

Visualization Type Definitions

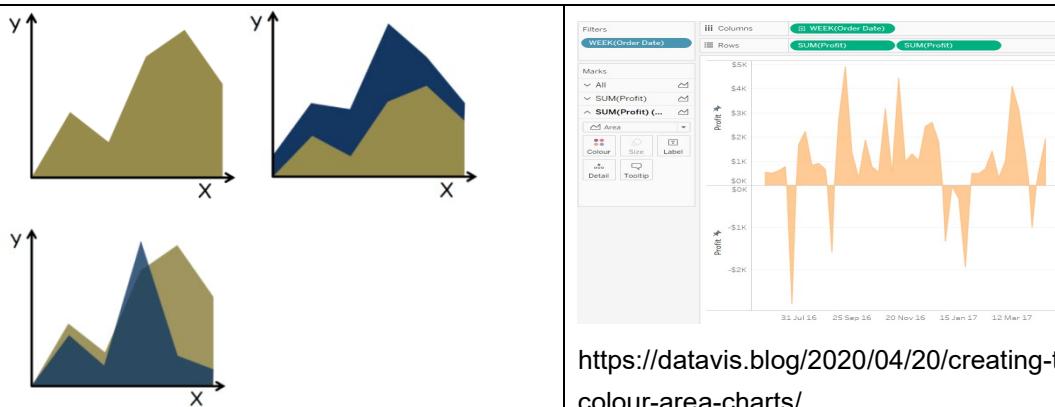
Index of Visualization Types:

Area Chart	Proportional Area Chart	Line Chart	Radar Chart	Parallel Coordinates	Storyline	Contour Graph
Surface Graph	Vector Graph	Bar Chart	Scatter Plot	Donut Chart	Pie Chart	Box Plot
Error Bar	Stripe Graph	Flow Chart	Sankey Diagram	Chord Diagram	Venn Diagram	Graph
Tree	Hierarchical Edge Bundling	Treemap	Sunburst/Icicle Chart	Table	Map	Heatmap
Matrix	Word Cloud	Phrase Net	Word Tree	Glyph-based Visualizations	Unit Visualizations	

Definitions and Examples:

1. Area Chart ([back to top](#))

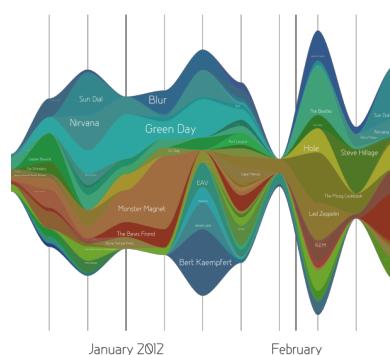
Area Chart is based on Line Chart utilizing the areas below the lines to represent data.



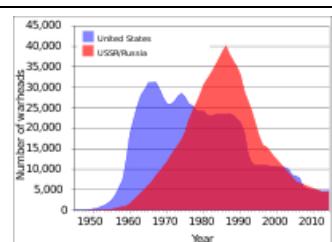
<https://datavis.blog/2020/04/20/creating-two-colour-area-charts/>



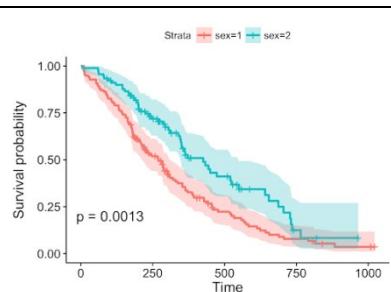
<http://www.excel-2010.com/excel-area-chart/>



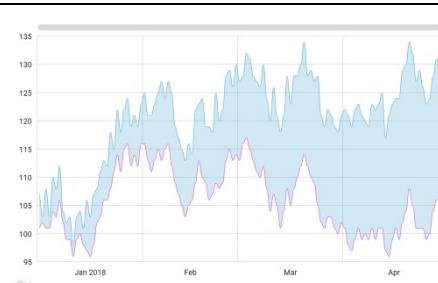
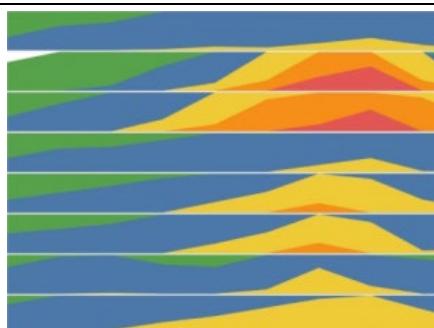
<https://infogram.com/blog/3-easy-tips-for-crafting-the-perfect-area-chart/>



https://en.wikipedia.org/wiki/Area_chart

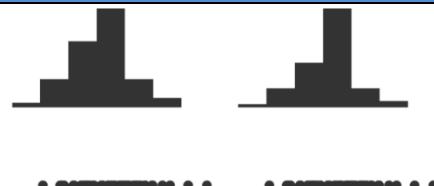


<http://www.sthda.com/english/wiki/survminer-r-package-survival-data-analysis-and-visualization>



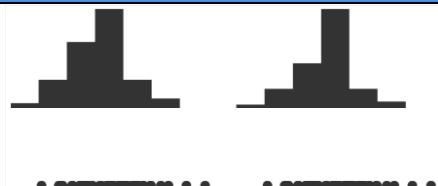
<https://www.amcharts.com/demos/range-area-chart/>

Annotation Examples



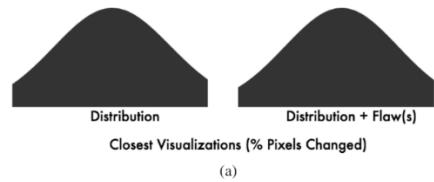
Closest Visualizations (% Pixels Changed)

(a)



Closest Visualizations (% Pixels Changed)

(a)

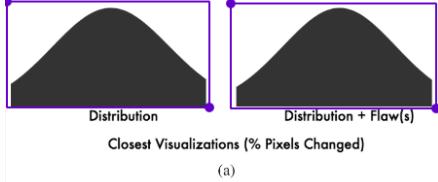


Distribution

Distribution + Flaw(s)

Closest Visualizations (% Pixels Changed)

(a)

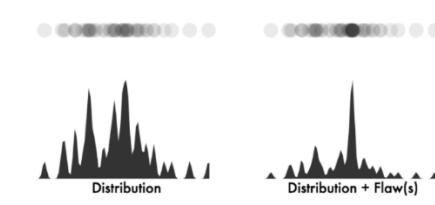


Distribution

Distribution + Flaw(s)

Closest Visualizations (% Pixels Changed)

(a)



Furthest Visualizations (% Pixels Changed)

(b)

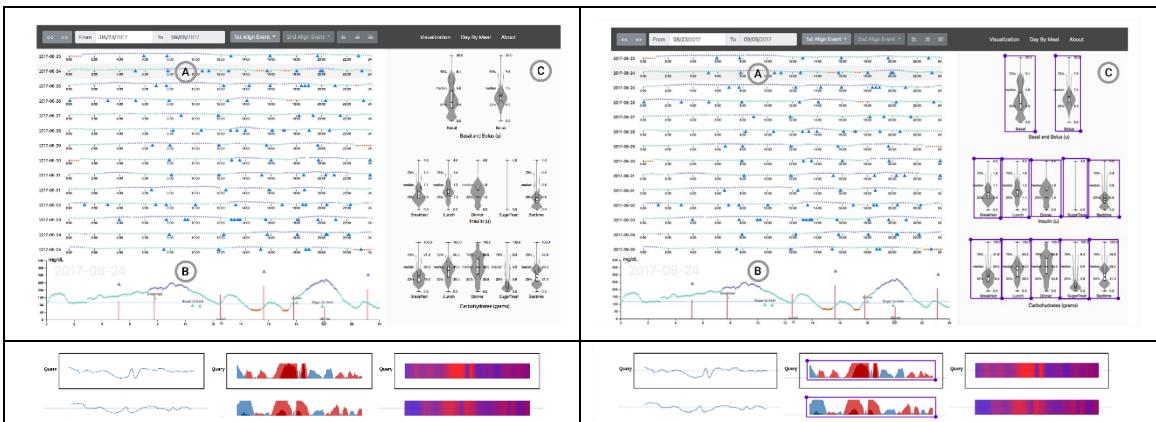


Distribution

Distribution + Flaw(s)

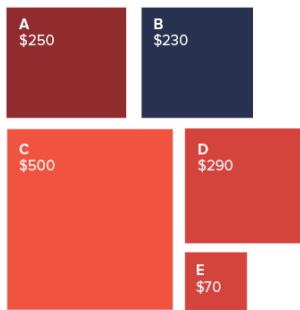
Furthest Visualizations (% Pixels Changed)

(b)

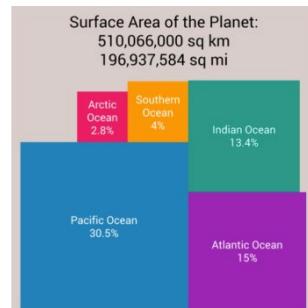


2. Proportional Area Chart ([back to top](#))

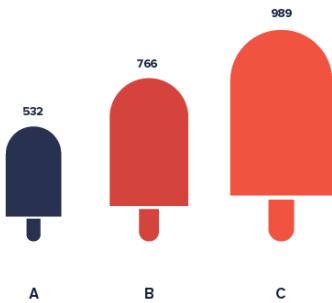
Different from Area Chart, Proportional Area Chart uses blocks to represent different entities. The area of each block corresponds to the relative size of data in order to compare proportions of different entities.



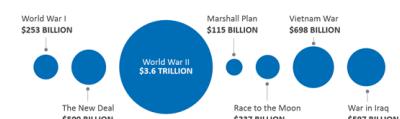
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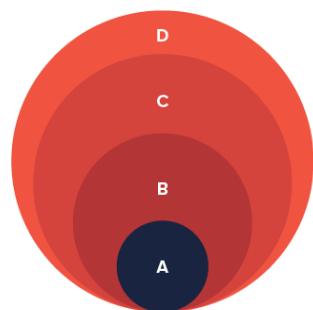
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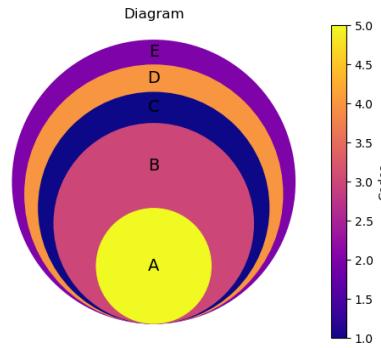
<https://datavizproject.com/data-type/proportional-area-chart-icon/>



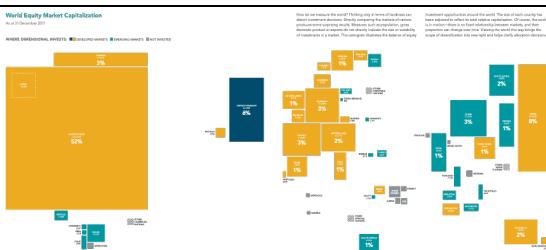
<https://markido.com/help/516/create-a-proportional-area-chart-in-engage>



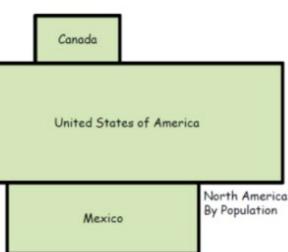
<https://stackoverflow.com/questions/59266060/how-to-do-a-nested-proportional-area-chart-circles>



<https://stackoverflow.com/questions/59266060/how-to-do-a-nested-proportional-area-chart-circles>



<https://chatfieldprivateclient.com/the-world-map/>



Annotation Examples

CrossQuad Charts

Aim: Provide a visual representation of a 2 by 2 contingency table (also known as a crossstab) allowing an immediate judgment to be made of relative magnitudes. Additionally, it should allow easy comparison between charts for detecting systematic associations and differences within and between charts.

Description

Consider for example, the following table:

	col 1	col 2
row 1	10	8
row 2	4	2

which we can represent with the following crossQuad chart:



Note how valid comparisons can be made across both columns and rows whilst relative areas remain proportional to magnitude. The use of numerical annotation of each quad allows absolute as well as relative judgements of magnitude to be made.

CrossQuad Charts

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Description

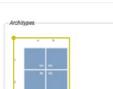
Consider for example, the following table:

	col 1	col 2
row 1	16	8
row 2	4	2

which we can represent with the following crossQuad chart:



Note how valid comparisons can be made across both columns and rows whilst relative areas remain proportional to magnitude. The use of numerical annotation of each quad allows absolute as well as relative judgements of magnitude to be made.

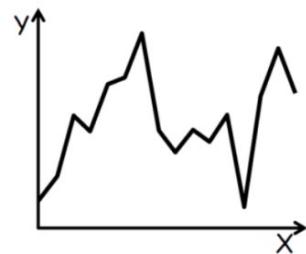


Limits:

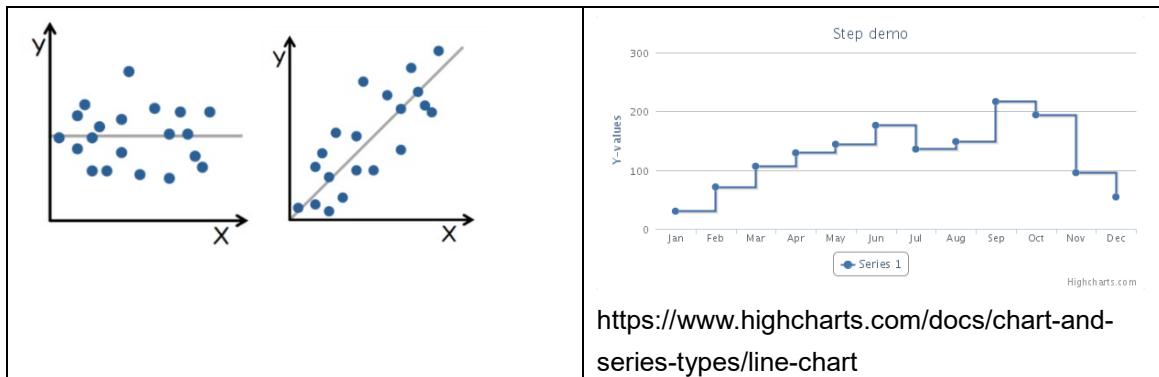
- Does not adapt well to contingency tables of more than 2x2 states.
- Some 2d to 1d mental transformation is still required when comparing two items in a bar chart rather than judge these like bars in a bar chart rather than perform a mental squaring of length differences (e.g. '4' in the example above may be incorrectly interpreted as half the magnitude of '16').
- Data needs to be integer (only numbers in each quadrant being

3. Line Chart ([back to top](#))

A Line Chart uses points connected by line segments from left to right to display changes in value.

