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MKTG 420

Article Summaries

**Principles of Data Visualization - What We See in a Visual**

This article coved the basics of data visualization including why information should be visualized and how visual data is processed when people look at it. The article begins by describing how data can be interpreted faster and with less space when it is visualized in some format. This way, instead of searching through a table of numbers, tends, patterns and relationships are apparently clear. The article then continues by explaining how the eyes and brain work together in parallel to make sense of visuals. It gives an example of finding fruit in a grocery store. When people enter the store they have a visual of what they want in their brains. They then scan the store using their eyes and try to match up the fruit section, then the specific fruit with the image they have in their mind.

This article then talks about how memory works in data visualization. Typically, working or short term memory is used when looking at visuals instead of long term memory. Working memory can hold around three “chunks” of information. A common problem with many data visualizations is having more than 3 “chunks” of information or including too much information in each “chunk.”

The second half of the article discusses preattentive processing that occurs when first looking at some data visualizations. Preattentive processing is done within “10 milliseconds” of looking at a data visualization. It is seeing the thing that pops out on a chart or graph. This can be done through differences in form, shape, color, position, proximity, distribution, size or anything that make the “target value” substantially different than the others.

**Perception in Visualization**

This article was far more technical than the previous one. It began with a more in depth description of what specifically preattentive processing is. This article defined preattentive processing as what viewers initially and very quickly detect with our visual system. This is often done before we can consciously think about the image. According to the article things that take us 250 milliseconds or less to “see” are considered preattentive processing. Color was considered to be one of the easiest attributes to preattentive process. Shapes were slightly more difficult to process and when the two are combined viewers can no longer preattentive process that information.

The article then discussed different theories of preattentive processing. The first theory was feature integration theory. This theory stated that the number of elements in a visual should not increase preattentive processing time. The second theory, texton theory, states that objects in a visualization are grouped based on similarities. This includes blobs, terminators and crossings. The third theory named similarity theory describes that search time is directly related to not only the number of elements, but how distinguishable those elements art from the target. This theory looks at the similarities between non targets and the differences between the target and non-target. The last theory, guided search theory, explains that viewers will systematically work their way up or down the visual and look for things that stand out. The article then briefly touches on Boolean map theory which states that there are two processes when looking at a visual. There is selection and there is access. Selection is when a viewer chooses what group to look at in a visual and access is when a view starts to interoperate that group.

The article concludes by describing postattentive vision. Postattentive vision is what occurs when looking and studying a visual. This part of the article talks about how visuals cannot be committed to long term memory, must be re-searched every time. The article also talks about change blindness and how this occurs when there is an interruption. The theories behind change blindness are overwriting, first impression, fist view, everything stored nothing compared. The article concludes by talking about recent development into texture visualizations and Nonphotorealism, enhancing pictures to add information.