2D Matrix
Design Basics

2D Bertin's Re-orderable Matrix
2D SOM / TreeMap

3D Space

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Topics to be covered today

- **Examples of 2D visualizations**
  - Frequency, grid/cell based
- **Design Basics**
  - Spatial organization & the Grid System
  - Swiss Graphic Design Fonts
- **Color Space**
  - RGB, HSL, and alpha transparency
- **Mohit Demo**
  - Completion of grid-based processing sketch

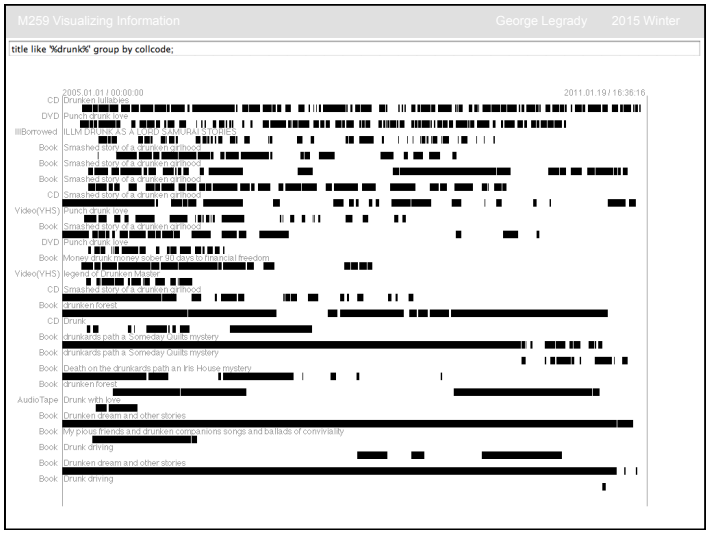
2 Kinds of 2D Maps

- **Synchronic:** The state of things at a specific moment in time
- **Diachronic**: Change over time

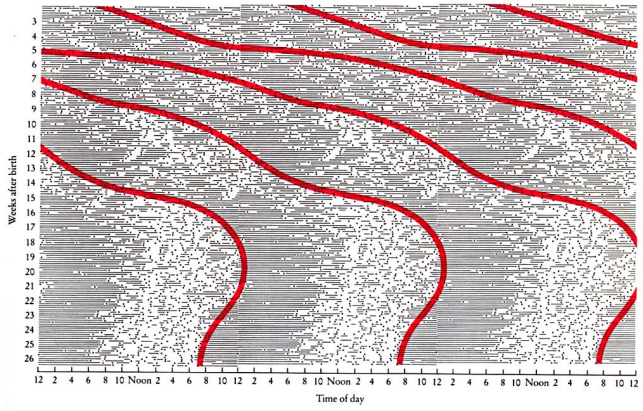
- The assignment focuses on synchronic state
  - Data organized within a 2D structure where a cell's horizontal and vertical locations and color/ tone value each represent a relationship to all the other

  - (Diachronic and Synchronic can be combined in 3D space)

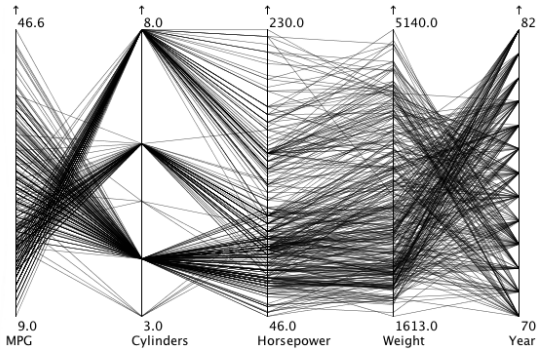
Examples of Frequency/Diachronic Mapping



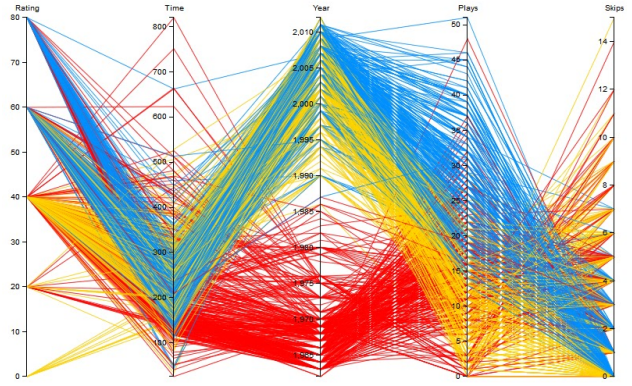
Bio-Rhythm: Frequency Map reveals pattern



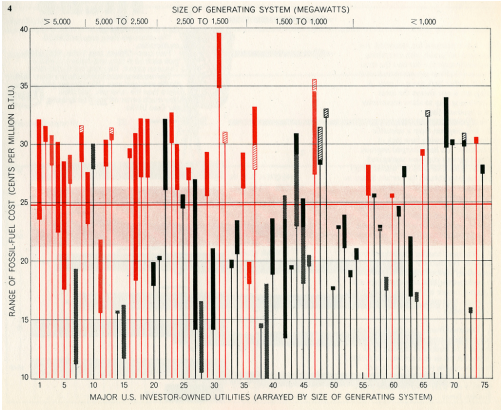
Parallel Coordinates: Multi-dimensional Data