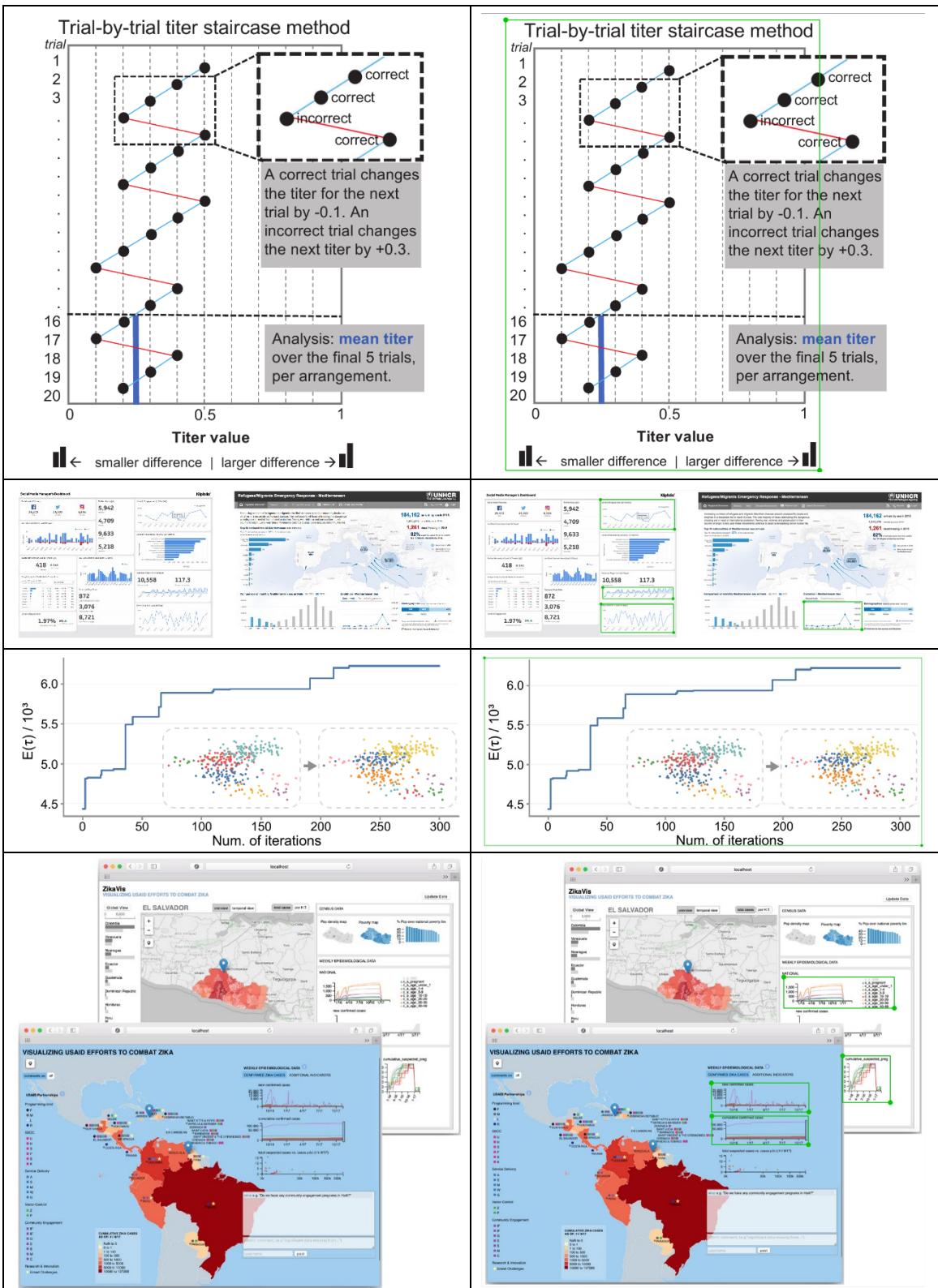


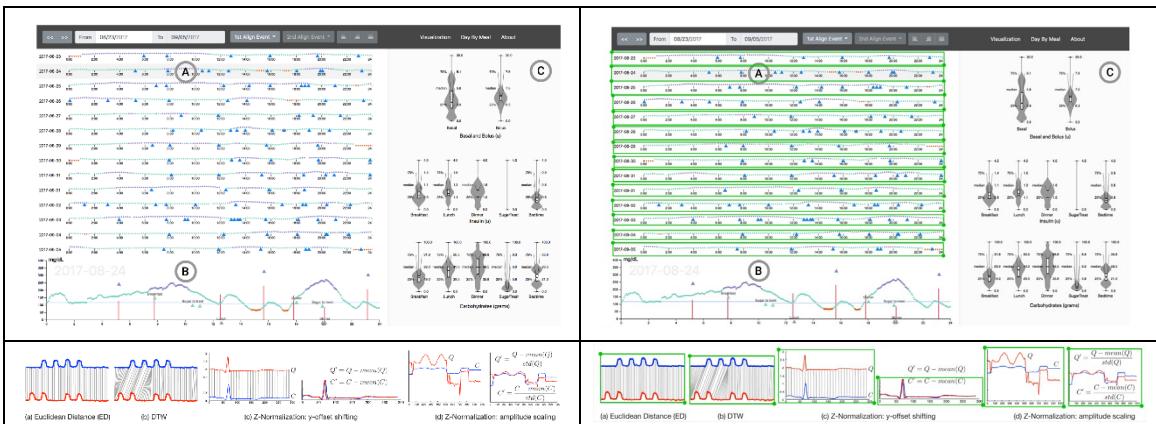
<https://www.excel-easy.com/examples/line-chart.html>



Annotation Examples

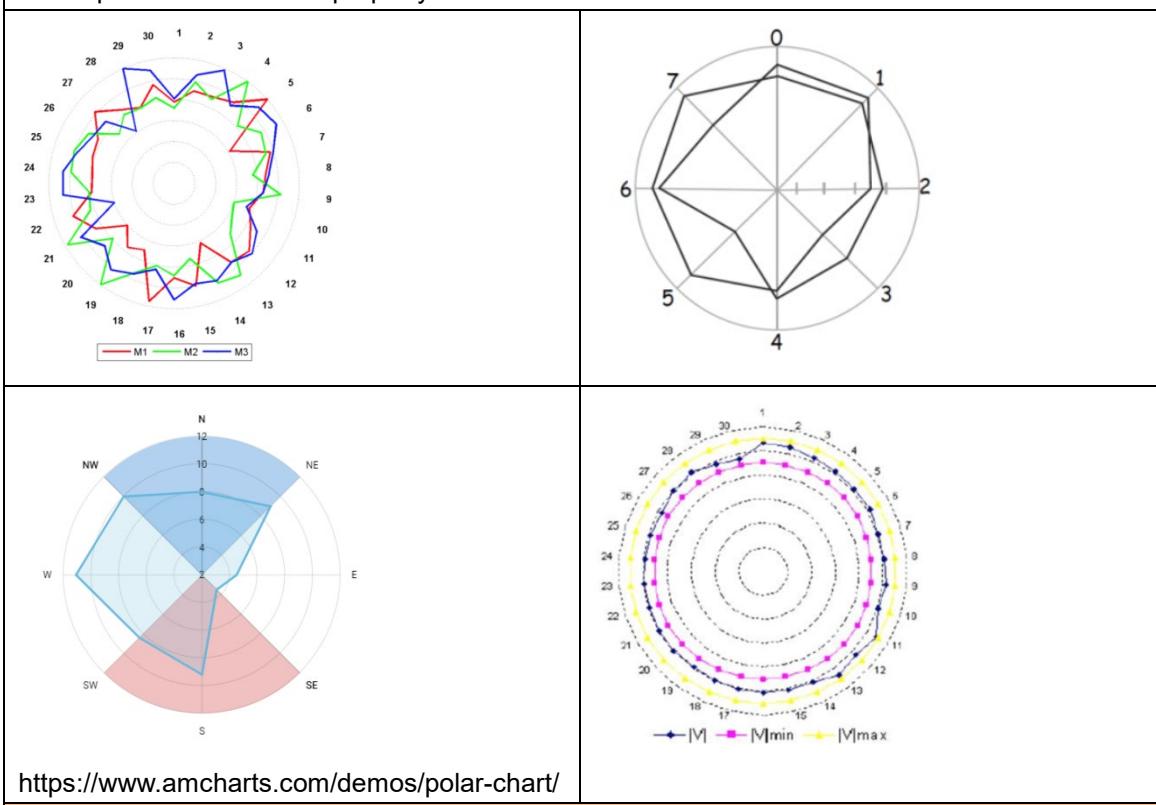
<p>(a) Data Points (b) Color Points (c) Color Points & Line Gradients (d) Constant Error Bars (e) Disconnected Lines (f) Unified Points & Line Gradients (g) Unified Points & Line Gradients</p>	<p>(a) Data Points (b) Color Points (c) Color Points & Line Gradients (d) Constant Error Bars (e) Disconnected Lines (f) Unified Points & Line Gradients (g) Unified Points & Line Gradients</p>
<p>The evaluator The autonomist DE amplitude time paper prototype user testing / evaluation user feedback Continuous development, implicit exposition</p> <p>The didacticist shared design narrative Capture phase Argumentation phase Evaluation phase</p>	<p>The evaluator The autonomist DE amplitude time paper prototype user testing / evaluation user feedback Continuous development, implicit exposition</p> <p>The didacticist shared design narrative Capture phase Argumentation phase Evaluation phase</p>
<p>Design Exposition Magnitude Design Exposition frequency</p>	<p>Design Exposition Magnitude Design Exposition frequency</p>
<p>What have you made these visual mark design choices? • Provide me with any data series per hour during the day to make a radar chart. • Provide me with any data series per hour during the day to make a scatter plot. • Provide me with any data series per hour during the day to make a line chart. • Provide me with any data series per hour during the day to make a bar chart. • Provide me with any data series per hour during the day to make a pie chart. • Provide me with any data series per hour during the day to make a heatmap. • Provide me with any data series per hour during the day to make a bubble chart. • Provide me with any data series per hour during the day to make a scatter plot. • Provide me with any data series per hour during the day to make a line chart. • Provide me with any data series per hour during the day to make a bar chart. • Provide me with any data series per hour during the day to make a pie chart. • Provide me with any data series per hour during the day to make a heatmap. • Provide me with any data series per hour during the day to make a bubble chart.</p>	<p>What have you made these visual mark design choices? • Provide me with any data series per hour during the day to make a radar chart. • Provide me with any data series per hour during the day to make a scatter plot. • Provide me with any data series per hour during the day to make a line chart. • Provide me with any data series per hour during the day to make a bar chart. • Provide me with any data series per hour during the day to make a pie chart. • Provide me with any data series per hour during the day to make a heatmap. • Provide me with any data series per hour during the day to make a bubble chart. • Provide me with any data series per hour during the day to make a scatter plot. • Provide me with any data series per hour during the day to make a line chart. • Provide me with any data series per hour during the day to make a bar chart. • Provide me with any data series per hour during the day to make a pie chart. • Provide me with any data series per hour during the day to make a heatmap. • Provide me with any data series per hour during the day to make a bubble chart.</p>





4. Radar chart ([back to top](#))

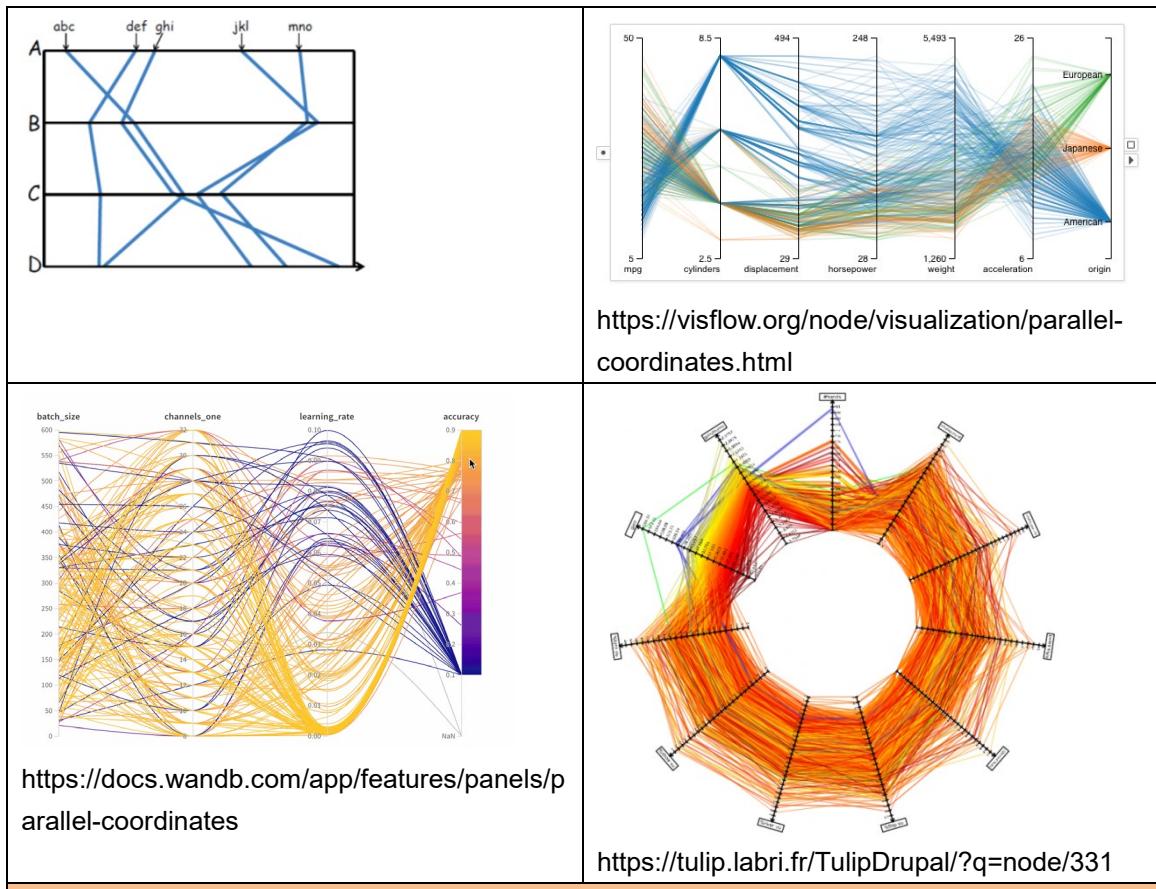
A Radar Chart represents data along radial and angular axes. In polar coordinates, each radial axis represents a different property.



<https://www.amcharts.com/demos/polar-chart/>

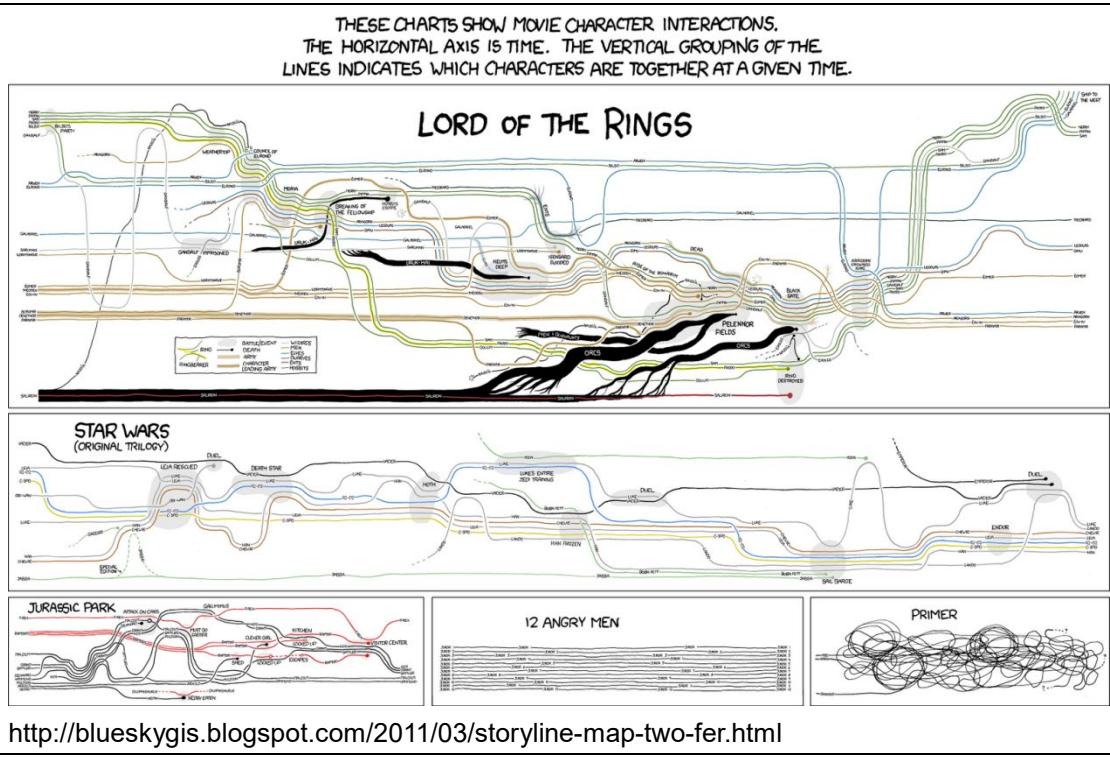
5. Parallel Coordinates ([back to top](#))

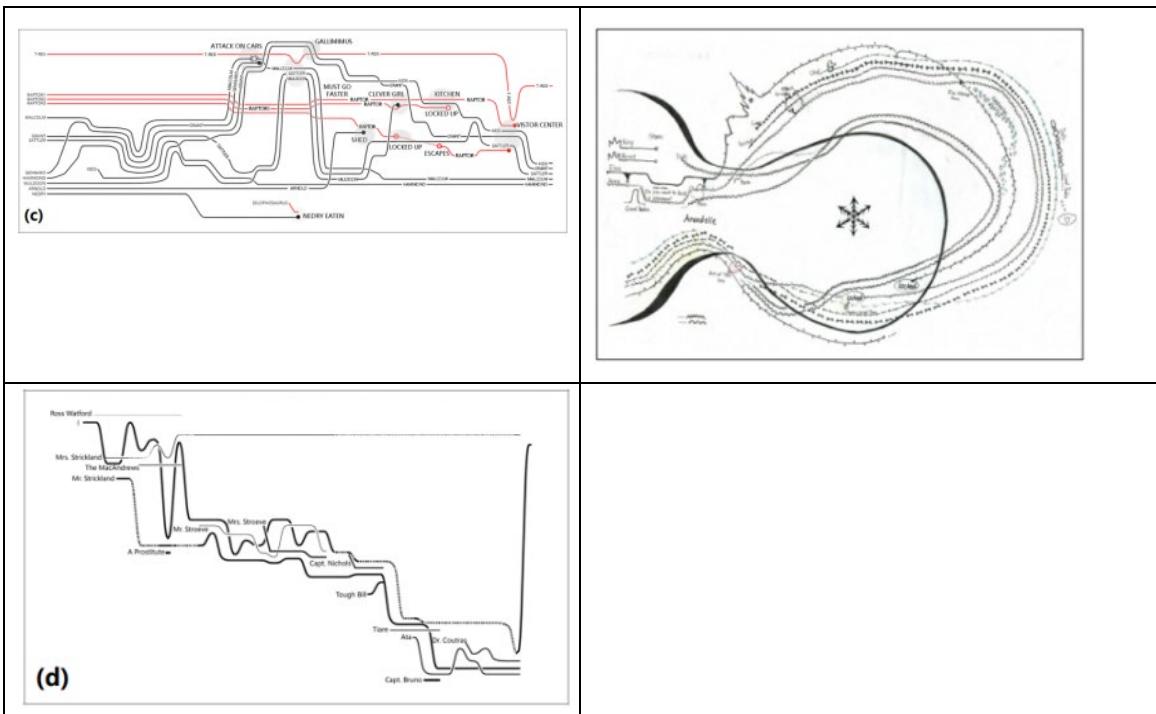
Parallel coordinates are a common way of visualizing and analyzing high-dimensional datasets. To show a set of points in an n-dimensional space, a backdrop is drawn consisting of n parallel lines, typically vertical and equally spaced. A point in n-dimensional space is represented as a polyline with vertices on the parallel axes; the position of the vertex on the i-th axis corresponds to the i-th coordinate of the point.



