Lecture 5 Notes March 25, 2019

Warmup Activity
https://xkcd.com/980/huge
Chart of distribution of Money using fixed size blocks (color coded) for comparison reasons.
Methods: Data obtained from multiple sources. The author has also provided an excel file with list of all the links form where the data was obtained
Strengths: Stores a lot of information about Money distribution is a well-organized way. Hierarchical representation and categorizing into Dollar, Millions, Billions, etc.
Weaknesses: Difficult to view finer details. Using dark and light shades of same color for some blocks leads to ambuiguity.

Networked and Heirarchical Data
Mainly represented through: Node link diagrams and Matrix views

Node Link Diagrams
Nodes/Vertex represent data objects and links can be relationships
Tree and Force-Directed graphs are two primary ways to draw node link diagrams.
Additional information and more dimensions can be represented using color of links, size of nodes, etc.
If the number of nodes and links are large, then node-link diagrams can look like a 'hairball' which can make it unreadable.
Edges and links can have weights to them and can also be directed.
Node link diagram example shown in class shows how some genes linked to breast cancer are linked with other.
Tree diagrams are a great way to show hierarchy.

Force-Directed Graphs
To cure the hairball issue and make a node link graph more readable and well organized, the nodes and edges can be assigned a force value (which makes it a force directed graph) so that they push away from each other, although this makes the diagram non-deterministic as the diagram may look different each time it is rendered. Force-Directed graphs used for finding path distance, adjacent nodes or unconnected nodes.

Matrix Diagrams
Adjacency matrix cures hairball issues. Good when the graph has good connectivity otherwise leads to wastage of space. Difficult to identify clusters.
If the graph edges are undirected then the adjacency matrix can also be cut in half along the diagonal as they data is always a mirror image along the diagonal.

Hierarchical Data
Containment Diagrams like treemaps also serve well for representing hierarchical data. Each block gets divided into further blocks based on topology. Good utilization of space.

Combining different types of networked visualization can help to create visualization which takes advantage of good aspects of each type to represent the networked data. For example, Nested circles can be used along with nodes and links.