Literature Review

Rivadeneira, A. W. et al. "Getting Our Head In The Clouds". *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '07* (2007): n. pag. Web. 21 May 2016.

(link)

Summary:

Rivadeneira et. al wrote note on the perception of word/tag clouds as a means for interpreting information. “[Their] note describes two studies to evaluate the effectiveness of differently constructed tagclouds for the various tasks they can be used to support, including searching, browsing, impression formation and recognition.” In this note they examined the effectiveness of tag clouds when varying font weight, color, and size, as well as the placement features of sorting, clustering, and spatial layout.

Pros:

This study was one of the few that used empirical graphical perception tasks to evaluate the effectiveness of different styles of word clouds. The experiments were well considered and well-formed, including practice and experiment trials, distractor tasks, and well-specified timing schema. Furthermore, the study design was robust, varying different perceptive variable including font color, size, and weight as well as spatial sorting, clustering, and layout. These studies were compared with reasonable controls, frequency and alphabetic lists of words.

Cons:

While the study was generally well constructed and well-formed, we wonder about the significance of their results, given the low number of participants used in their study; the first experiment had 13 participants, the second had 11 participants - some of which participated in the first study. Furthermore, a great deal of the work in this study focuses on precise recall rather than impression formation and retention.

Takeaways:

We are interested in reapplying a significant part of the methodology and study design in this note for our own work, including the distractor tasks, timing, and comparison to standard frequency lists. However, we are interested in using Qualtrics and Mechanical Turk as avenues for expanding the number of participants and responses we get, in hopes of increasing the robustness of the results and conclusions. Whereas this study focused on exact recall, we will begin with examining impression formation and retention from the ‘gist’ of the text and draw inferences about the base corpus from two different forms of information presentation.

Hearst, Marti A. and Daniela Rosner. "Tag Clouds: Data Analysis Tool Or Social Signaller?". *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)* (2008): n. pag. Web.

http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4577920

Summary:

Marti A. Hearst and Daniela Rosner and the Berkeley School of Information conducted a study where they scraped opinions from blogs and articles written about tag clouds and coded the commentary for different categories about how tag clouds are appreciated, used, and perceived by those who chose to write about them and make commentary about them.

Pros:

This method pulls a group of highly-detailed and well articulated feedback about word-clouds/tag-clouds from those individuals on the internet that have spent a great deal of time and energy thinking about them (as evidenced by their taking the time to produce an article on the matter). This study effectively identifies some well-stated advantages and use cases for word-clouds which are corroborated by their fellows.

Cons:

This study, while collecting a solid assortment or existent published opinions about tag clouds, is inherently self-selecting. The people that choose to write articles such as those used could fairly be termed ‘design experienced’ or, at the very least, ‘design conscious’. While their opinions vary in credibility, they are all biased in having thought about and spent time considering word clouds. To get a more organic sense of the interpretation, opinions, about, and best case usage of word clouds, we wonder if it would have been better to have solicited unbiased, fresh individuals with little or no experience with word clouds.

Takeaways:

“We have concluded that tag clouds are primarily a visualization used to signal the existence of tags and collaborative human activity, as opposed to a visualization used for data analysis.” This study determined that - in terms of their usability - tag clouds a good visualization best used for lower-brow visualization needs. They are fun, social, dynamic, and extemporaneous. It is a good medium for drawing out higher-level patterns and frequency information about a collection of text, but is not good for lower-level, specific and precise data about frequency. In short, good for the internet, bad for social scientists.

Fernanda B. Viégas and Martin Wattenberg. "Tag Clouds and the Case for Vernacular Visualization". *ACM Interactions* (July 2008): n. pag. Web.

http://delivery.acm.org/10.1145/1380000/1374501/p49-viegas.pdf?ip=171.66.30.204&id=1374501&acc=ACTIVE%20SERVICE&key=AA86BE8B6928DDC7%2E0AF80552DEC4BA76%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=789182891&CFTOKEN=18662700&__acm__=1463984333_d281b3a604641a69f0d25384579a2b1b

Summary:

Fernanda Viegas and Martin Wattenberg write a brief note about the history and usage Tag Clouds, and reflect on prior work. The combine past work and commentary on the uses of and cases for/against tag clouds. They wrap up by discussing future possibilities for the medium.

Pros:

This article does a nice job highlighting the history and previous studies which have utilized word clouds. The commentary is approachable and narrative, and quickly conveys the usage and benefits/problems with using word clouds. It identifies the principles of visualization design (or lack thereof) which make the visualization effective/ineffective. It gives a wonderful holistic examination as the word cloud as a phenomenon in Web 2.0 and in the information visualization community.

Cons:

While the document provides a nice history of this visualization medium, it does not contribute to the field of knowledge about word clouds in any meaningful way. It does not present a study, data, or research of it's own, but merely commentates on past work and history, and speculates about future areas for possible continued research or use of the word/tag cloud visualization.

Takeaways:

The authors summarize their own findings about tag clouds best in the following passage: "A tag cloud is truly a "vernacular" technique—one that does not come from the visualization community, and that violates some of the golden rules of traditional visualization design. Nevertheless, the tag cloud's widespread popularity and flexibility—playing a starring role in situations ranging from psychological experiments to fiction writing to political analysis— suggest that it passes the test of applicability. One might say that tag clouds work in practice, but not in theory." This takeaway, the authors then point out, leaves a great deal of room for *why* tag clouds

Halvey, Martin and Mark T. Keane. “An assessment of tag presentation techniques.” WWW 2007: 1313-1314.

link

Summary:

Halvey & Keane measured the selection time across different variations of word lists and and tag clouds. Their variations include: alphabetical cloud, cloud, alphabetical horizontal list, horizontal list, alphabetical vertical list, vertical list. The user task was to complete 24 different selections from a randomly presented visualization of 10 countries (which were also randomly selected from a list of 60 country names). An alphabetical cloud (2.94s) has similar selection time to an alphabetical horizontal list (2.887s) and alphabetical vertical list (2.892s). However, a cloud has the highest selection time (3.409s) with a vertical list the second highest at 3.241s. After these results, they decided to investigate further the effect of font size on tag cloud selection. They found that the larger the font used, the quicker the selection.

