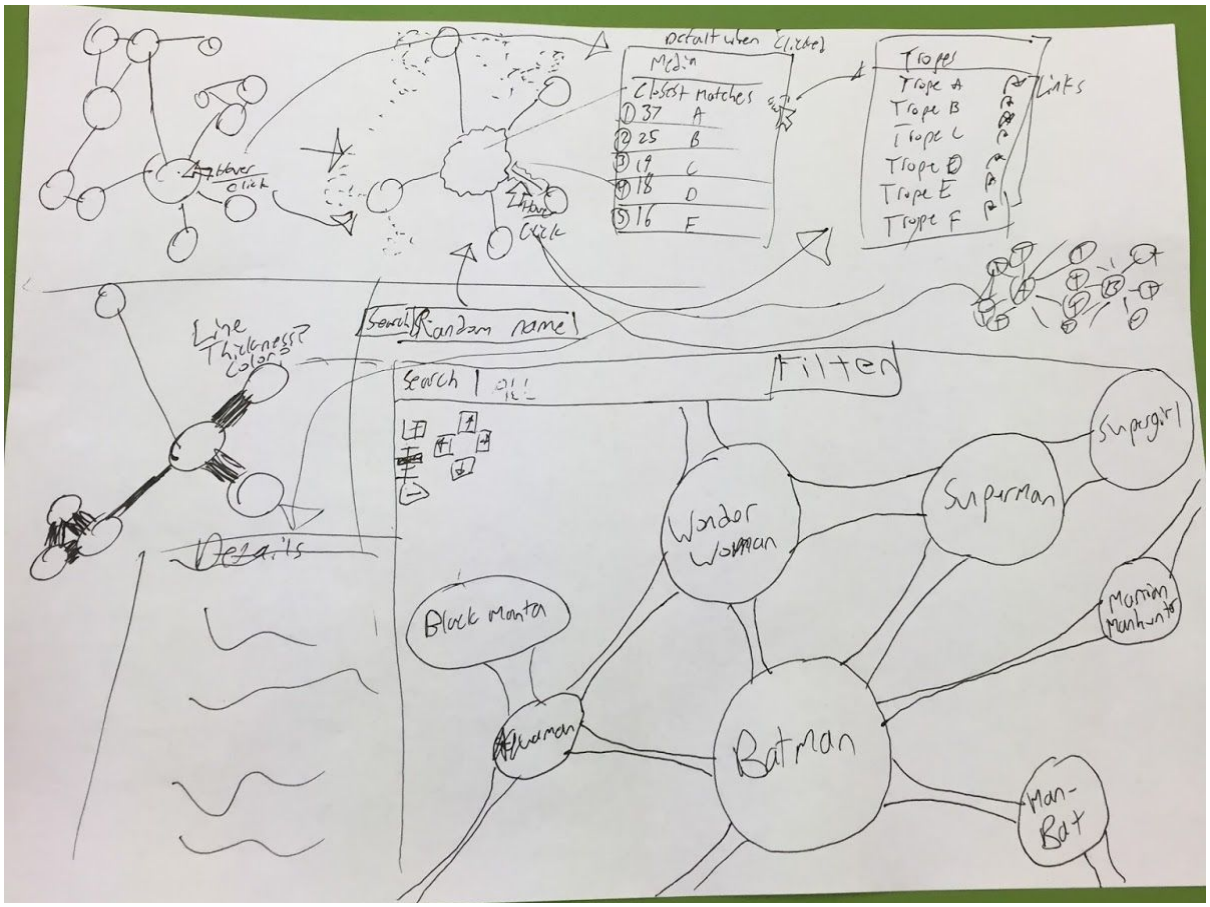
Citations:

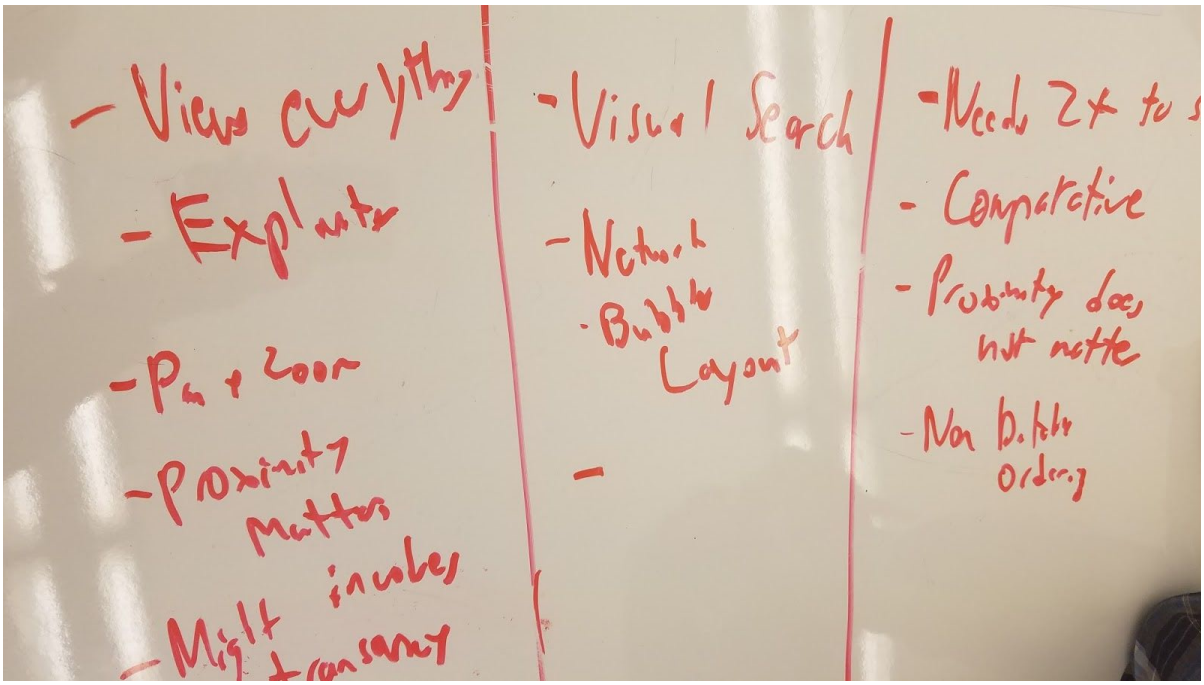
Were, Colin. "Chapter 1." Information Visualization: Perception for Design. 2nd ed. N.p.: Morgan Kaufman, n.d. N. pag. Print.

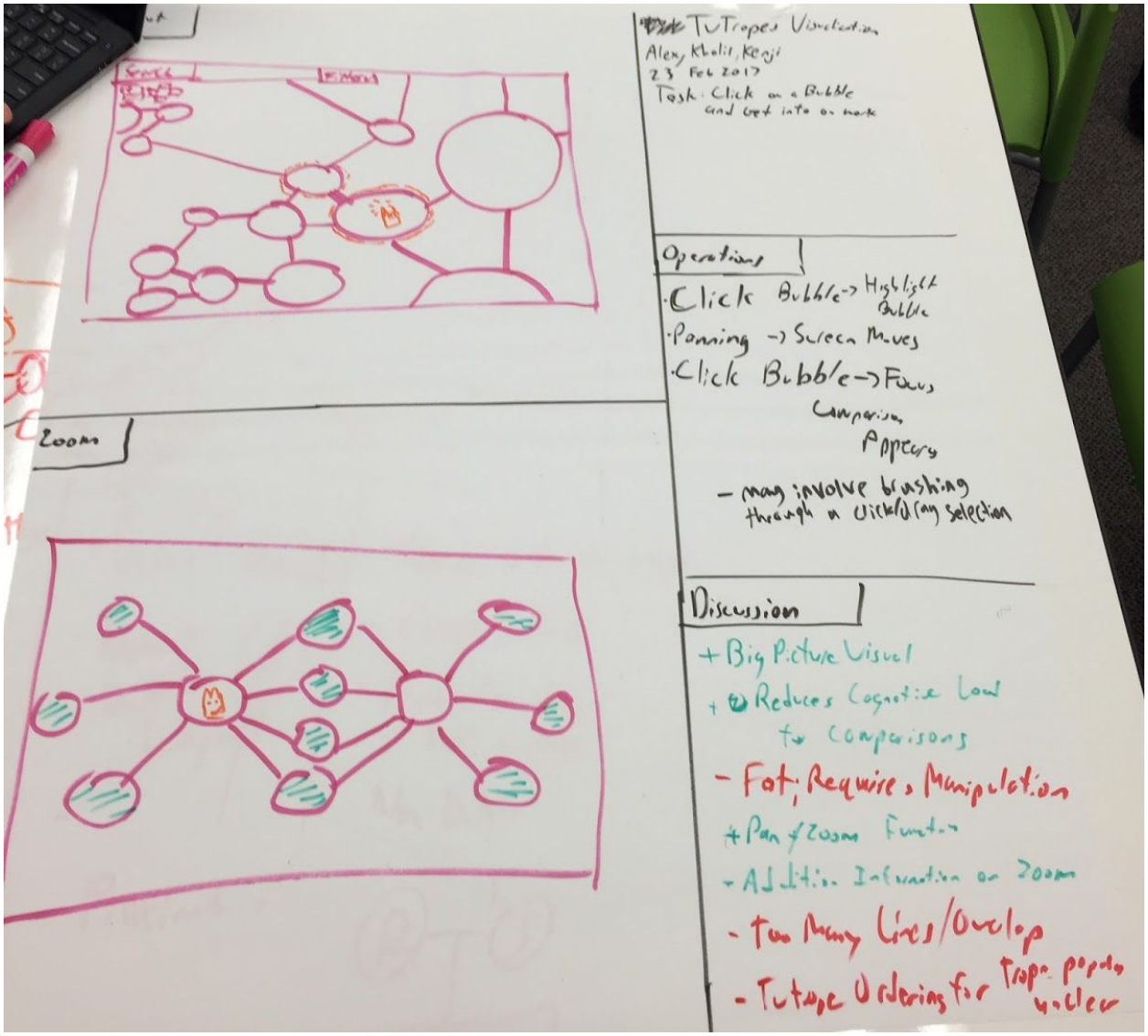
Heer, Jeffrey, and Ben Shneiderman. "Interactive Dynamics for Visual Analysis." Communications of the ACM 55.4 (2012): 45. Web.