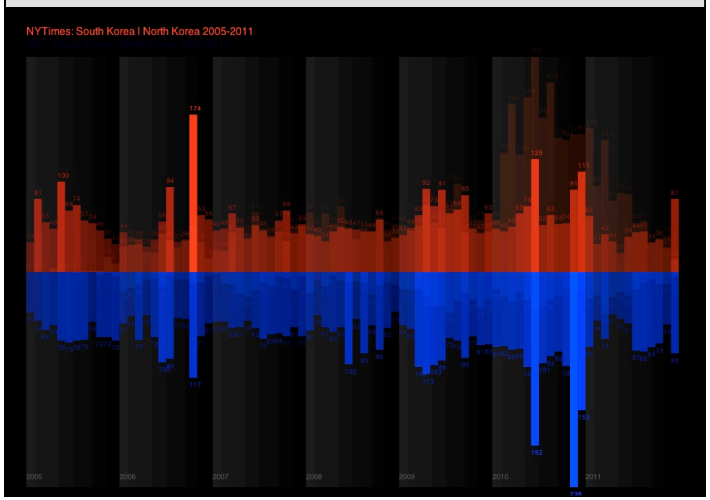


Parallel Coordinates: Multi-dimensional Data

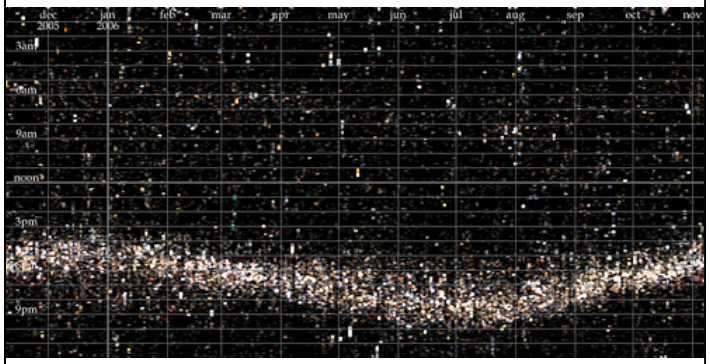


Histogram-like map with boxplot





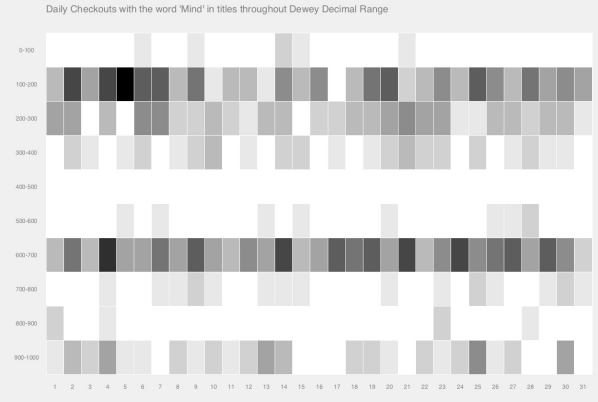
Linear Time Graphs



Design Basics

- **Stay with Swiss Graphic Design Rules**
- **Background:** grey to white (not black)
- **Use invisible Grid System**
- **Best for Screens: Sans Serif Fonts:**
  - Arial, Futura, Helvetica, Univers, etc.

2D Synchronic Map Visualization



2D Assignment

- **Examples of 2D visualizations**
  - Frequency, grid/cell based
- **Design Basics**
  - Spatial organization & the Grid System
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- **Color Space**
  - RGB, HSL, and alpha transparency
- **Mohit Demo**
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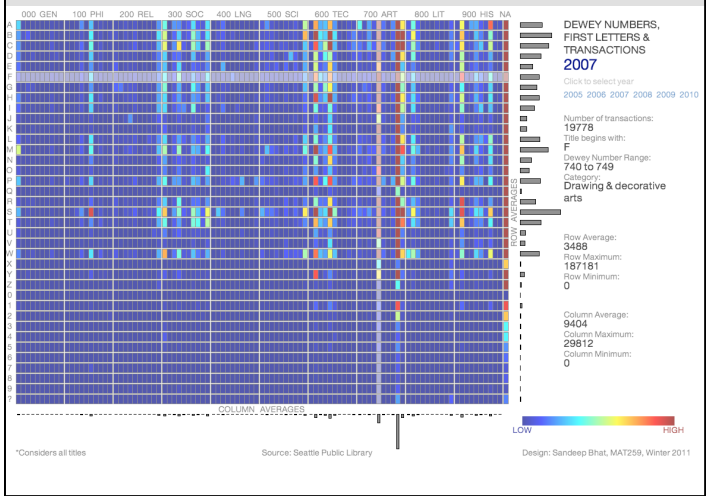
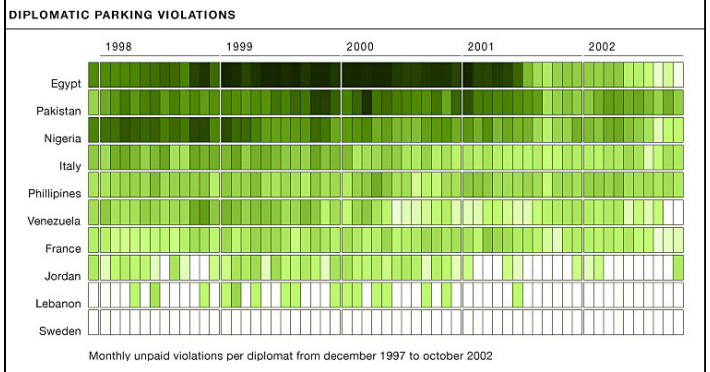
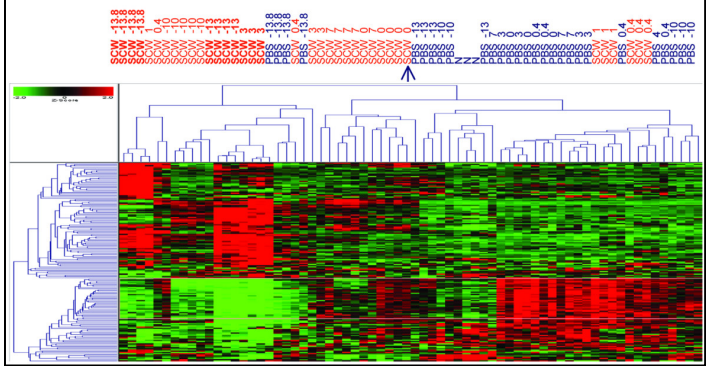


