

CS 171/CSCI E-64: Visualization

Homework 2, Problem 4: Readings

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Questions

1. Ware describes bottom up and top down processing of visual information in the brain. Give a concrete and detailed example of how bottom up processing is influenced by top down processing, leading to a potentially wrong interpretation of "reality" by the viewer. Your example can include a screenshot, photo, or web site URL to refer to the scene that is being viewed.

For this question I chose the image in this story from National Public Radio¹:

<http://www.npr.org/blogs/health/2013/02/11/171409656/why-even-radiologists-can-miss-a-gorilla-hiding-in-plain-sight>



Figure 1: Trafton Drew and Jeremy Wolfe

In bottom up the first stage of visual processing low level features or shapes are processed. In the middle stage those features are organized into more complex patterns. In the final stage those patterns are shaped into objects in the visual working memory. This visual working memory is only capable of holding about three objects in attention at once.

¹ Alix Spiegel, "Why Even Radiologists Can Miss A Gorilla Hiding In Plain Sight," *NPR*, February 11, 2013 accessed February 12, 2013, <http://www.npr.org/blogs/health/2013/02/11/171409656/why-even-radiologists-can-miss-a-gorilla-hiding-in-plain-sight>

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Ware describes the top down processes as being driven by the need to accomplish a goal. This happens at every stage of the bottom up processing. This need for attention causes the bottom up process to take a back seat to the signals that are being looked for in top down processing.

The image above was shown to cancer radiologists, experts at searching images – in this case for cancer. In the study by Trafton Drew, 83% of the radiologists failed to see the gorilla in the image because they were so focused on finding cancer nodules. To put it in the context of top down processing the goal or signal of finding the cancer nodules was loud enough to drown out the bottom up processing of seeing the gorilla.

2. In the Polaris paper, carefully read section 7.1 Scenario 1: Commercial Database Analysis on p. 62 again and examine Figure 6. Describe the visual mappings and visual queries, as mentioned earlier in the article, that Polaris enables in this series of screenshots.

The Polaris system relies heavily on Bertin's visual properties for shape, size, orientation, color value, hue (texture is not currently supported). Polaris also supports the ability to change its display (visual encodings) as well as allowing the user to manipulate and explore the data or visual queries.

Visual Mappings: In Scenario 1 the user starts with a scatter plot. In this case the size visual mapping is a series of dots representing the relationship between marketing costs and profit. Size, orientation and color are not factors in the scatter plot. In the third display the user creates a series of bar charts showing profit, sales and marketing for each product. In this case the size of the bar represents value. The orientation of the bars is vertical and the color represents different products being analyzed.

Visual Queries: The ability to change and manipulate the data as the user explores and finds patterns is referred to as data transformations and visual queries. In the first scenario the user starts with a scatter plot and quickly notices that some products have high marketing costs with little profit. The CFO then creates a linked table deriving additional fields with state data. Adding this additional data allows the user to see that in New York there are several products returning very little profit. Finally the user creates the bar chart view filtered for New York and sorted by month. Scenario 1 does not make use of the Brushing and Tooltips or Undo and Redo functions.

3. Go to the [Many Eyes](#) website and browse around the visualizations. Click through a few and look at the comments. How successful do you think Many Eyes has been in achieving its original design purpose according to the paper? What do you think is the biggest issue/ flaw with Many Eyes? What improvements might you suggest to Many Eyes to address these issues/flaws?

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The main goal of the Many Eyes website is “enabling end-user creation of visualizations and fostering large-scale collaborative usage.” All in all I think the Many Eyes site has done a good job. It easily allows users to upload data and create visualizations from that data. There is also a place to comment on existing visualizations as well as a way to add a snippet to a blog.

I think the biggest problem with Many Eyes is the numerous visualizations that are just plain bad. Many Eyes has accomplished their goal of allowing non-technical users to easily create visualizations, but this has allowed for a proliferation of poor visualizations. Many Eyes does have featured visualizations on its home page, which is good, but finding interesting designs outside of this page is problematic. I think that if the site had a rating system and made it easy to find highly rated visualizations it would help keep user’s interest in the site.

The social aspect of the site could also use some work. While there is a way to leave comments many of the visualizations have no comments on them. Making it easy for a user to post to Twitter or Facebook would probably help increase the conversations surrounding some of these visualizations.

The site itself is also not aesthetically pleasing to look at or interact with which may end up driving users away. The UI and UX is somewhat antiquated. Additionally the use of Java applets caused my browser to crash which, had I been a normal user, would have meant I would never have returned to the site.

Overall I think the site provides for the goals it sets out – it is easy for users to load a data set and create a visualization from it. The social collaboration could use some work and I believe that making some changes to how the visualizations are ranked, as well as updating the site to a more modern look and feel would go a long way in increasing the sites popularity.