INFORMATION VISUALIZATION

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The Eyes Have It:  
A Task by Data Type Taxonomy for Information Visualizations

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Abstract  
A useful starting point for designing advanced graphical user interfaces is the Visual Information-Seeking Mantra: overview first, zoom and filter, then details on demand. But this is only a starting point in trying to understand the rich and varied set of information visualizations that have been proposed in recent years. This paper offers a task by data type taxonomy with seven data types (one-, two-, three-dimensional data, temporal and multi-dimensional data, and tree and network data) and seven tasks (overview, zoom, filter, details-on-demand, relate, history, and extracts).

Everything points to the conclusion that the phrase 'the language of art' is more than a loose metaphor, that even to describe the visible world in images we need a developed system of schemata.

E. H. Gombrich Art and Illusion, 1959 (p. 76)

1. Introduction

keys), are being pushed aside by newer notions of information gathering, seeking, or visualization and data mining, warehousing, or filtering. While distinctions are subtle, the common goals reach from finding a narrow set of items in a large collection that satisfy a well-understood information need (known-item search) to developing an understanding of unexpected patterns within the collection (browse) (Marchionini, 1995).

Exploring information collections becomes increasingly difficult as the volume grows. A page of information is easy to explore, but when the information becomes the size of a book, or library, or even larger, it may be difficult to locate known items or to browse to gain an overview.

Designers are just discovering how to use the rapid and high resolution color displays to present large amounts of information in orderly and user-controlled ways. Perceptual psychologists, statisticians, and graphic designers (Bertin, 1983; Cleveland, 1993; Tufte, 1983, 1990) offer valuable guidance about presenting static information, but the opportunity for dynamic displays takes user interface designers well beyond current wisdom.

2. Visual Information Seeking Mantra
Data-Driven Documents
CSS 3
SVG
DOM
Document Object Model
Data-Driven Documents
HTML
JavaScript
MANIPULATING DOCUMENTS: EXAMPLES

- [http://mbtaviz.github.io](http://mbtaviz.github.io)
- [http://www.cse.wustl.edu/~alvitta/publications.html](http://www.cse.wustl.edu/~alvitta/publications.html)
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>D3 Test</title>
    <script src="https://d3js.org/d3.v4.js"></script>
  </head>
  <body>
    <script type="text/javascript">
      //D3 code goes here
    </script>
  </body>
</html>
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        </script>
    </body>
</html>
VIEWING YOUR PAGE
NOTE ON BROWSER
NOTE ON DEBUGGING
NOTE ON LOADING EXTERNAL DATA FILES

Need local web server

• Step 1: cd into code directory
• Step 2: python -m SimpleHTTPServer 8000
MANIPULATING DOM ELEMENTS
IN-CLASS EXERCISE: CREATE THE PAGE BELOW BY USING D3 CODE

h1 Manipulating DOM elements in D3

p Where is the visualization?
SIMPLE SCATTER PLOT EXAMPLE

SCATTER PLOT
IN CLASS EXERCISE

• Encode the z value into radius of each circle
  • Use: Math.sqrt(height - zval)

• Add the x, y values as text to each circle
NEXT TIME...

Graphs Visualizations