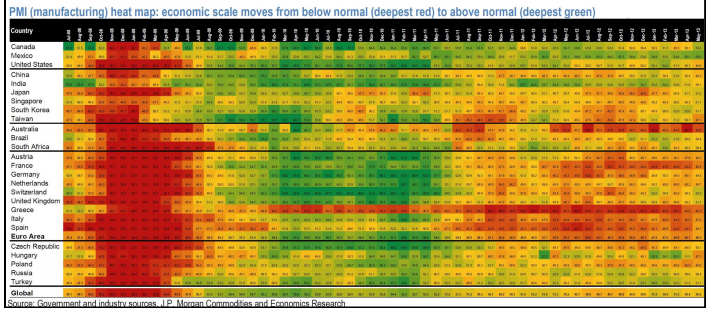
Frequency Maps Can Tell a Story (catalogtree)

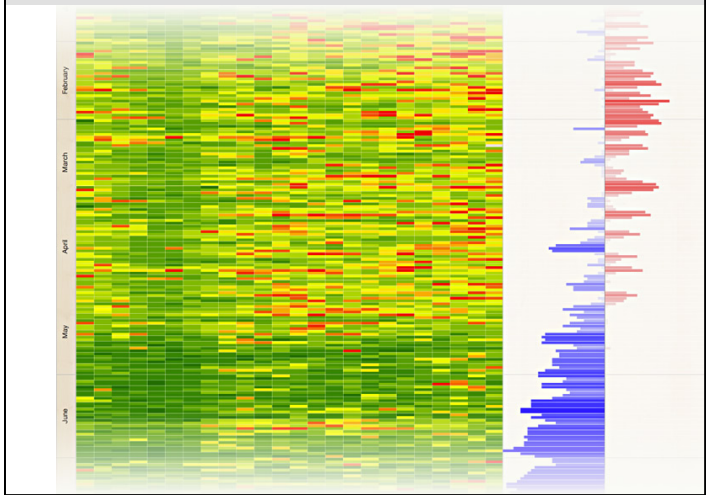


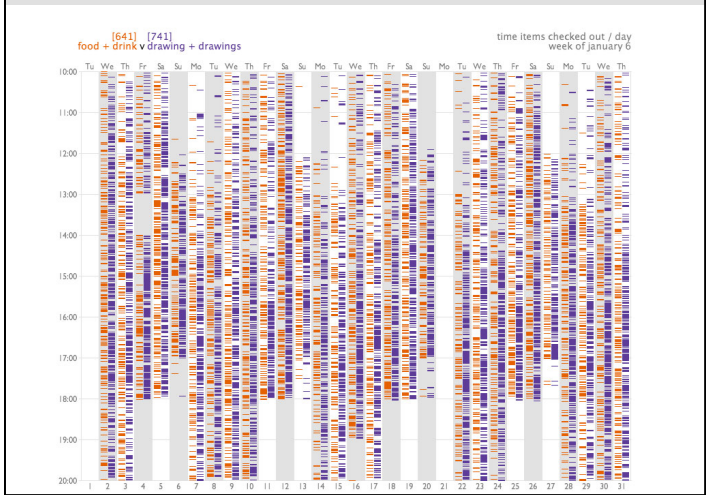
Heat Map



Heat Map



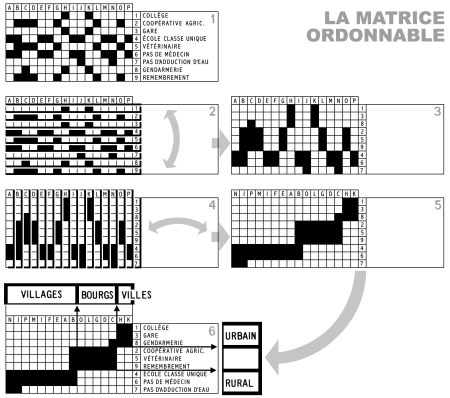




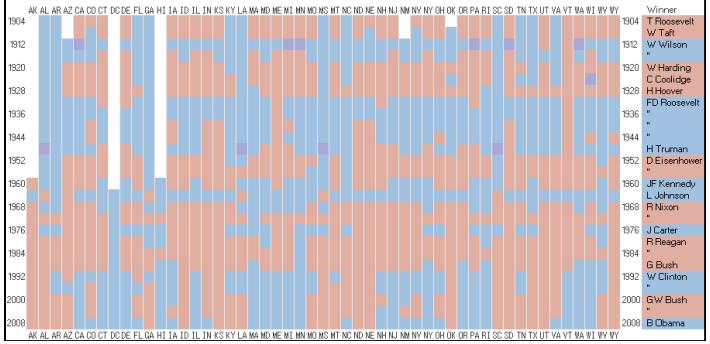
Explore Different Color Scale Systems

- Donghao variations