Pros:

They have a very simple task which makes it easier to get multiple data points from one test user. Because the task was simple and concrete, direct comparisons are easily made.

Cons:

Noted in the article, they had a study error where previously visited links were getting highlighted on their actual study. Regardless, they were still able to pull 1231 “clean” selections. Regarding the tag cloud visualizations, they could’ve added in more variations - such as ordering the cloud by size or altering font colors used. The results seem to prove less that tag clouds are ineffective but more that alphabetization improves performance.

Takeaways:

Our study is different in that we are looking at the effectiveness of trend identification rather than simply finding and selecting a word. However, in the future work, they propose an interesting idea which is to include an eye-tracking paradigm. Since we are trying to measure trend identification and overall perception, being able to compare differences in eye movement could prove interesting.

Hassan-Montero, Y., & Herrero-Solana, V., “Improving tagclouds as visual information retrieval interfaces,” Proc. InfoSciT2006.

link

Summary:

Contrary to Halvey’s study, Hassan-Montero proposes that alphabetization is not effective in tag clouds. Instead, he proposes an improvement by clustering words based on similarity. Their study draws from the ‘del.icio.us’ bookmarking tool to produce a “sample containing 218,063 URLs tagged with 242,349 tags by

111,234 users." With this dataset, they create a tool that calculates tag similarity and produces a corresponding tag cloud. Although they did not test the effectiveness of this new visualization with real users, they devise an equation to evaluate it. The equation measures coverage and overlapping, where "coverage is the number of resources that have been described by at least one of the 95 selected tags. Overlapping is the relative co-occurrence between tags."

Takeaways:

The overall approach is interesting - create a mathematical function to map the tags and produce the visualization from there. This is actually quite similar to the Facebook tag clouds that we will be using in our study; those tag clouds have general words in the center with six topic-specific clusters surrounding it. This research supports a hypothesis that similarity-based tag clouds lend themselves more to trend identification than plain alphabetical lists.

Scott Bateman, Carl Gutwin, and Miguel Nacenta. 2008. Seeing things in the clouds: the effect of visual features on tag cloud selections. In *Proceedings of the nineteenth ACM conference on Hypertext and hypermedia* (HT '08). ACM, New York, NY, USA, 193-202. DOI=http://dx.doi.org/10.1145/1379092.1379130

Link

Summary:

This study looks at font size, font weight, color, intensity, number of pixels, tag width, number of characters, tag area, and position and tries to determine their independent influences on tag clouds. In order to do so, they developed 10 different "cloud sets" where "each of our cloud sets contained 10 clouds, and manipulated a different set of visual properties (see Table 1); due to the interdependencies between properties, some properties could not be tested alone." In addition to task completion, participants answered surveys asking them what properties influenced their perception the most.

Takeaways:

This study basically does what we initially proposed - concentrating on features that are side effects of the medium (like tag area and number of characters). What surprised me is that number of pixels, tag width, and tag area were the least significant factors. While they have a strong correlation to other important factors, viewers did not explicitly say that those factors influenced their perception.

Full list of references:

Fernanda B. Viégas and Martin Wattenberg. "Tag Clouds and the Case for Vernacular Visualization". *ACM Interactions* (July 2008): n. pag. Web.

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Rivadeneira, A. W. et al. "Getting Our Head In The Clouds". *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '07* (2007): n. pag. Web. 21 May 2016.

Schwartz HA, Eichstaedt JC, Kern ML, Dziurzynski L, Ramones SM, Agrawal M, et al. (2013) Personality, Gender, and Age in the Language of Social Media: The Open-Vocabulary Approach. PLoS ONE 8(9): e73791. doi:10.1371/journal.pone.0073791

Scott Bateman, Carl Gutwin, and Miguel Nacenta. 2008. Seeing things in the clouds: the effect of visual features on tag cloud selections. In *Proceedings of the nineteenth ACM conference on Hypertext and hypermedia* (HT '08). ACM, New York, NY, USA, 193-202. DOI=http://dx.doi.org/10.1145/1379092.1379130

http://www.slate.com/blogs/business_insider/2013/10/02/study_most_popular_facebook_keywords_by_age_gender_and_personality.html

Project Plan

Task	Deadline	Assigned to
Create surveys	5/20/2016, midnight	Leigh
Convert tag clouds into text lists	5/20/2016, midnight	Sarah
Launch MTurk pilot	5/21/2016, noon	Leigh
Analyze initial results (see if anything needs to be changed)	5/22/2016, noon	Sarah
Re-release survey on MTurk (and implement any changes)	5/22/2016, afternoon	Leigh
Analyze results to identify themes/conclusions	5/28/2016, afternoon	Leigh & Sarah
Synthesis	5/29/2016	Leigh & Sarah
Poster (first draft) *	5/30/2016	Leigh & Sarah
Revise poster and submit for printing *	5/31/2016	Leigh & Sarah
Paper (first draft) *	6/4/2016	Leigh & Sarah
Revise paper and submit *	6/5/2016	Leigh & Sarah

* though we're both listed as responsible for deliverables, Leigh will take more ownership of the poster and Sarah will take more ownership of the paper