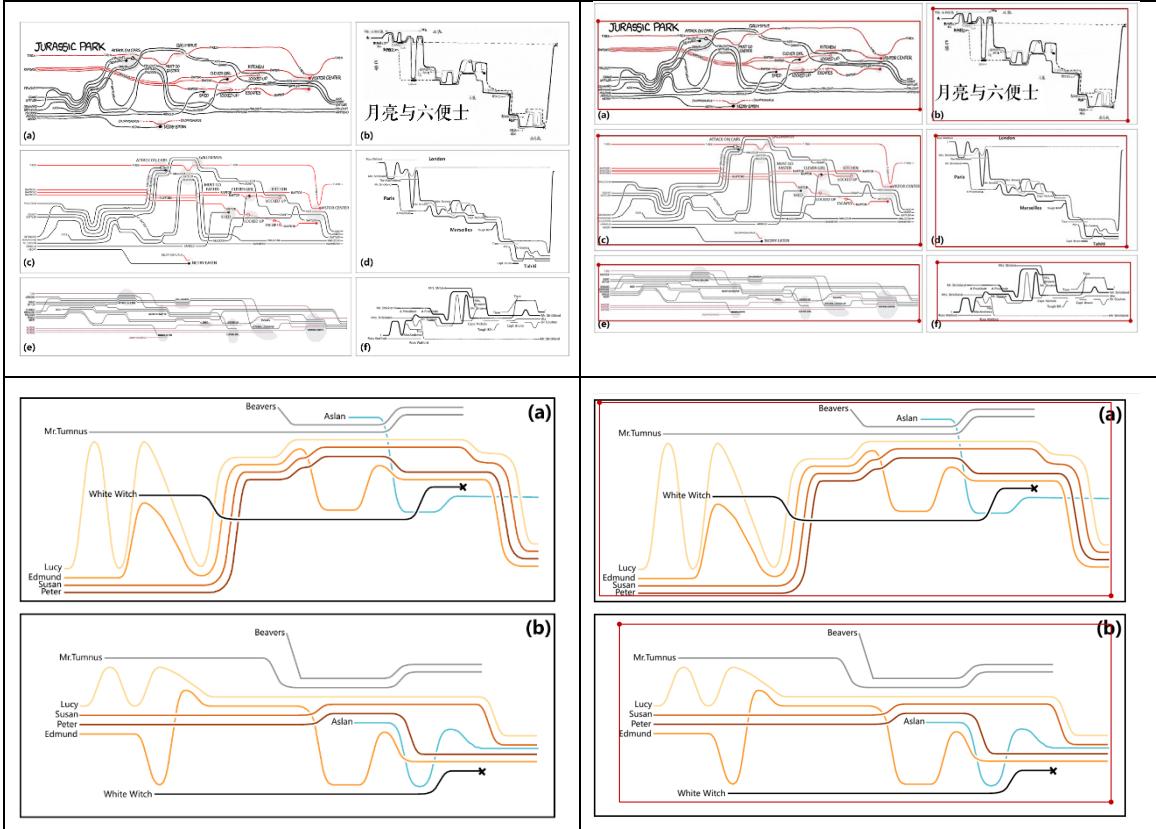
6. Storyline ([back to top](#))

Storyline is a commonly used narrative technique. Storyline usually uses a set of lines (parallel or non-parallel) to represent the relationship between each character in a story. The closer the relationship between two characters, the closer the distance between the lines.



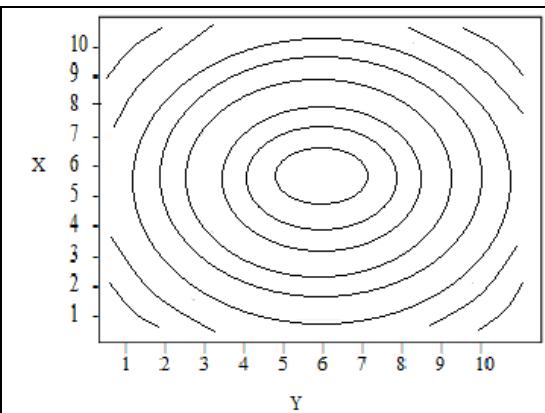


Annotation Examples

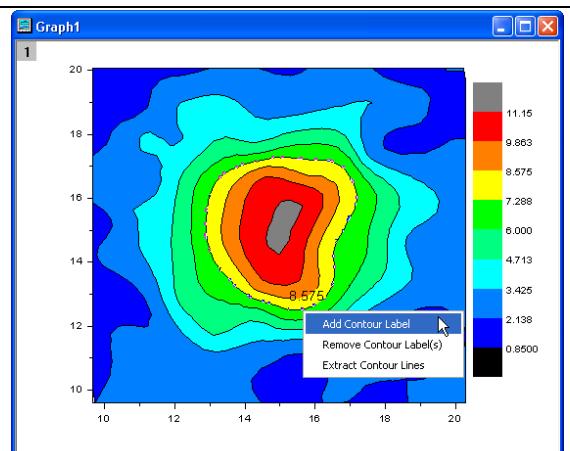


7. Contour Plot ([back to top](#))

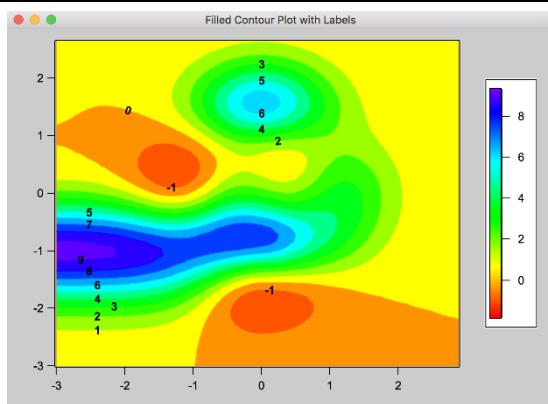
Contour plots (sometimes called Level Plots) are a way to show a three-dimensional surface on a two-dimensional plane.



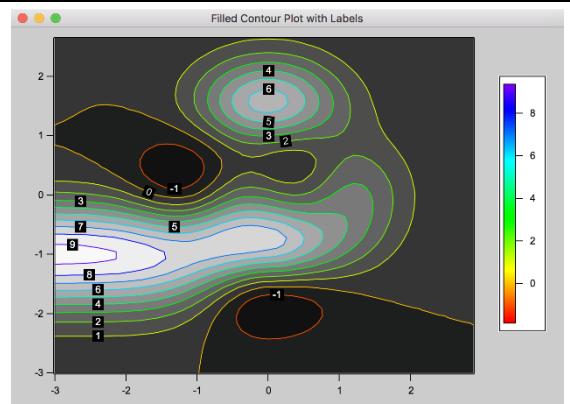
<https://www.statisticshowto.com/contour-plots/>



<https://www.originlab.com/doc/Origin-Help/Create-Contour-Graph>



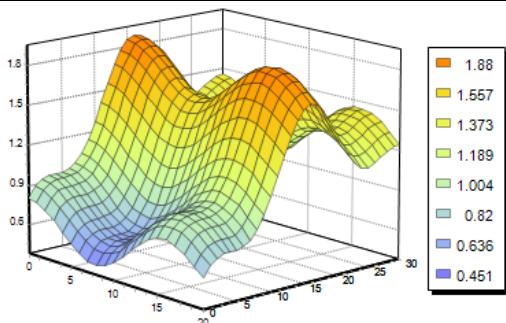
<https://www.wavemetrics.com/products/igorpro/creatinggraphs/2dgraphs/contourgraphs>



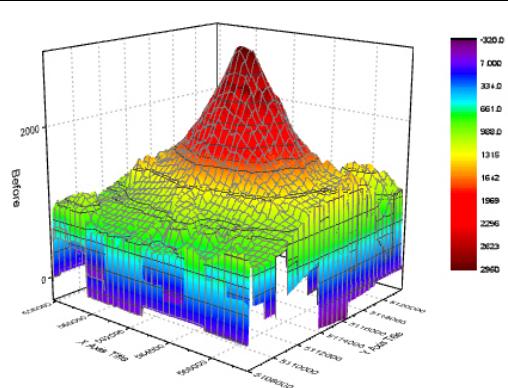
<https://www.wavemetrics.com/products/igorpro/creatinggraphs/2dgraphs/contourgraphs>

8. Surface Plot ([back to top](#))

The Surface graph or series is used to represent a set of three-dimensional data as a mesh surface.



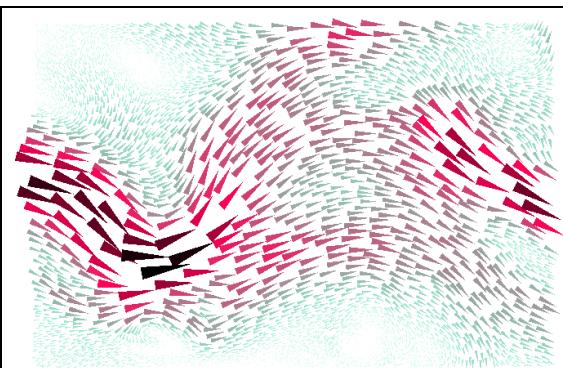
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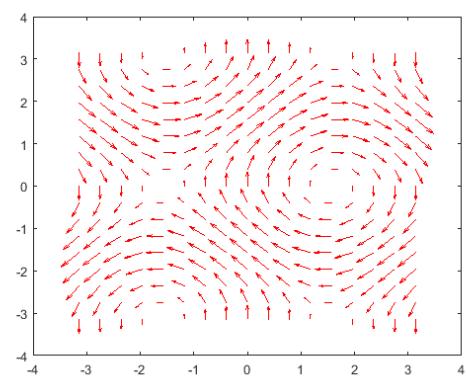
<https://www.originlab.com/doc/Tutorials/3D-Stack-Surface>

9. Vector Plot ([back to top](#))

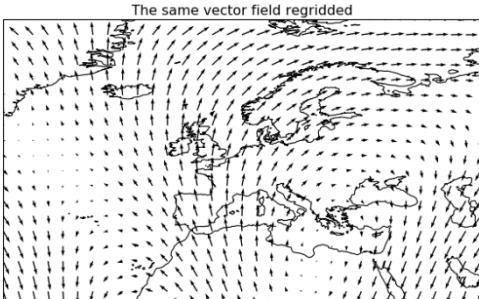
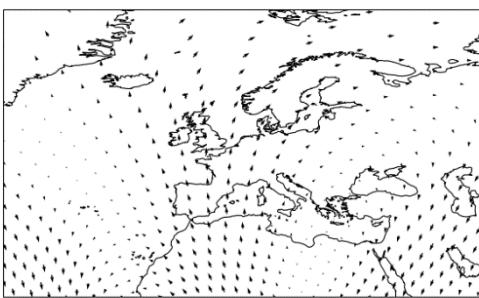
A vector plot is a type of cartesian chart where each point has an X and Y position, a length, and a direction. Vectors are drawn as arrows.



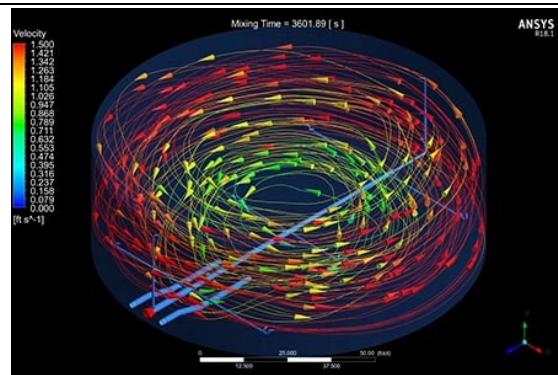
<https://www.mathworks.com/matlabcentral/fileexchange/62078-vector-plot>



<https://www.mathworks.com/help/matlab/ref/quiver.html>



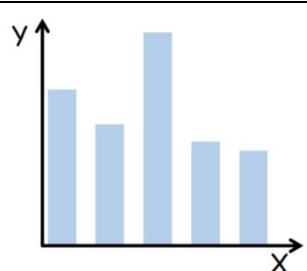
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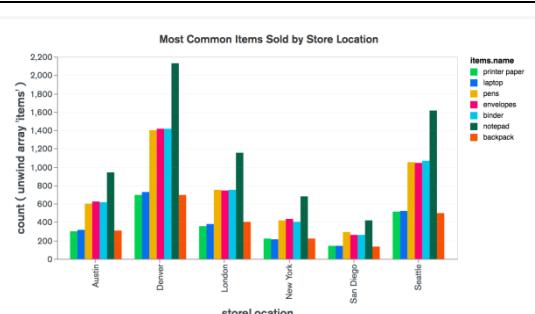
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10. Bar Chart ([back to top](#))

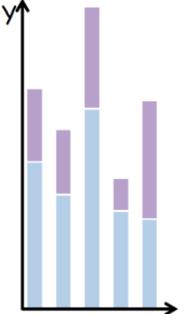
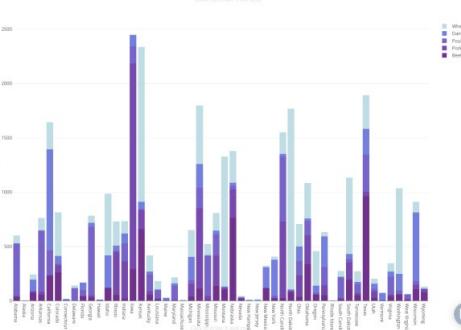
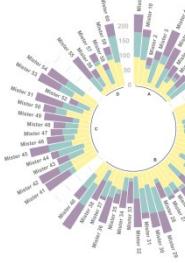
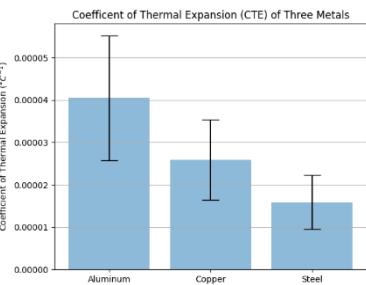
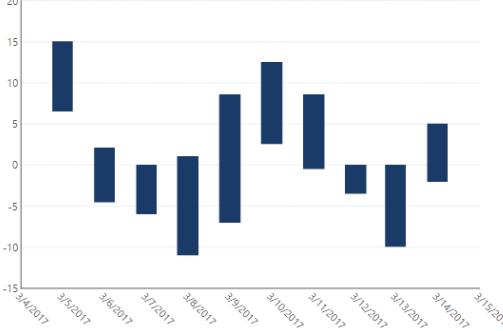
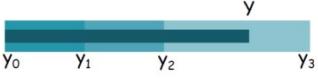
A bar Chart is a chart or graph that presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally.