- Yung Teng jpg sampling references

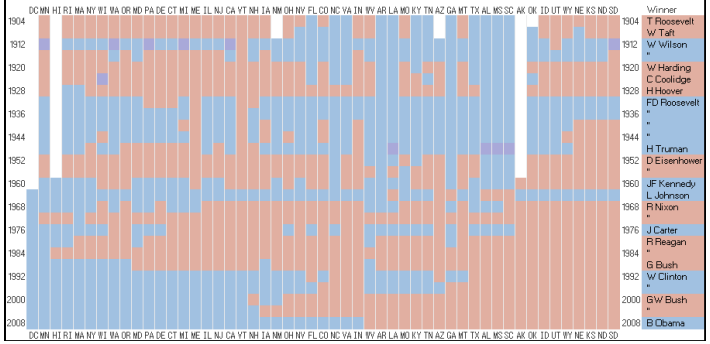
Bertin: Reorderable Matrix



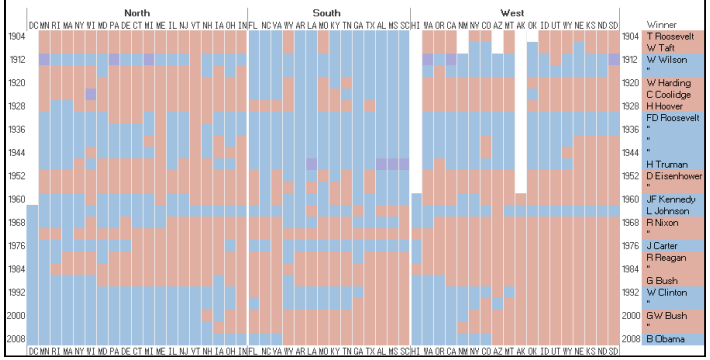
US Political History: Alphabetical



US Political History: Most recent results



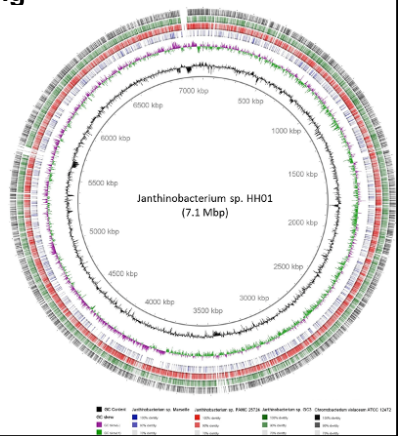
US Political History: 3 regions

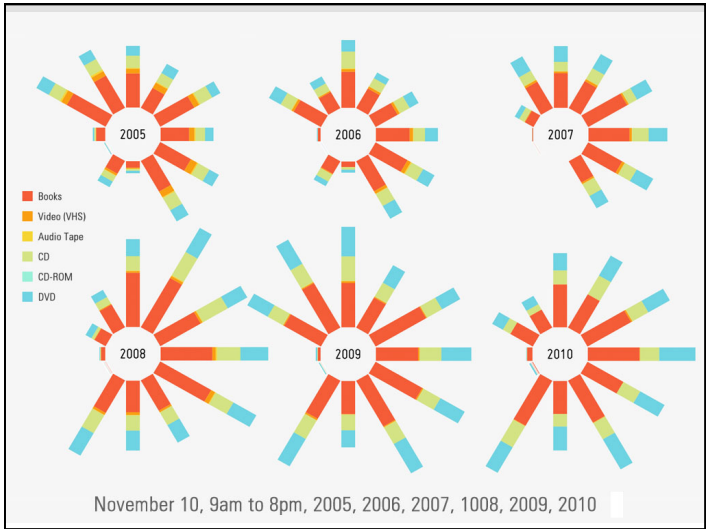