Roberts, Jonathan C., Chris Headleand, and Panagiotis D. Ritsos. "Sketching Designs Using the Five Design-Sheet Methodology." IEEE Transactions on Visualization and Computer Graphics 22.1 (2016): 419-28. Web.

Appendix


Search
Random name!
Filter
Details
Wonder Woman
Superman
Supergirl
Batman
Aquaman
Man-Bat
Black Manta
Martian Manhunter
Trope A
Trope B
Trope C
Trope D
Trope E
Trope F
Links
Closest matches
37 A
25 B
19 C
18 D
16 E


- Visual Search
- Network
- Bubble Layout
-
- Comparative
- Non Data Ordering


TvTropes Visualization
Alex, Khalil, Kenji
23 Feb 2017
Task: Click on a Bubble and get into an article
Operations
·Click Bubble -> Highlight Bubble
·Panning -> Screen Moves
·Click Bubble -> Focus
Comparison Appears
- may involve brushing through or click/drag selection
Zoom
Discussion
+ Big Picture Visual
+ Reduces Cognitive Load for Comparisons
- Fat; Requires Manipulation
+ Pan/Zoom Function
+ Additional Information on Zoom
- Too Many Lines/Overlap
- Tvtrope Ordering for Trope-people wailer

24 Feb 2017

Task: Explore and Compare Two Works

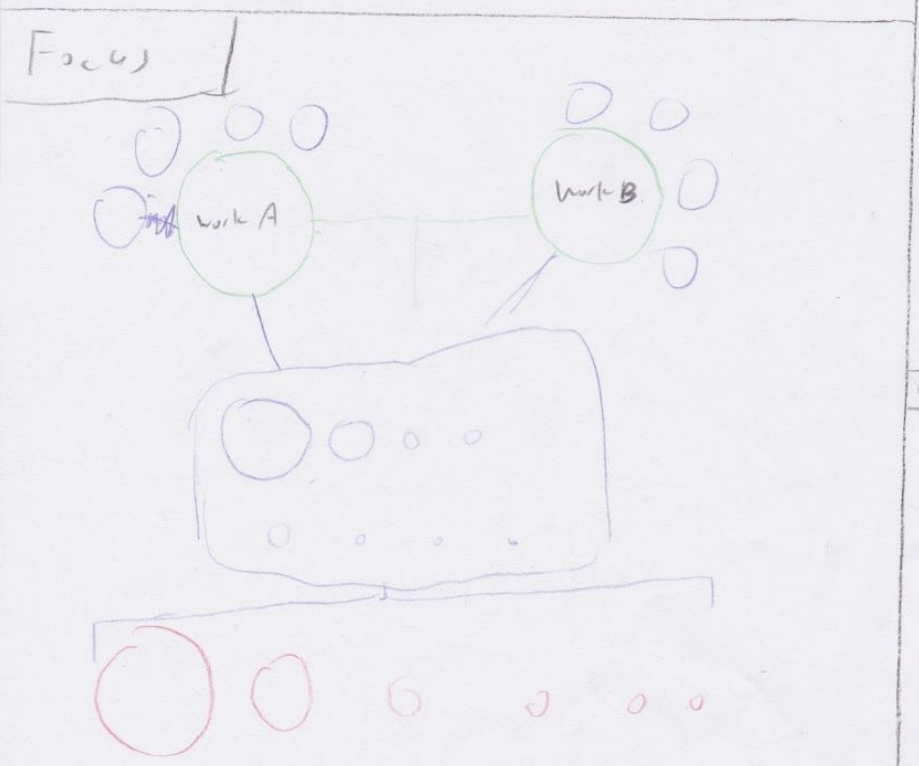
Operation 1

Mouse Over →
Highlight and
Disply Work + Trope In

Mouse off
Info Disappears

Click Bubble
lock in info windo

Click Bubble +
Drag to other bubble
→ expand comparison