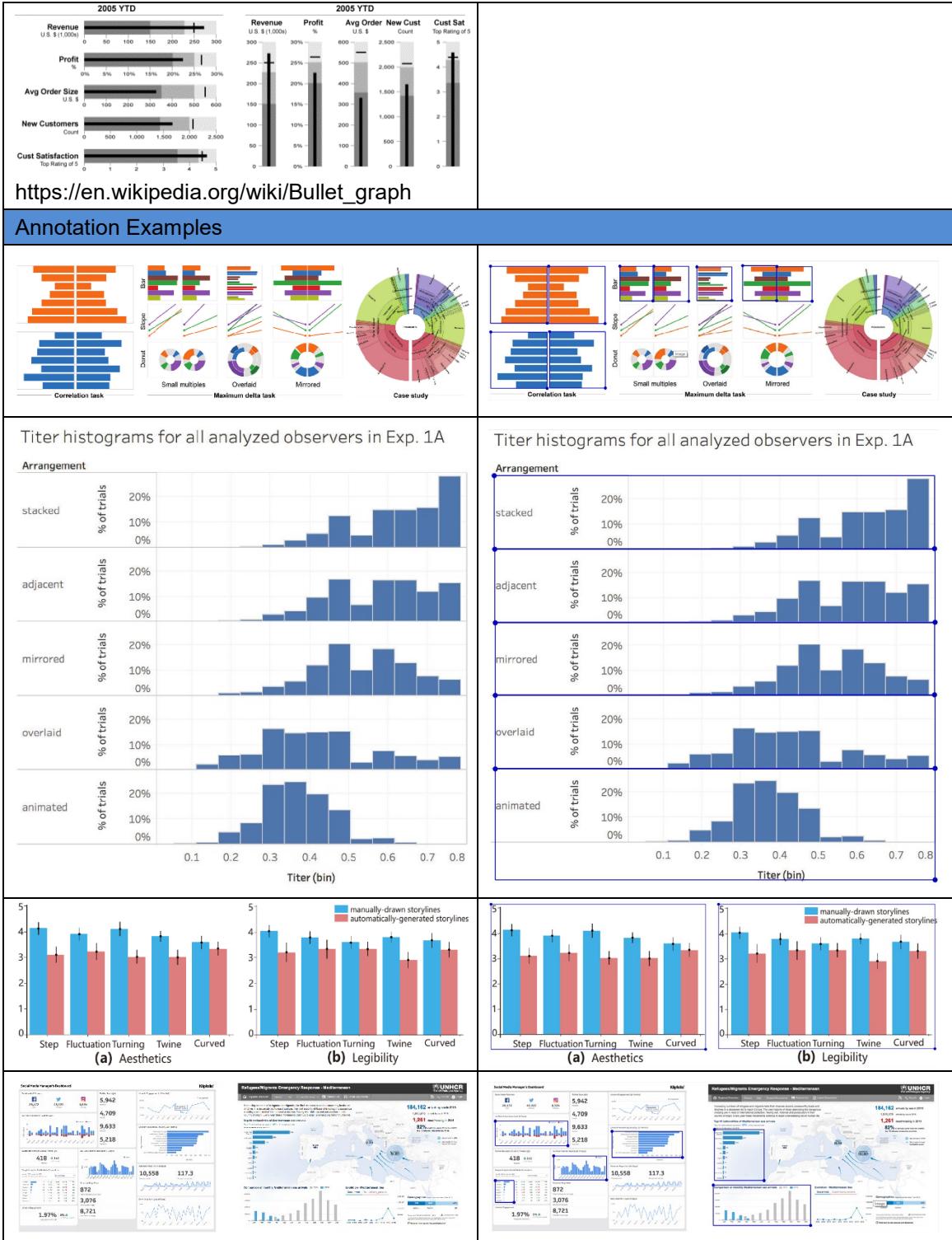


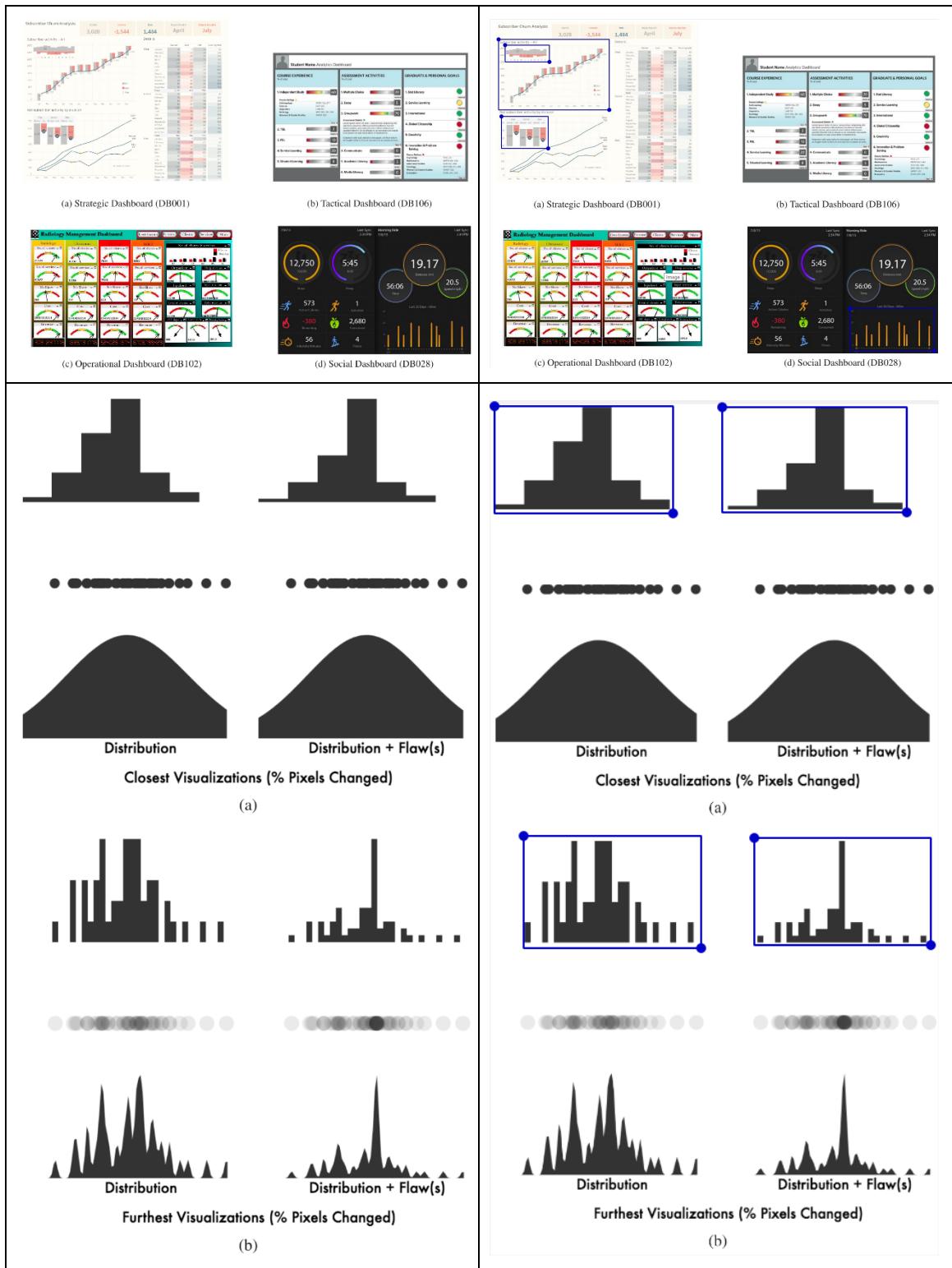
<https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130>

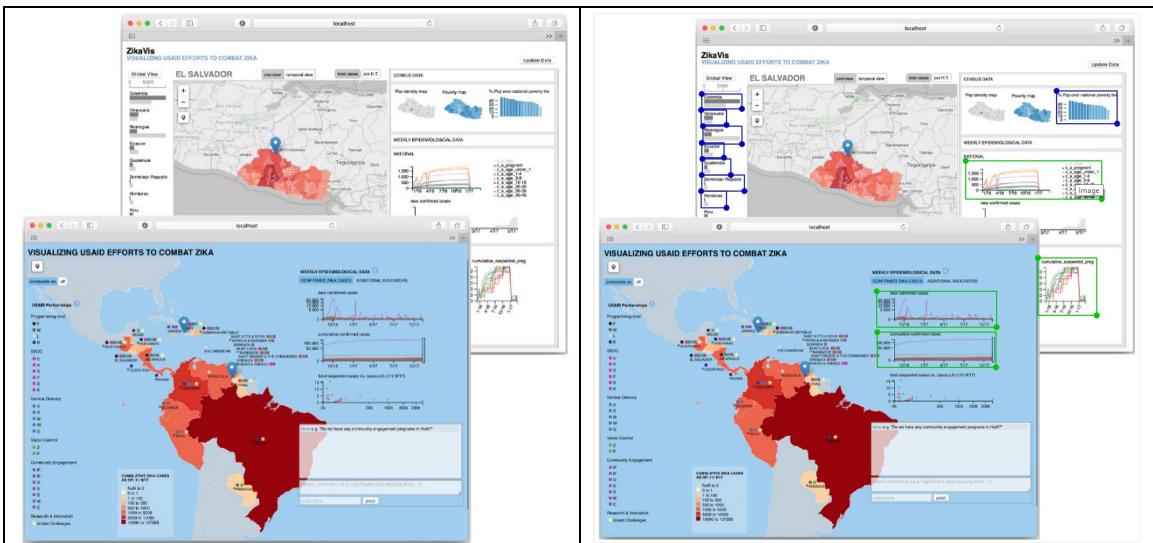


<https://docs.mongodb.com/charts/master/chart>

 <p>https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130</p>	<p>-type-reference/column-bar-chart/</p>  <p>https://plotly.com/chart-studio-help/stacked-bar-chart/</p>
 <p>https://www.r-graph-gallery.com/circular-barplot.html</p>	 <p>https://pythonforundergradengineers.com/python-matplotlib-error-bars.html</p>
 <p>https://www.dundas.com/support/learning/documentation/data-visualizations/how-to/using-a-range-bar-chart-and-visualizing-a-project-schedule-gantt-like-chart</p>	 <p>https://g2plot.antv.vision/en/examples/gallery</p>
 <p>https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130</p>	 <p>https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130</p>

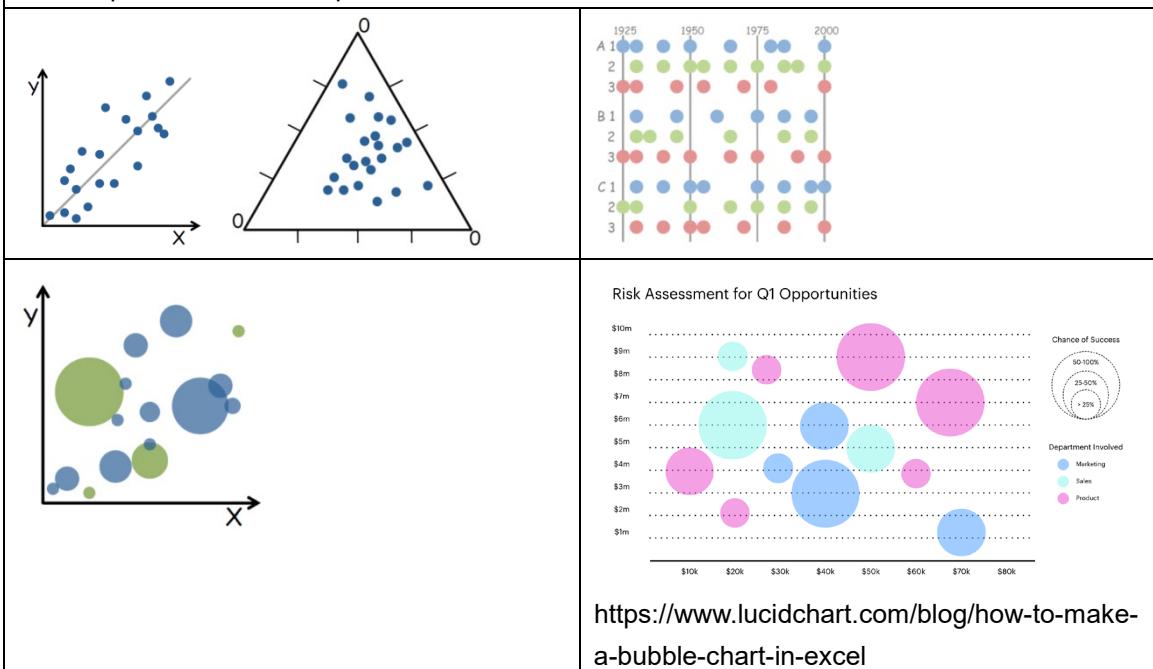




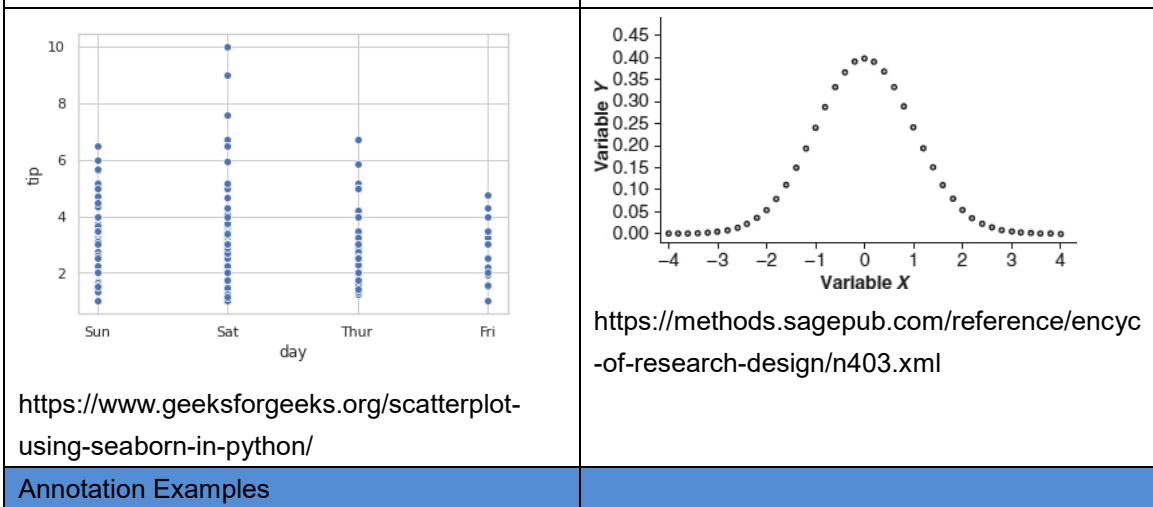


11. Scatter Plot ([back to top](#))

Scatter plot uses dots to represent values for two different numeric variables.