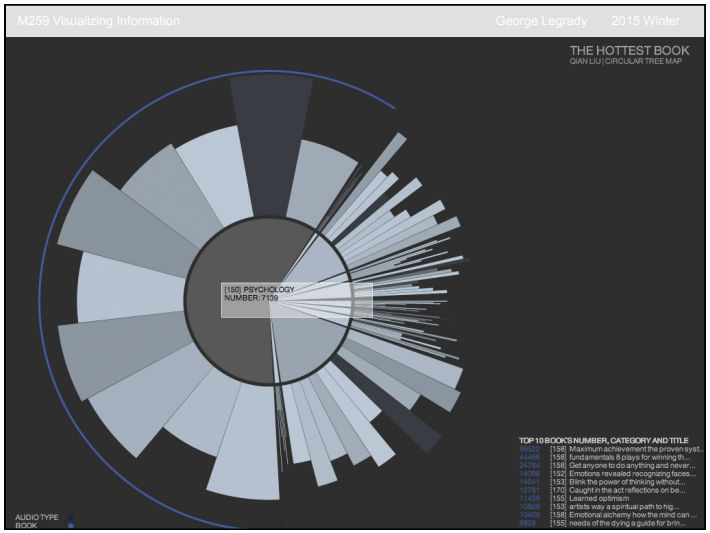
Other 2D Representations

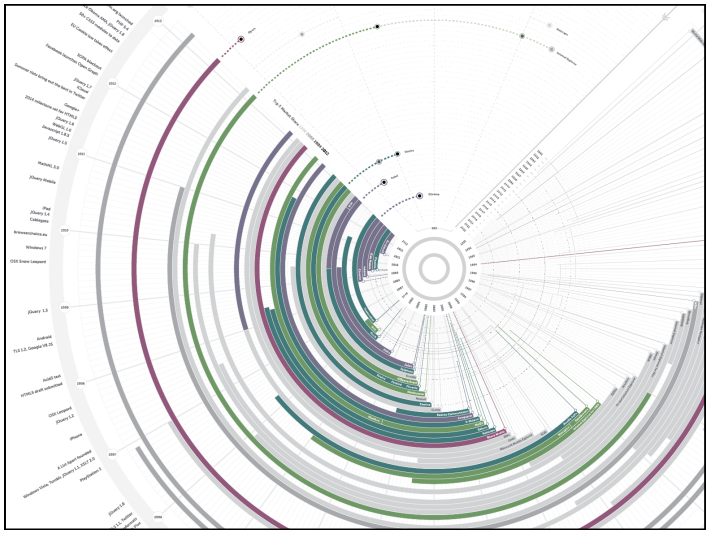
- Spherical Mapping
- Treemap
- Kohonen Self-Organizing Map

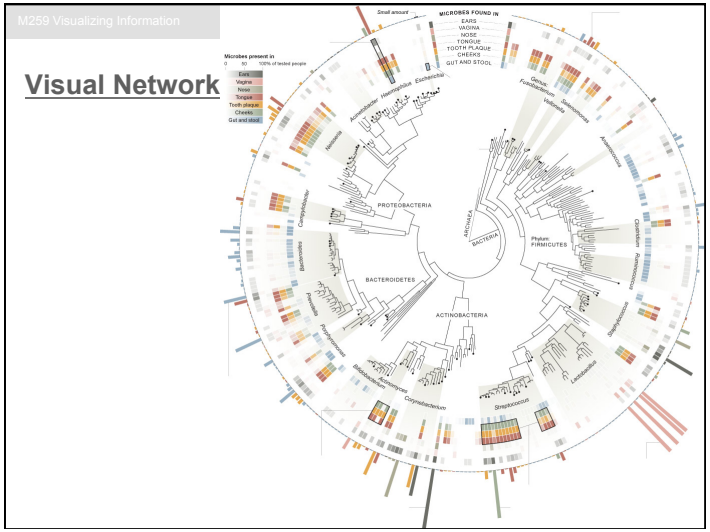
Spherical Data Mapping











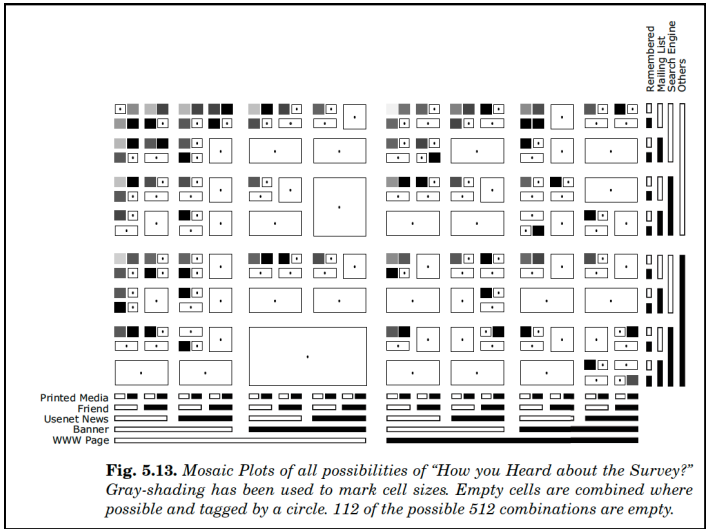
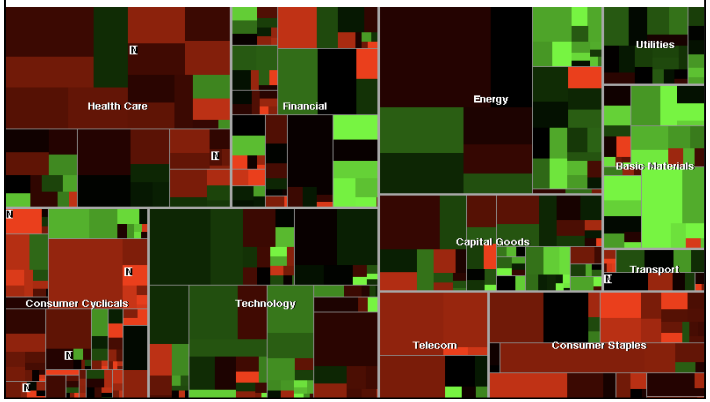
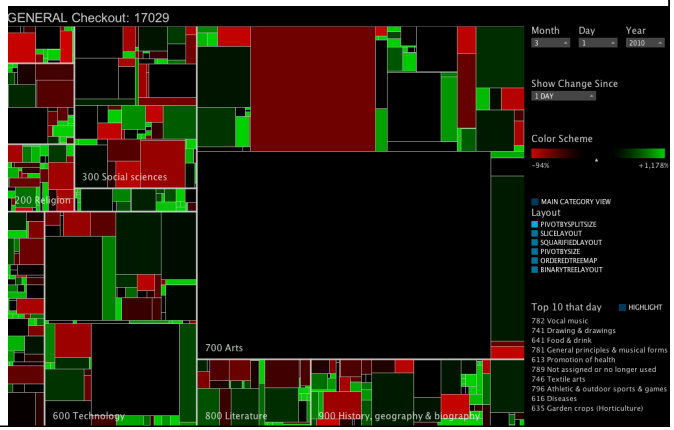