view



Discussion

+ ~~Interactive~~

- Not all functions are apparent

+ Functions contextual based on state

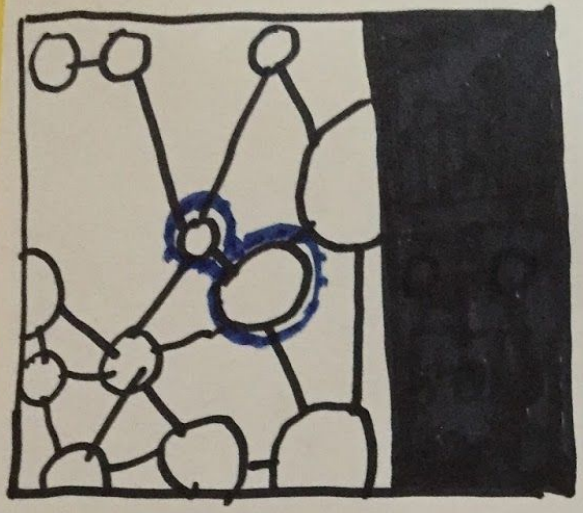
- Disorganized Trope view

- Logical Issues with Bubble Spacing

+ Exploration Encouraged

+ Extra Info at View Variations

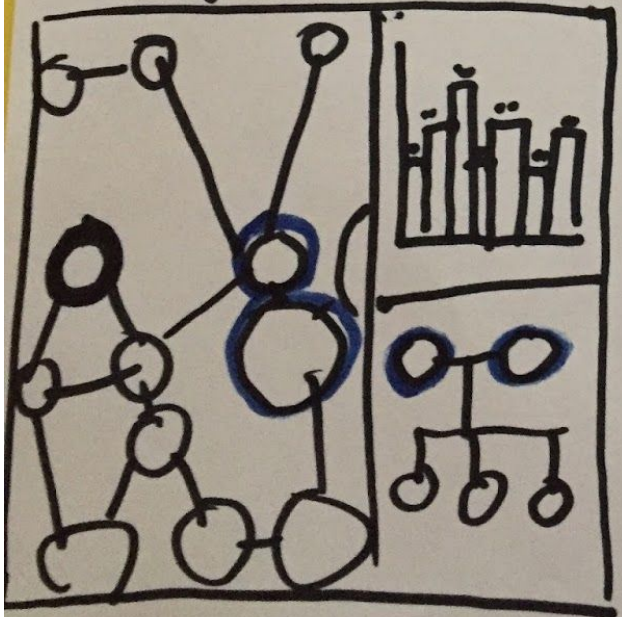
Layout



zoom

same

updates



TV Trope Multi-comp Viz Ideation

- Khalil, Alex, Kenji
- 23rd Feb 2017
- Task: Cross-view effects of clicking a bubble

operations

1) click a large view bubble
2) drag to adjacent bubble
3) View change of scope/pattern in 3 disparate sections

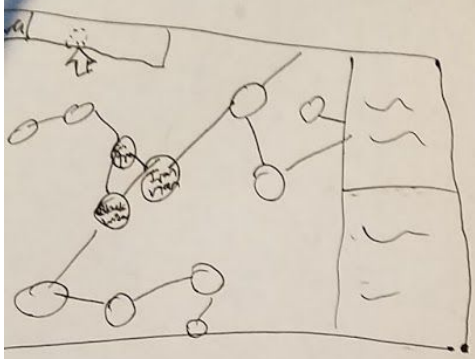
✓ Many diff views for easy inference and extrapolation

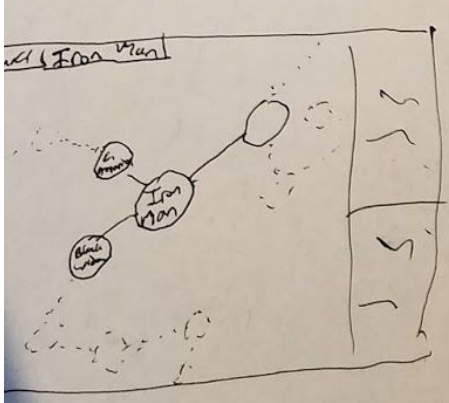
✓ Details on demand when relevant

✗ complex, may inc. cognitive load

✗ hard visual search

ont





• TV Tropes visualization

Alex, Kenji, Khalil

2/26/17

Task - Focusing On a single piece of media when mouseover/clicked or searched

Operations

1) click search box
2) enter search term
3) view isolated piece of media

Pro/Con

✓ Isolates data, reducing visual overload

✓ Searching allows for details on demand, and is useful for sifting through data

+ Information Tradeoff, as ability to do data analysis across media is reduced