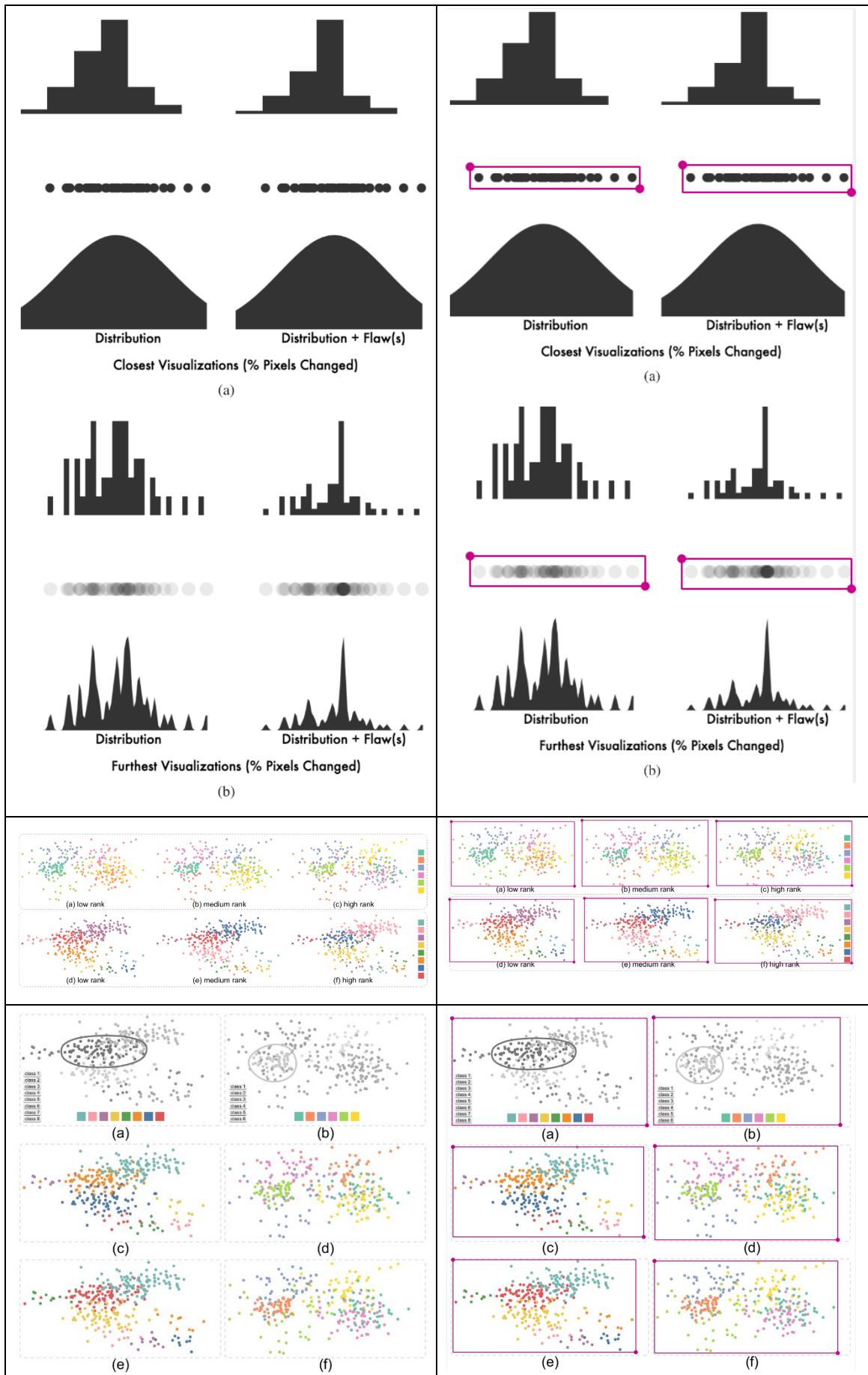
<https://www.lucidchart.com/blog/how-to-make-a-bubble-chart-in-excel>

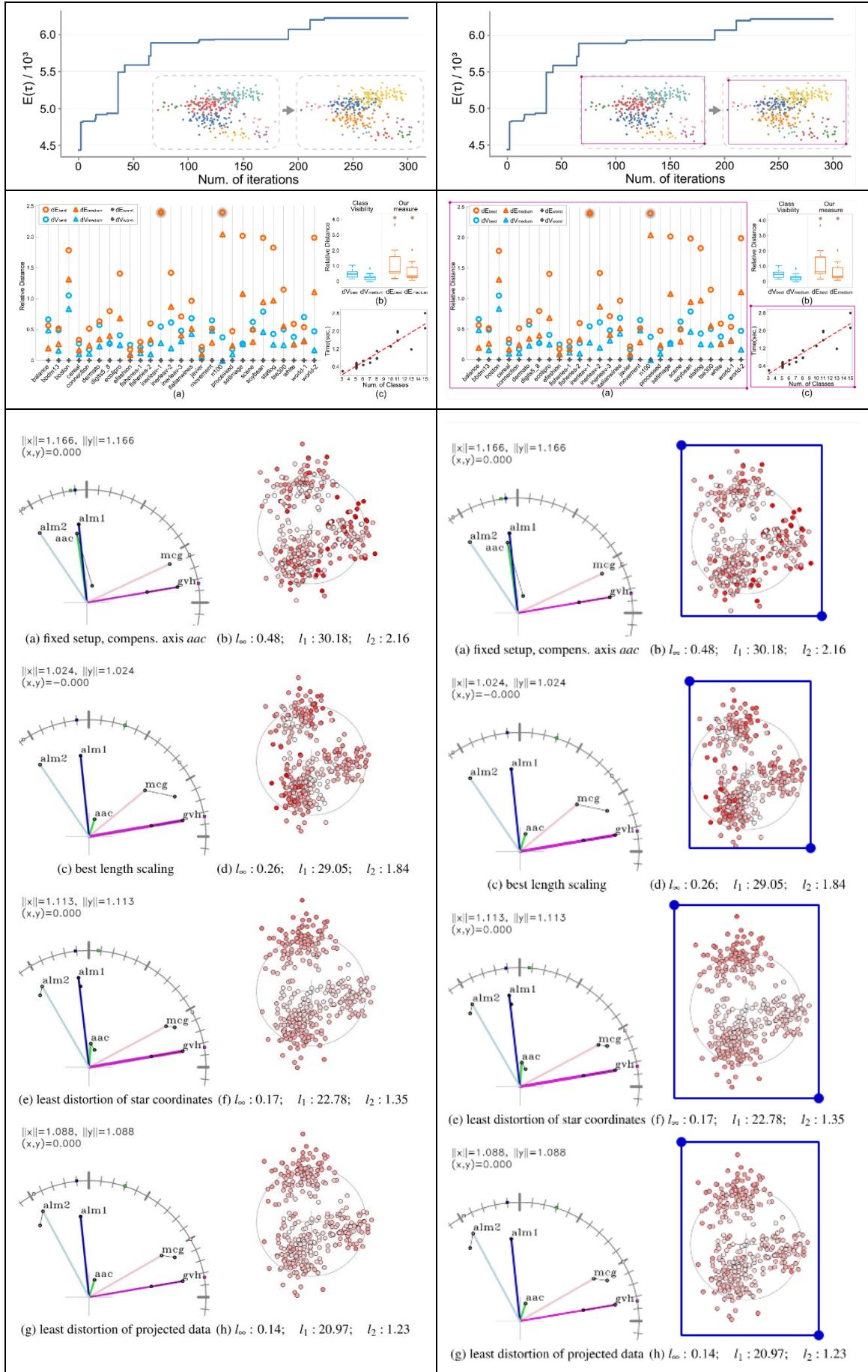


<https://www.geeksforgeeks.org/scatterplot-using-seaborn-in-python/>

<https://methods.sagepub.com/reference/encyc-of-research-design/n403.xml>

Annotation Examples





12. Donut Chart ([back to top](#))

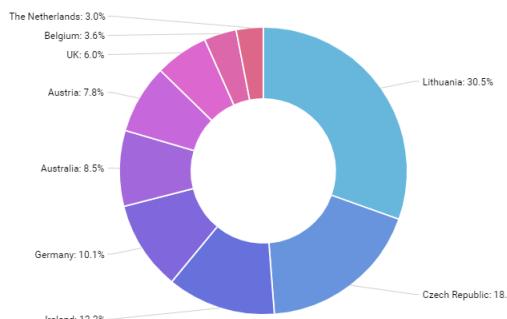
A Donut Chart is functionally identical to a pie chart, with the exception of a blank center and the ability to support multiple statistics at once. Donut Chart provides a better data intensity ratio to standard pie charts since the blank center can be used to display additional, related data.

Recessionary sentiment grew

Percent saying country is in a recession at the moment

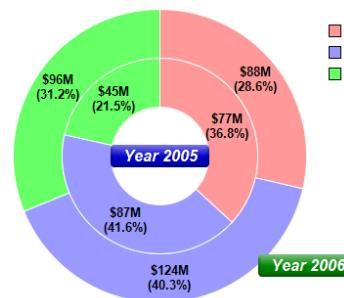


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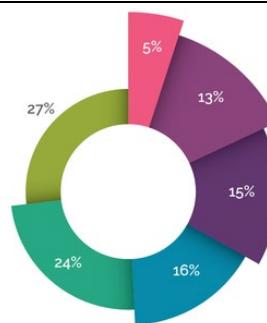


<https://www.amcharts.com/demos/donut-chart/>

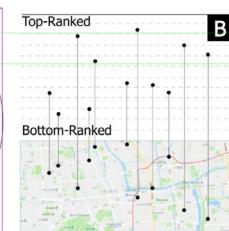
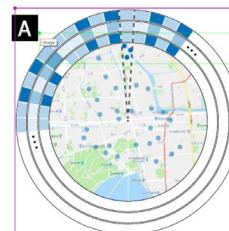
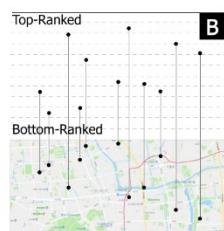
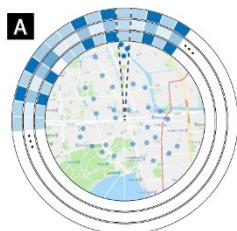
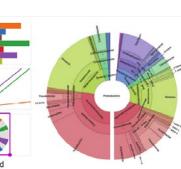
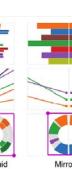
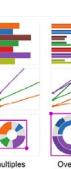
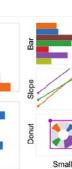
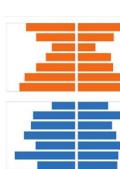
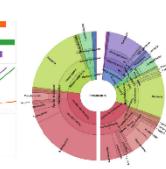
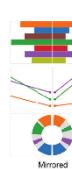
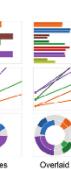
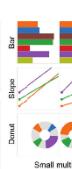
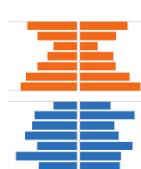
Concentric Donut Chart



<https://www.advsofteng.com/doc/cdpypdoc/concentric.htm>

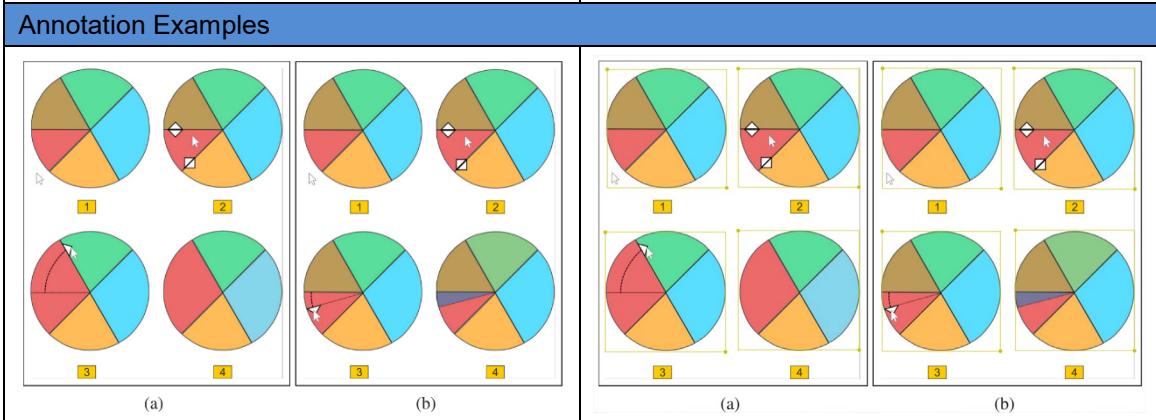
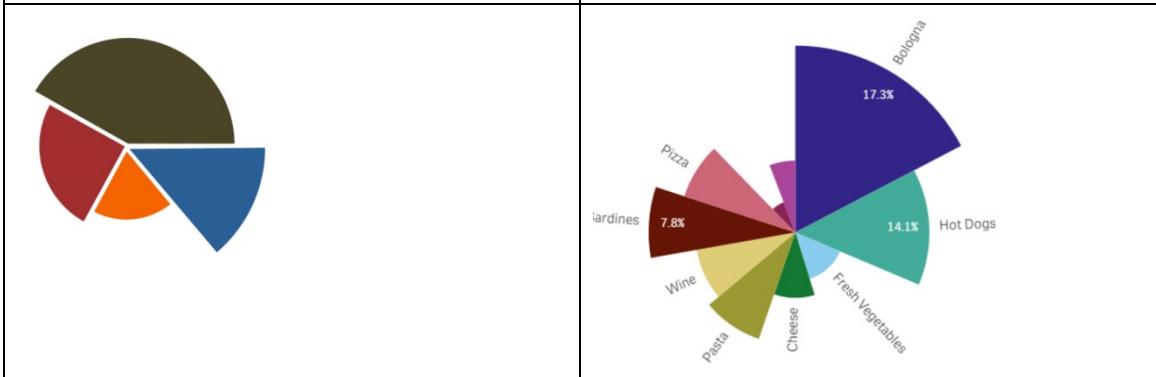
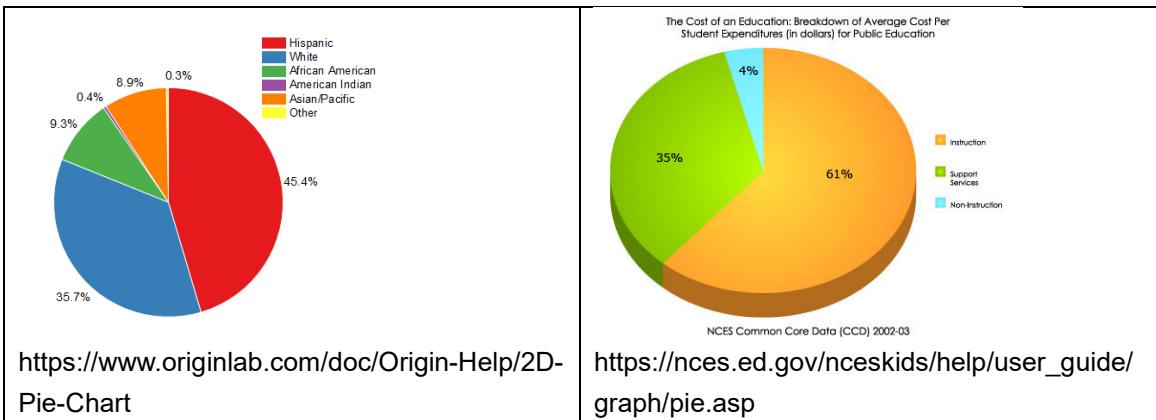


Annotation Examples



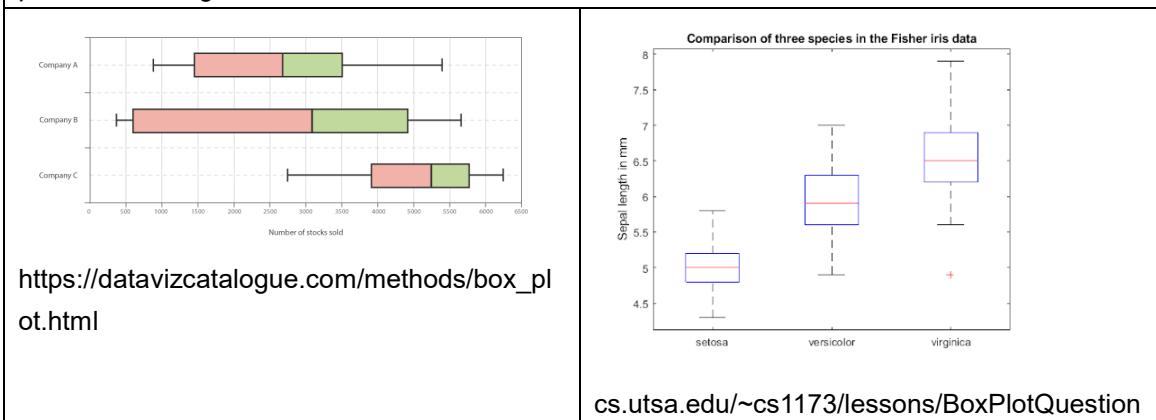
13. Pie Chart ([back to top](#))