Fig. 5.13. *Mosaic Plots of all possibilities of "How you Heard about the Survey?" Gray-shading has been used to mark cell sizes. Empty cells are combined where possible and tagged by a circle. 112 of the possible 512 combinations are empty.*

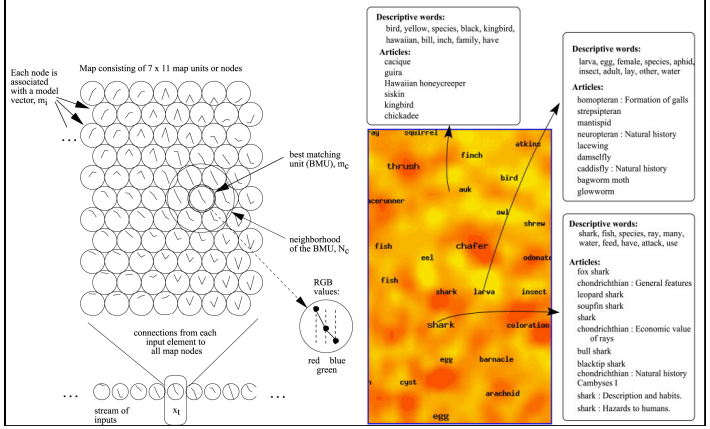
TreeMap: SmartMoney (Schneiderman/Wattenberg)



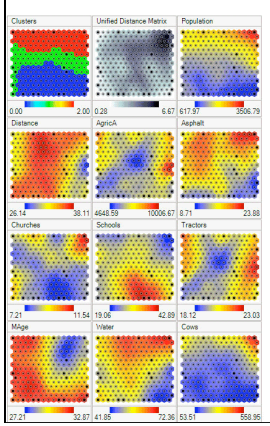
Yun Teng Treemap [link]

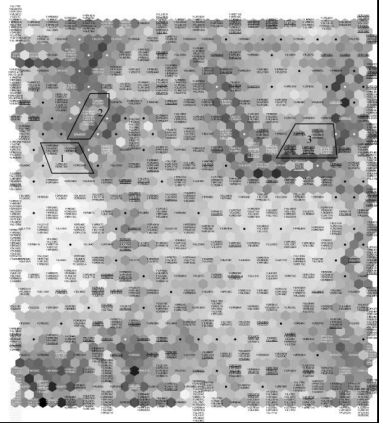


Kohonen Self-Organizing Map Algorithm

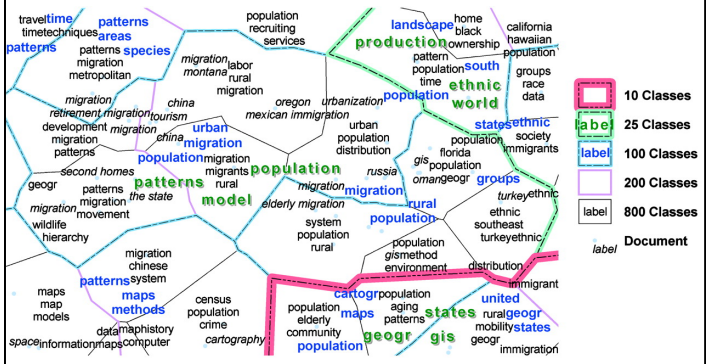


SOM Unified-Distance Matrix [link]



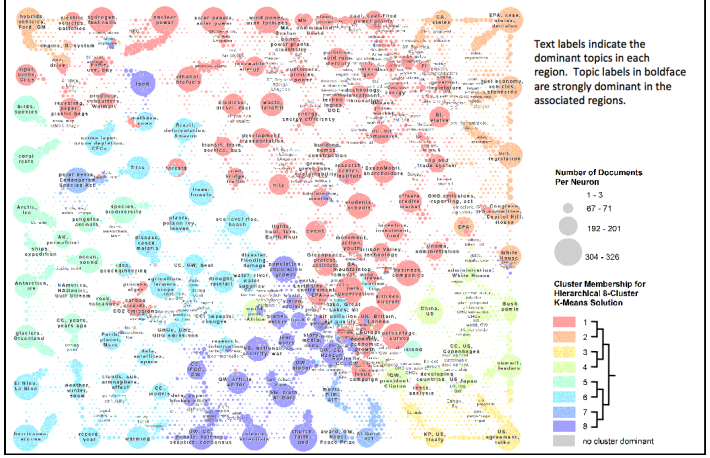


Visualizing knowledge domain spatially using Kohonen (Skupin)

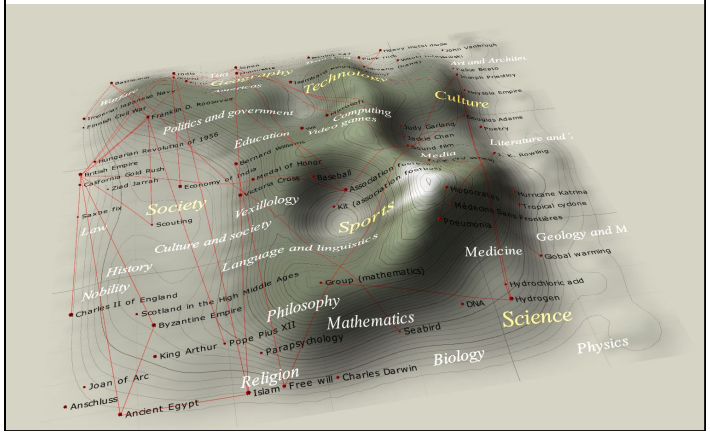


Self-Organizing Map with Hierarchical K-Means Clustering for Minimum Error Classification Outputs

This SOM is a representation of document relatedness and topic dominance. Circle sizes represent the number of documents contained with in a neuron, and in general, closer circles are more thematically related than more distant circles. Circle colors correspond to hierarchical K-means cluster membership and provide information about cases in which the neighborhood-relatedness metaphor breaks down.



SOM in 3D



Kohonen Maps & Spatial Metaphor

Stacy Hespanha

Mike Godwin

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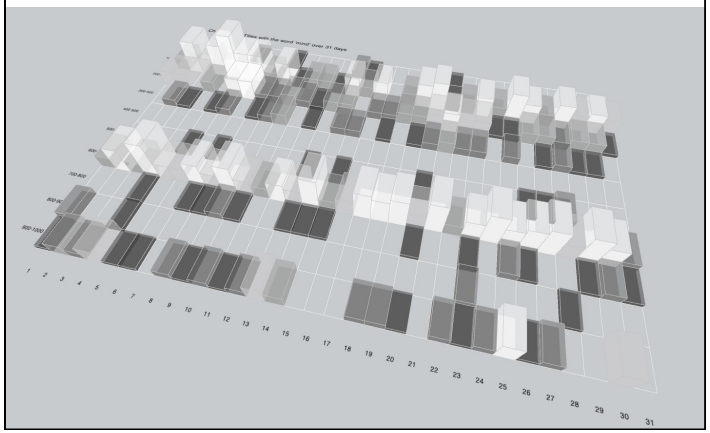
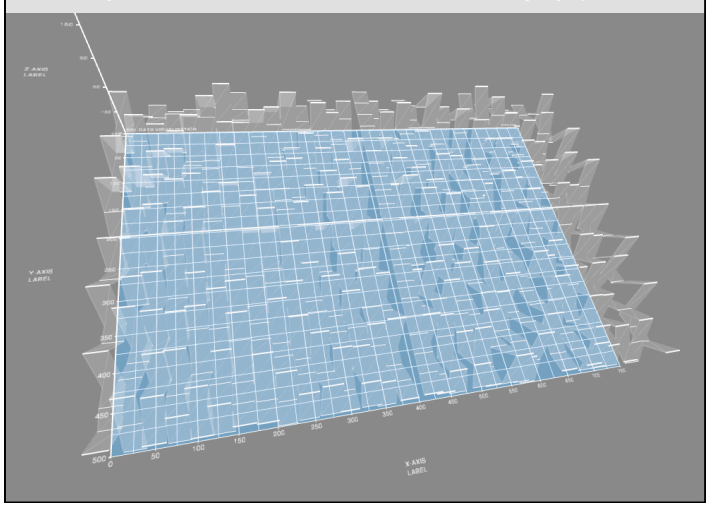
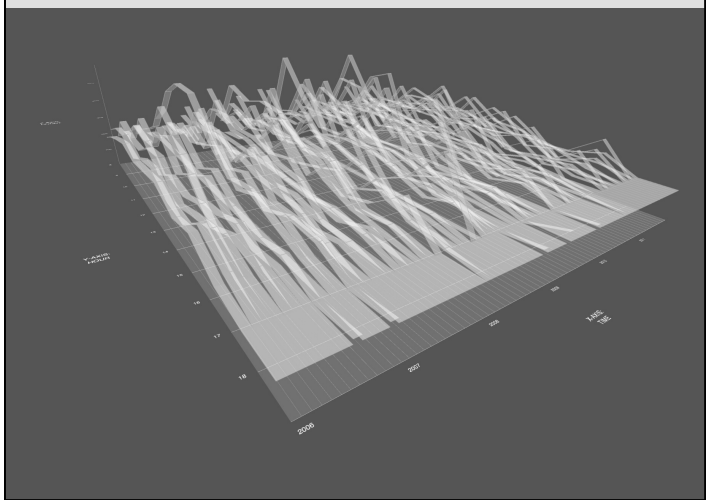
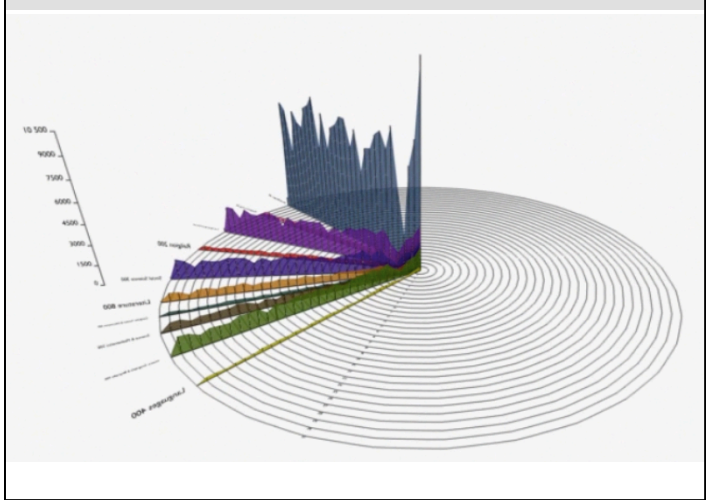
Andre Skupin