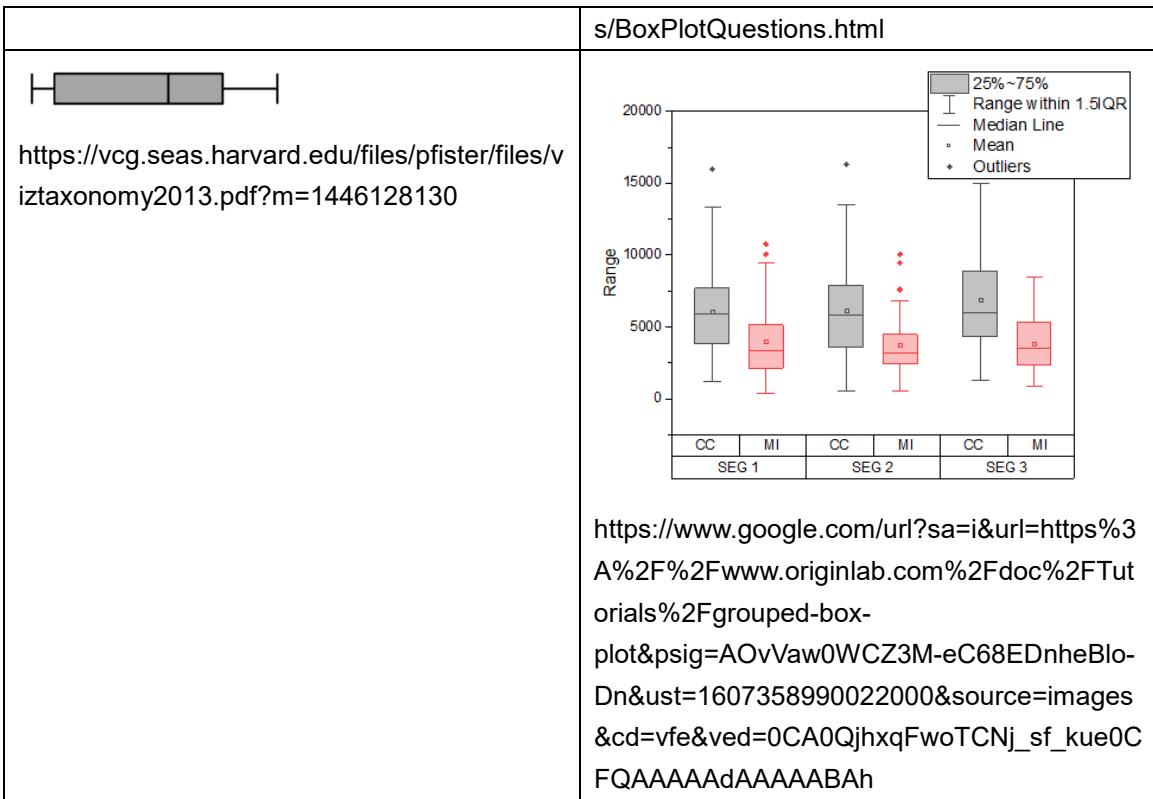
A Pie Chart is a circular statistical graphic, which is divided into slices to illustrate numerical proportion. In a Pie Chart, the arc length of each slice (and consequently its central angle and area), is proportional to the quantity it represents. While it is named for its resemblance to a pie which has been sliced, there are variations on the way it can be presented. The radius of the sector in the Pie Chart is equal in length.



14. Box Plot ([back to top](#))

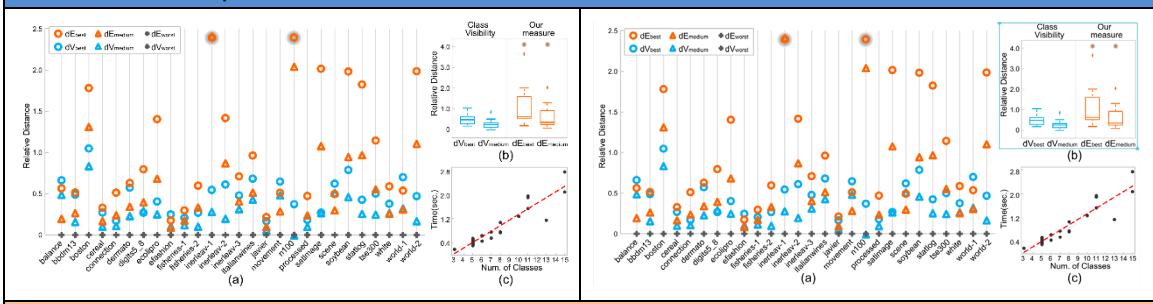
A box plot uses boxes and lines to depict the distributions of one or more groups of numeric data. Box limits indicate the range of the central 50% of the data, with a central line marking the median value. Lines extend from each box to capture the range of the remaining data, with dots placed past the line edges to indicate outliers.





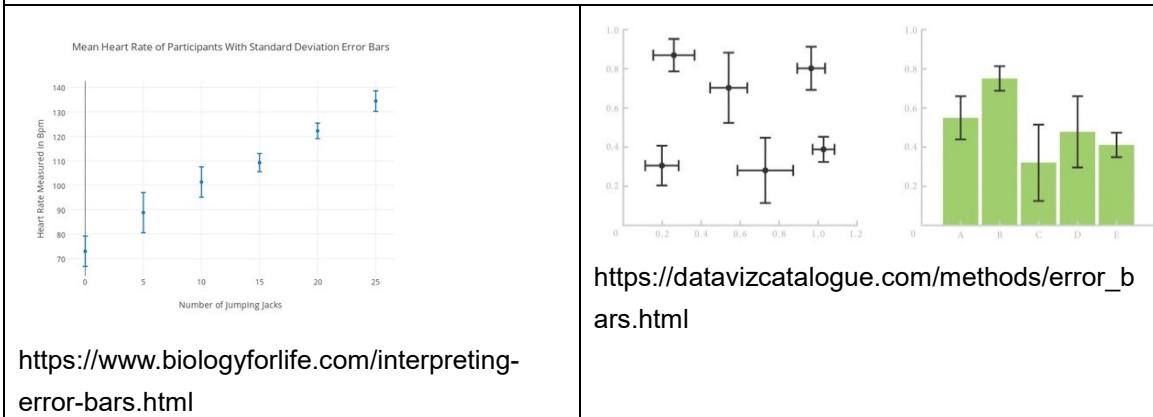
https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.originlab.com%2Fdoc%2FTutorials%2Fgrouped-box-plot&psig=AOvVaw0WCZ3M-eC68EDnheBLo-Dn&ust=1607358990022000&source=images&cd=vfe&ved=0CA0QjhxqFwoTCNj_sf_kue0CFQAAAAAdAAAAABAh

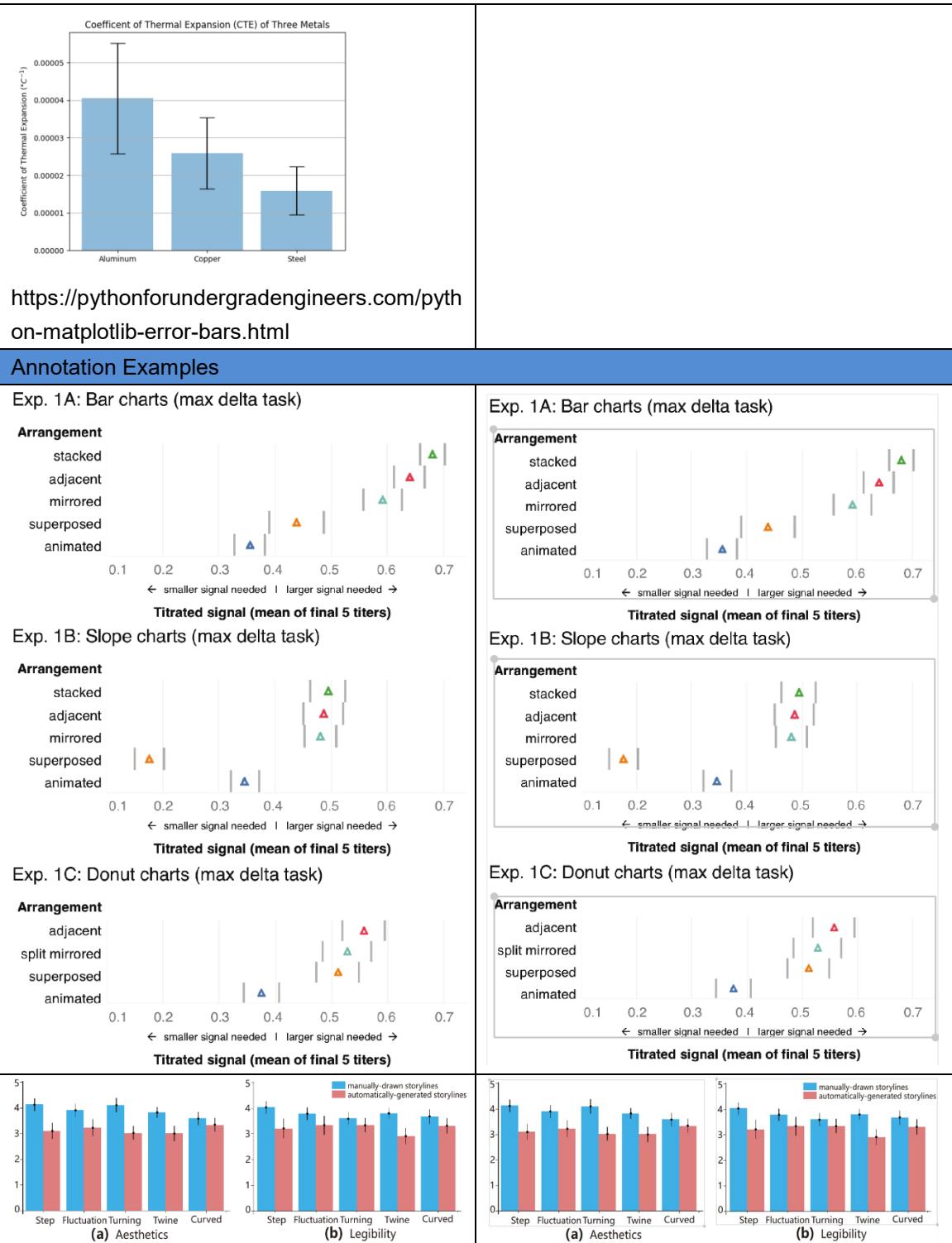
Annotation Examples

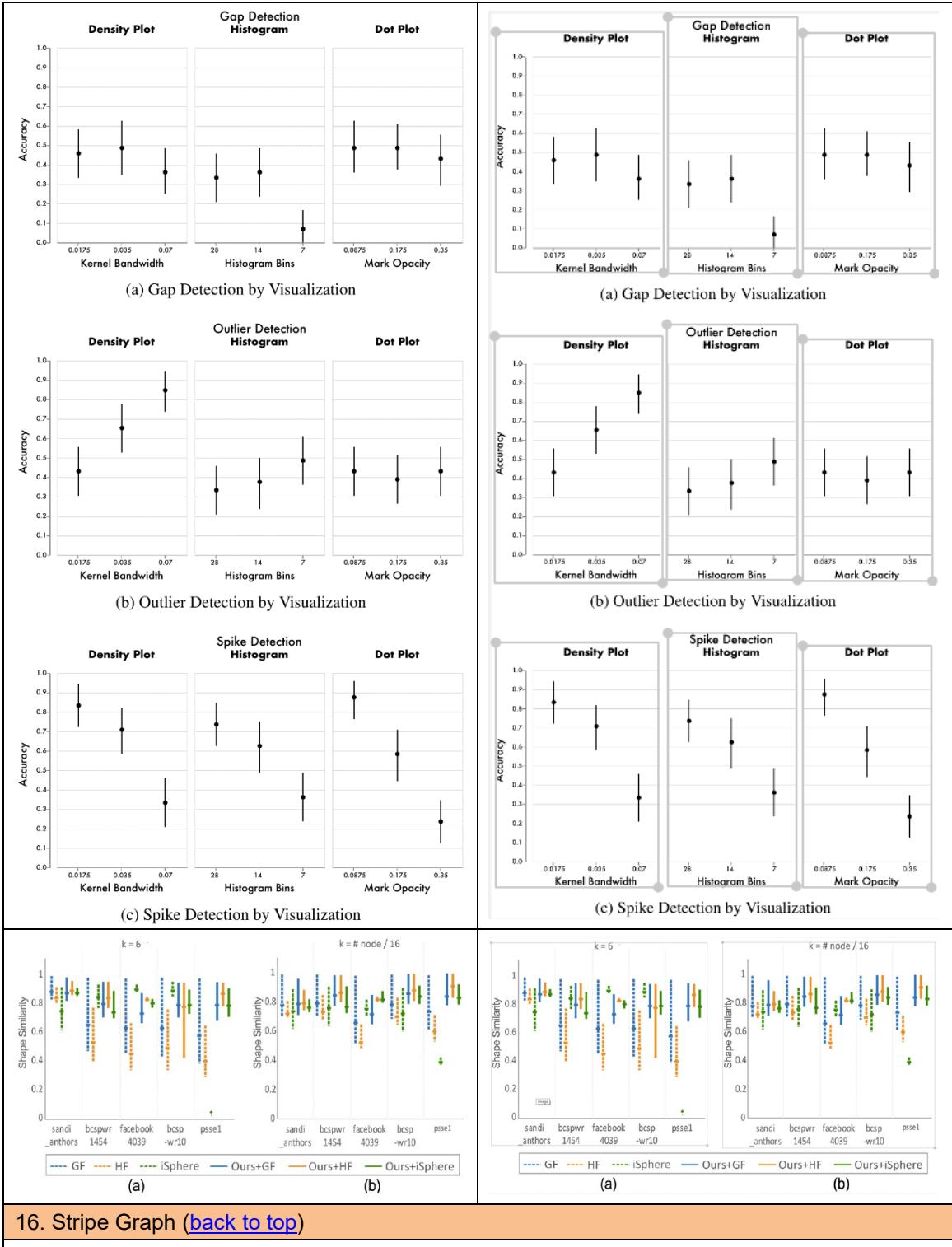


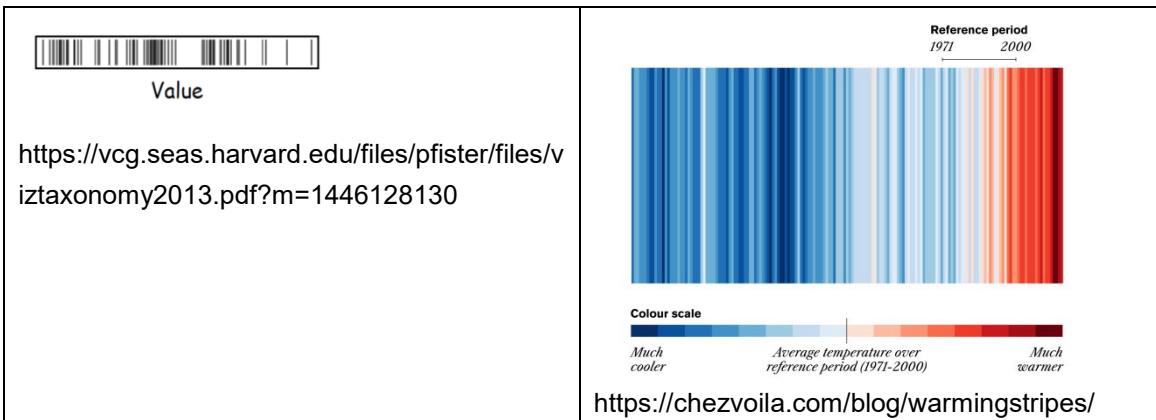
15. Error Bar ([back to top](#))

Error bars are graphical representations of the variability of data and used on graphs to indicate the error or uncertainty in a reported measurement.



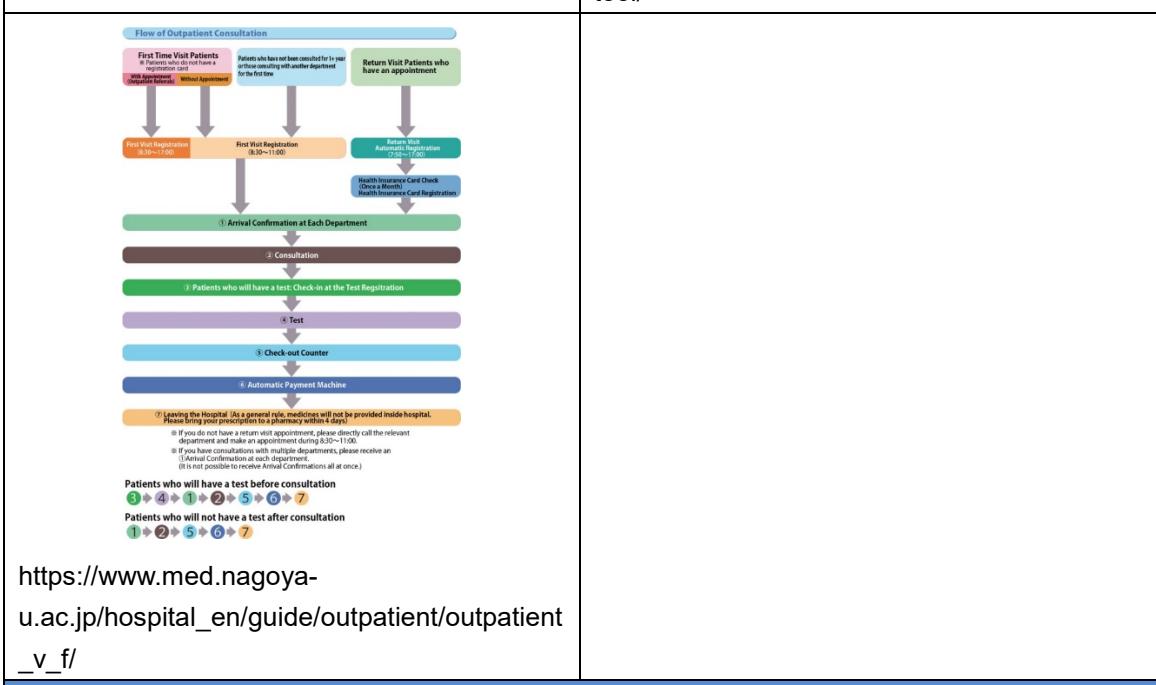
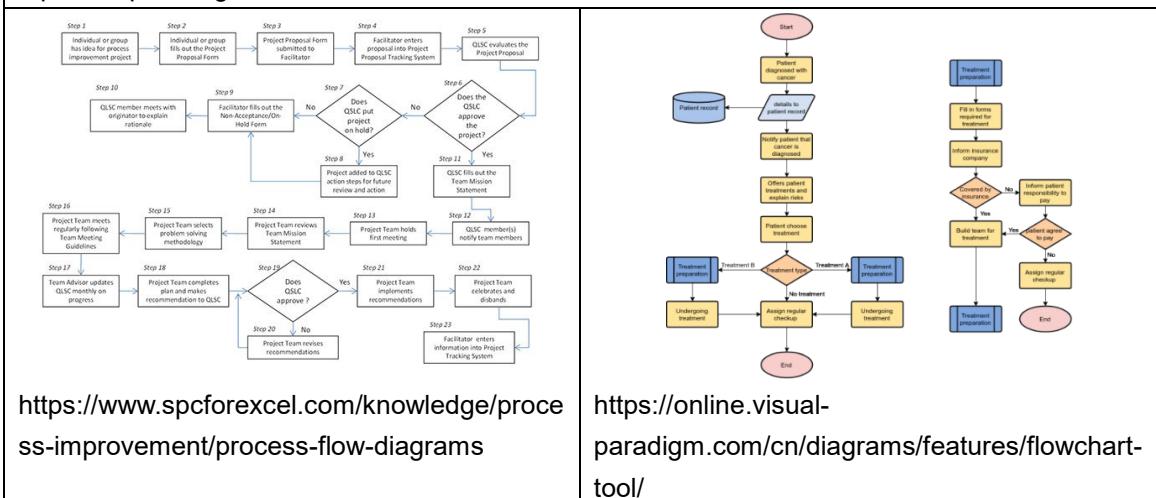




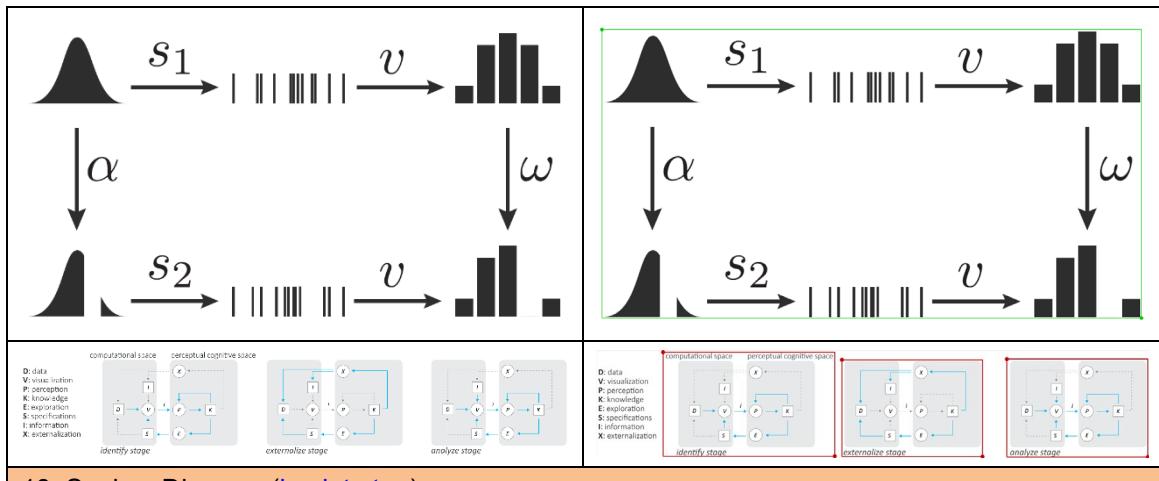


17. Flow Diagram ([back to top](#))

Flow Diagram intuitively depicts a workflow or process, using specific graphic symbols (e.g., arrows, diamond boxes, etc.), along with textual descriptions to represent the system flow or data flow, to give the user an accurate picture of how things are done. It is also sometimes called an Input-Output Diagram.

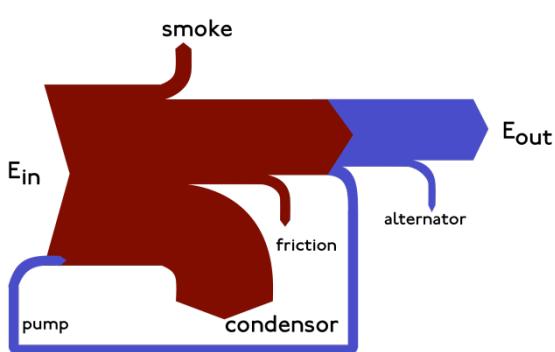


Annotation Examples

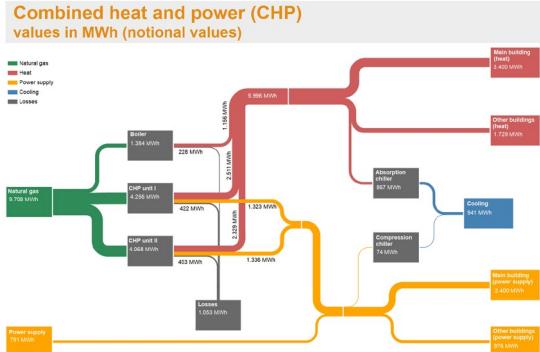


18. Sankey Diagram ([back to top](#))

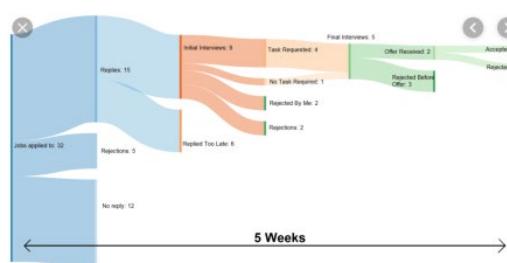
Sankey Diagram is a type of diagram in which the width of the arrows is proportional to the flow rate.



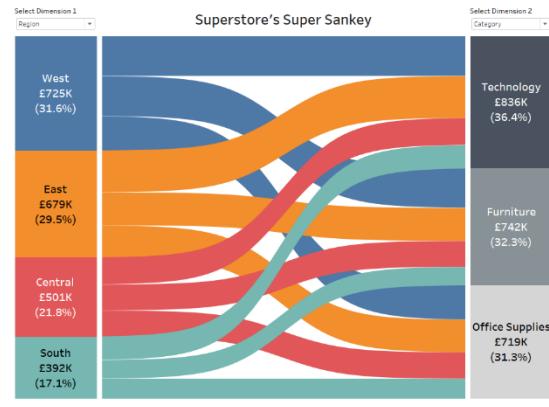
https://en.wikipedia.org/wiki/Sankey_diagram



<https://www.ifu.com/en/e-sankey/>

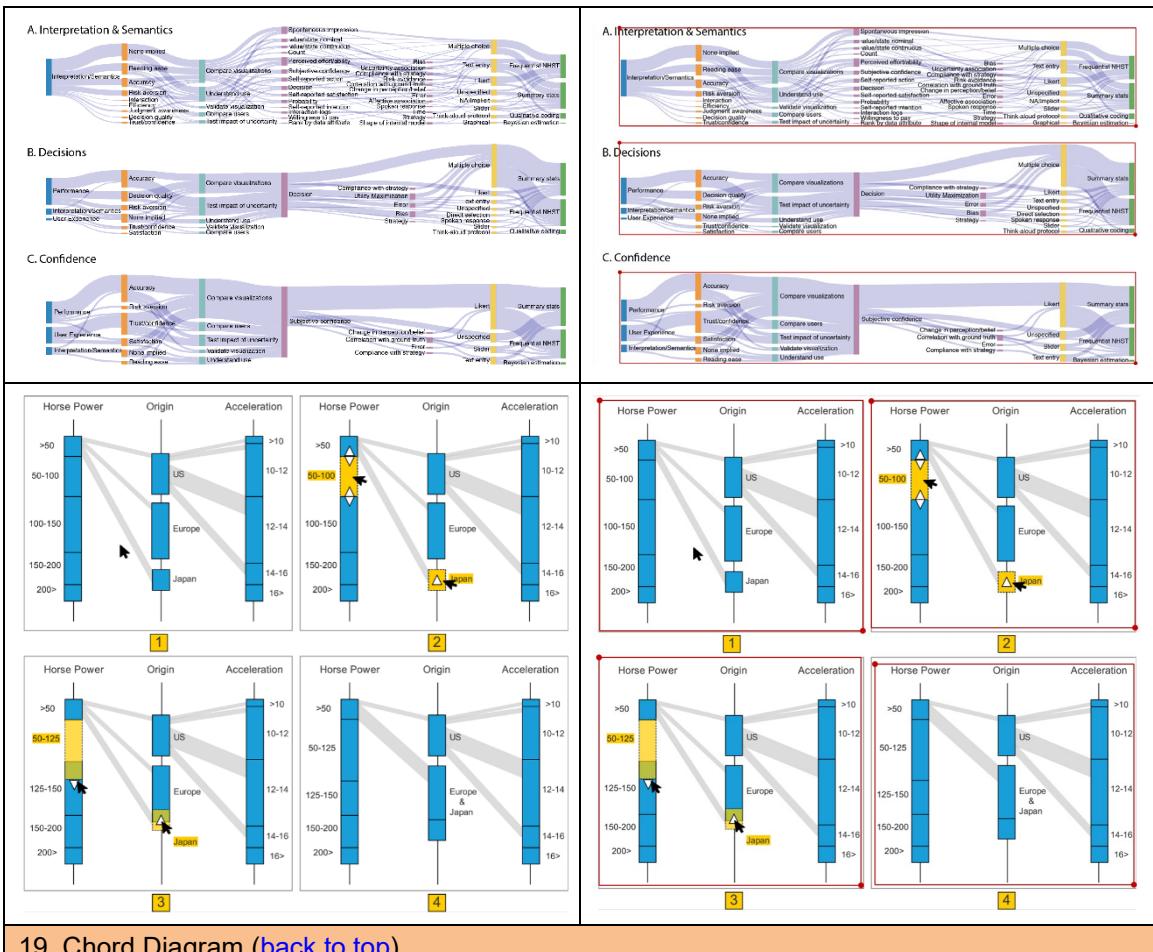


https://www.reddit.com/r/dataisbeautiful/comments/992s4c/a_detailed_sankey_diagram_of_my_recent_job_search/

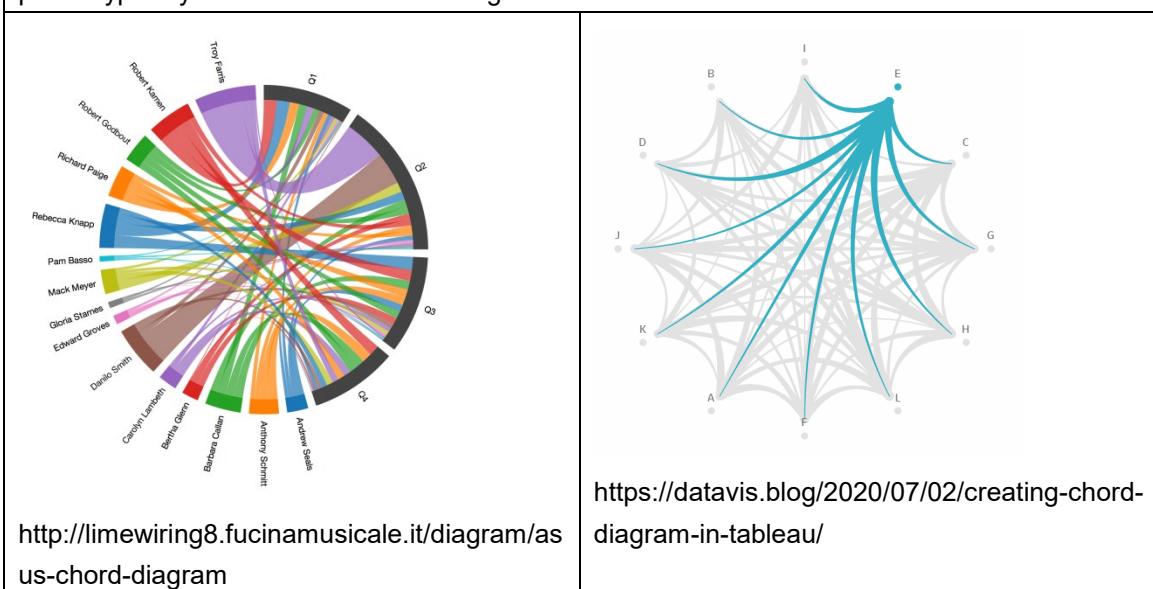


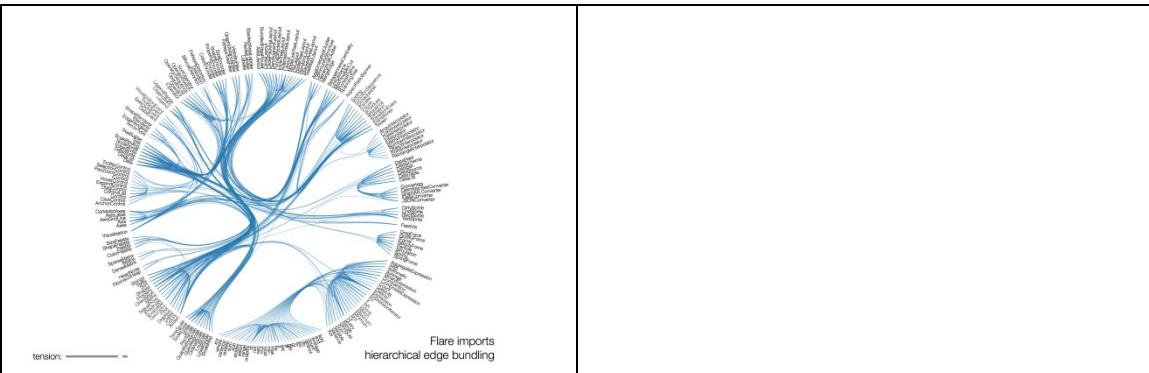
<https://www.theinformationlab.co.uk/2018/03/09/build-sankey-diagram-tableau-without-data-prep-beforehand/>

Annotation Examples



A Chord Diagram is a graphical method of displaying the inter-relationships between data in a matrix. The data are arranged radially around a circle with the relationships between the data points typically drawn as arcs connecting the data.