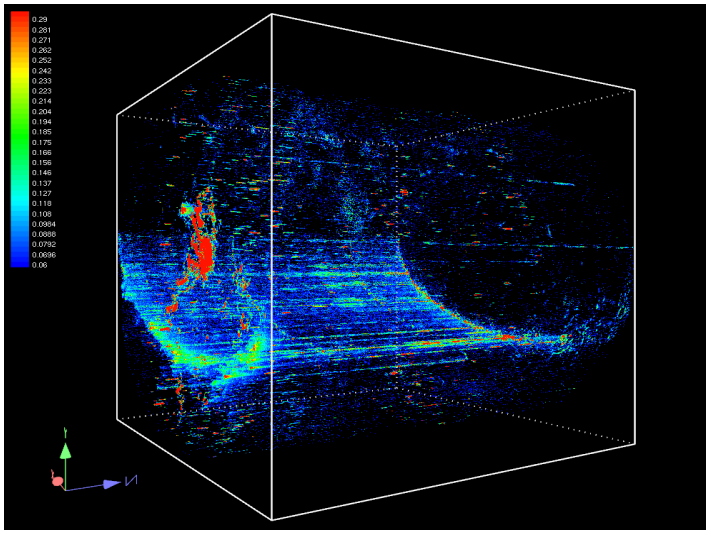
3D Visualization / Change Over Time-Space







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0.281
0.271
0.262
0.252
0.242
0.233
0.223
0.214
0.204
0.194
0.185
0.175
0.166
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0.137
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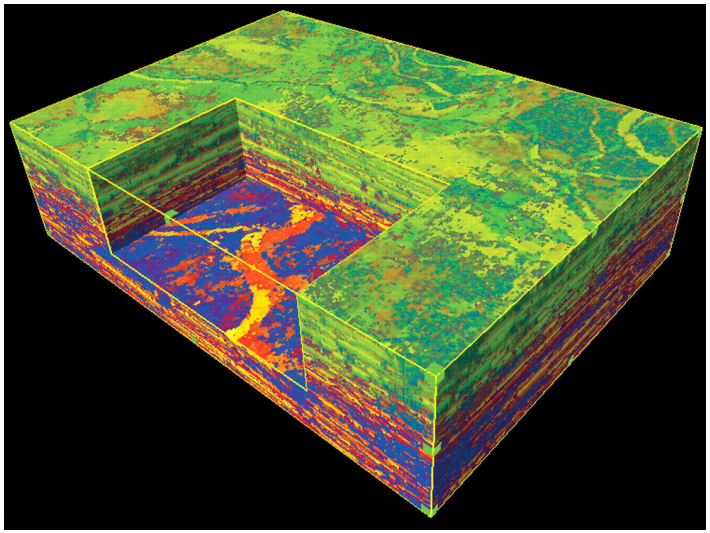
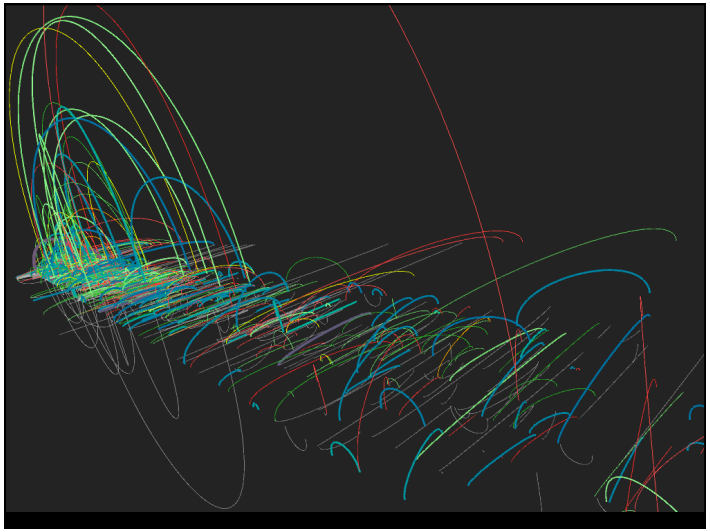
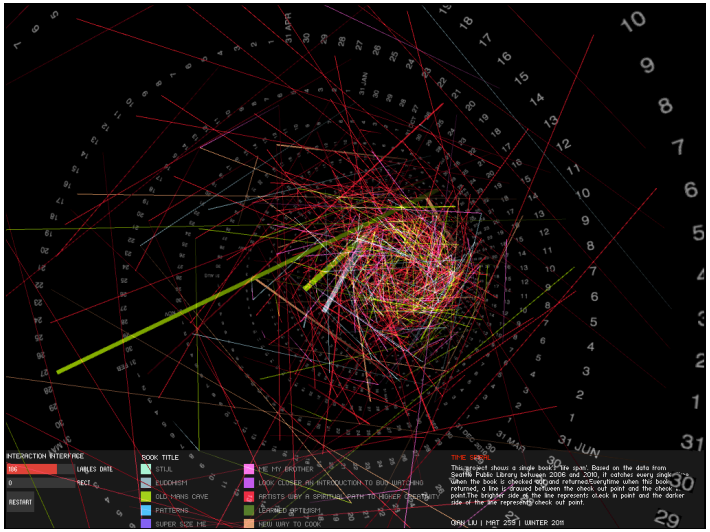
0.06






INTERACTION INTERFACE
BOOK TITLE
STILL
ELDORHEIM
OLD MANS CAVE
PATTERNS
SUPER SIZE ME
ME MY BROTHER
LOOK CLOSER AN INTRODUCTION TO BIRD WATCHING
ARTISTS GUIDE A SPIRITUAL PATH TO HIGHER CREATIVITY
LEARNED OPTIMISM
NEW WAY TO COOK
31 JUN

3D Frequency Pattern Algorithm