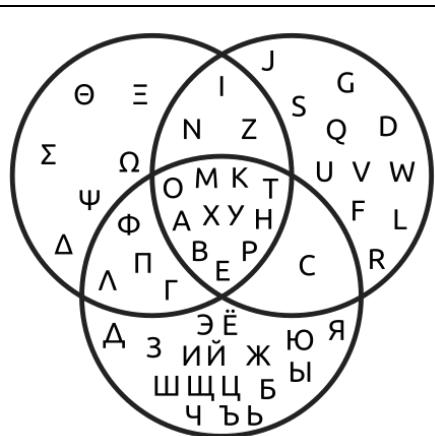




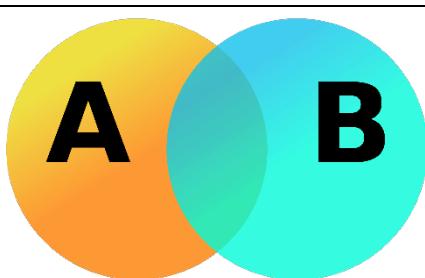
20. Venn Diagram ([back to top](#))

A Venn diagram is a widely used diagram style that shows the logical relation between sets. The diagrams are used to illustrate simple set relationships in probability, logic, statistics, linguistics and computer science. A Venn diagram uses simple closed curves drawn on a plane to represent sets. Very often, these curves are circles or ellipses.

https://en.wikipedia.org/wiki/Venn_diagram



https://en.wikipedia.org/wiki/Venn_diagram#/media/File:Venn_diagram_qr_la_ru.svg

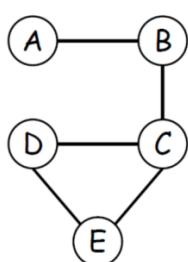


https://en.wikipedia.org/wiki/Venn_diagram#/media/File:%D0%92%D0%B5%D0%BD%D0%BE%D0%B2_%D0%B4%D0%B8%D1%98%D0%B0%D0%B3%D1%80%D0%B0%D0%BC.svg

21. Graph ([back to top](#))

Graph is a collection of points that are connected by a series of edges. The vertices represent the entities and the edges represent the relationships between the entities.

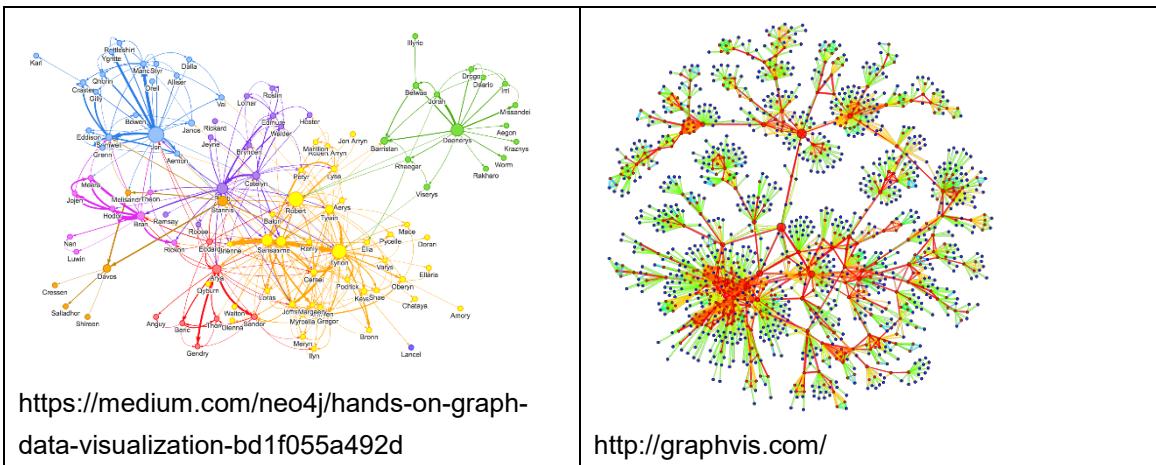
[https://en.wikipedia.org/wiki/Graph_\(discrete_mathematics\)](https://en.wikipedia.org/wiki/Graph_(discrete_mathematics))



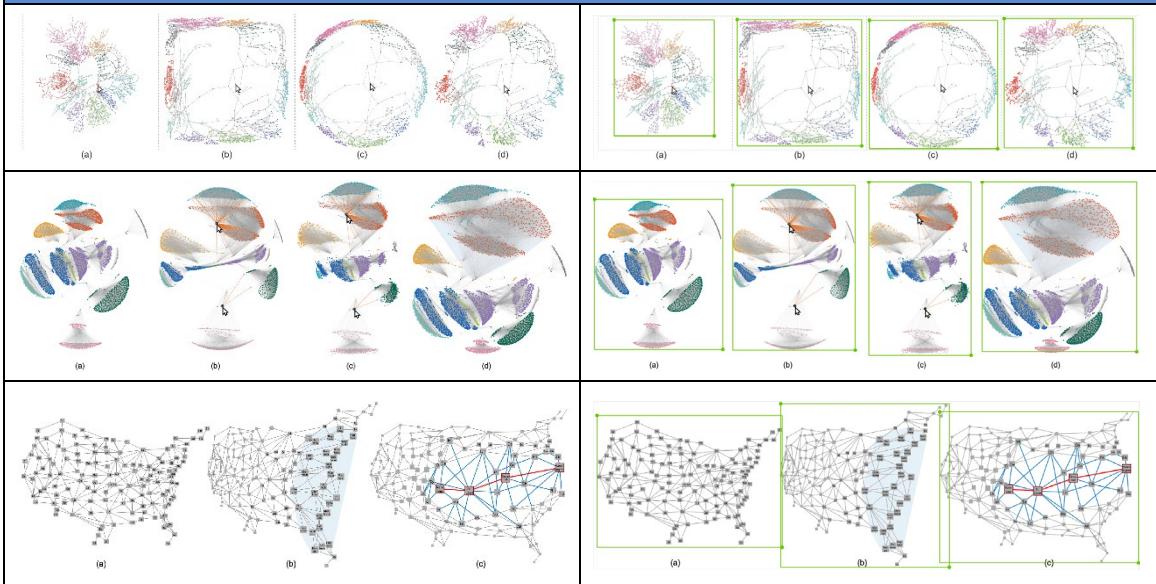
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<http://www.touchgraph.com/news>



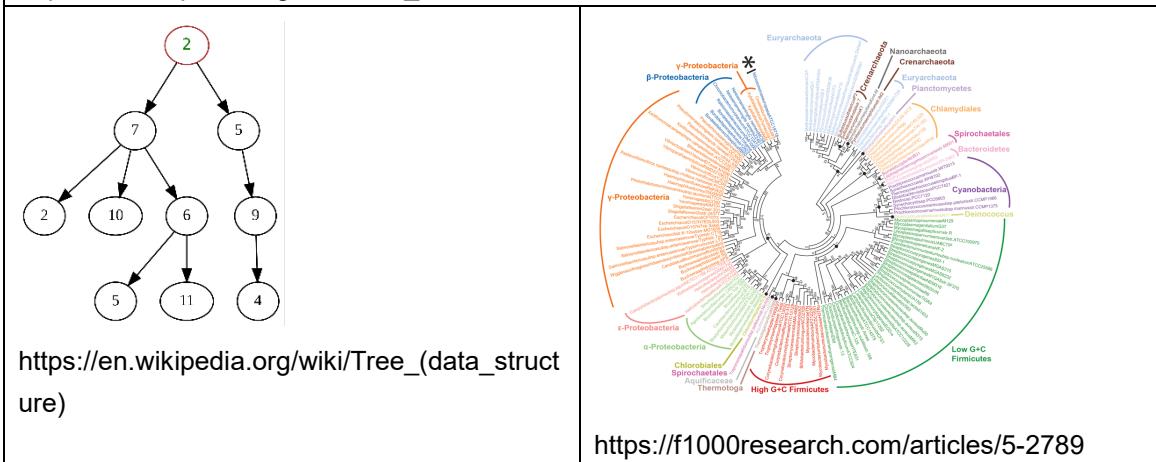
Annotation Examples

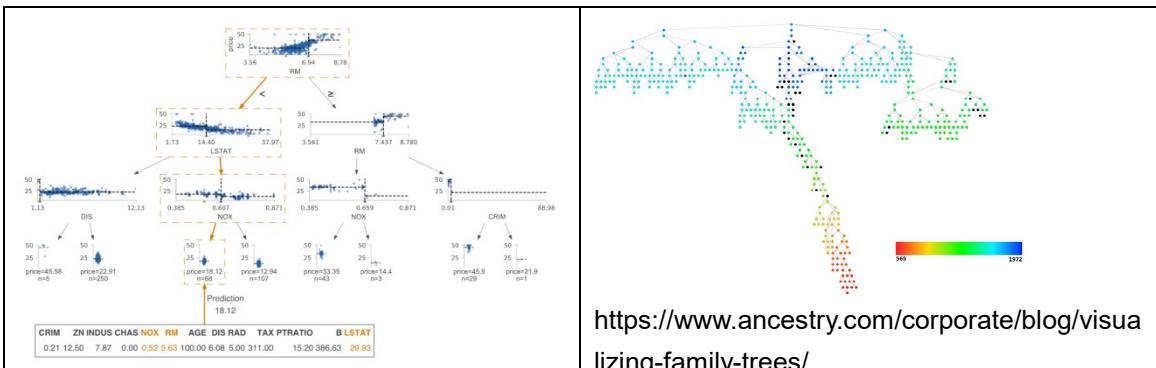


22. Tree ([back to top](#))

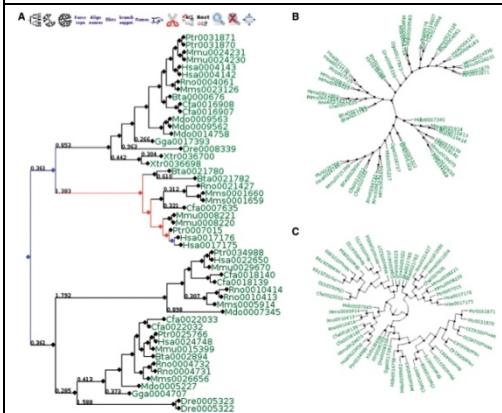
A tree structure, tree diagram, or tree model is a way of representing the hierarchical nature of a structure in a graphical form.

https://en.wikipedia.org/wiki/Tree_structure



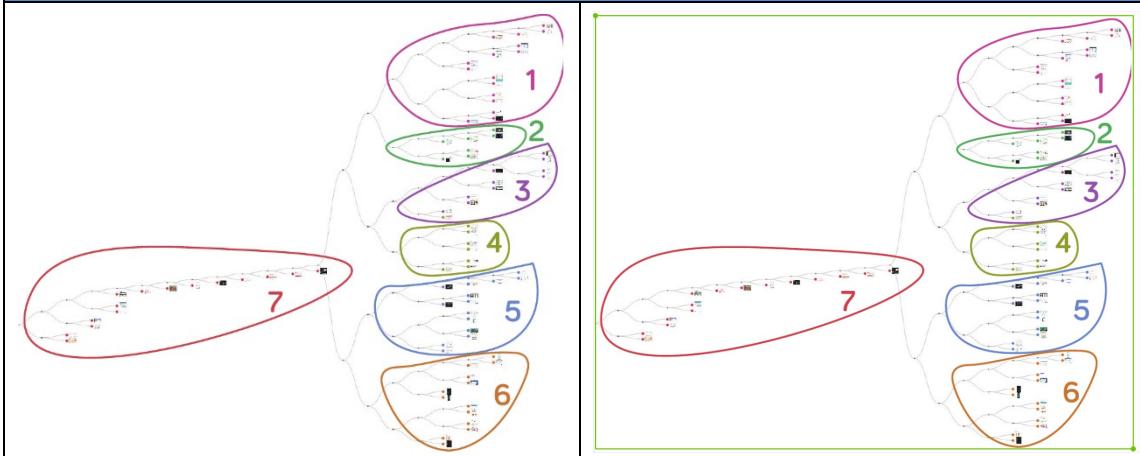


<https://explained.ai/decision-tree-viz/>



https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.nngroup.com%2Farticles%2Ftree-maps%2F&psig=AOvVaw2vH7P2_FDQO0eDTQN43-DN&ust=1607414365821000&source=images&cd=vfe&ved=0CA0QjhxqFwoTCPilqaSz-0CFQAAAAAdAAAAABA0

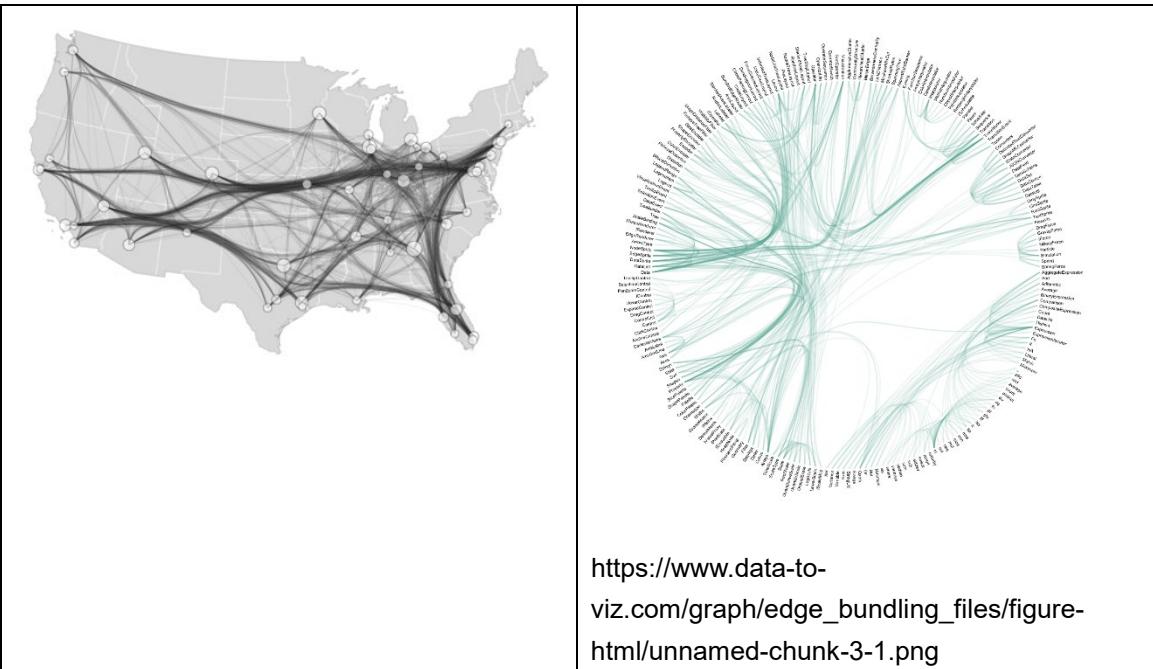
Annotation Examples



23. Hierarchical Edge Bundling ([back to top](#))

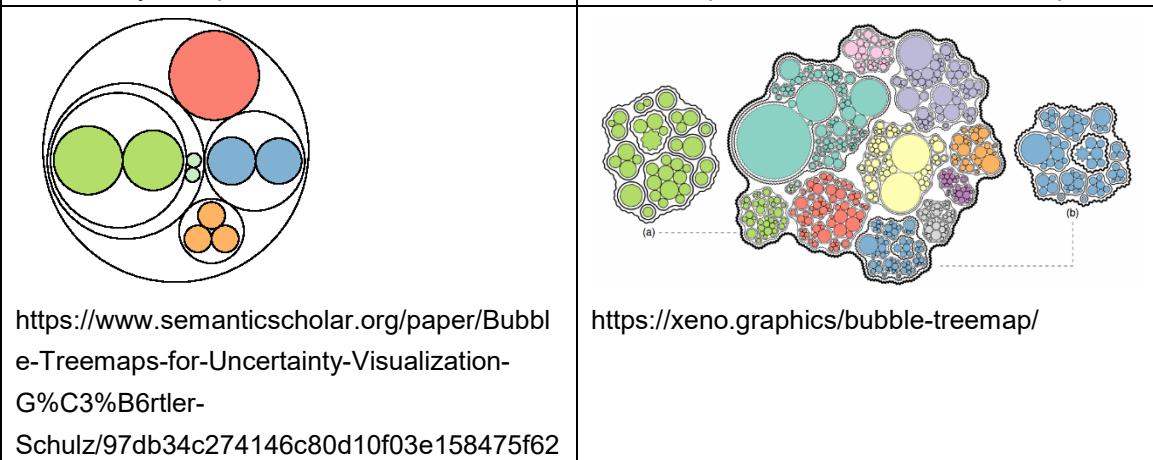
Hierarchical Edge Bundling allows to visualize adjacency relations between entities organized in a hierarchy. The idea is to bundle the adjacency edges together to decrease the clutter usually observed in complex networks.

https://www.data-to-viz.com/graph/edge_bundling.html#:~:text=Definition,usually%20observed%20in%20complex%20networks.



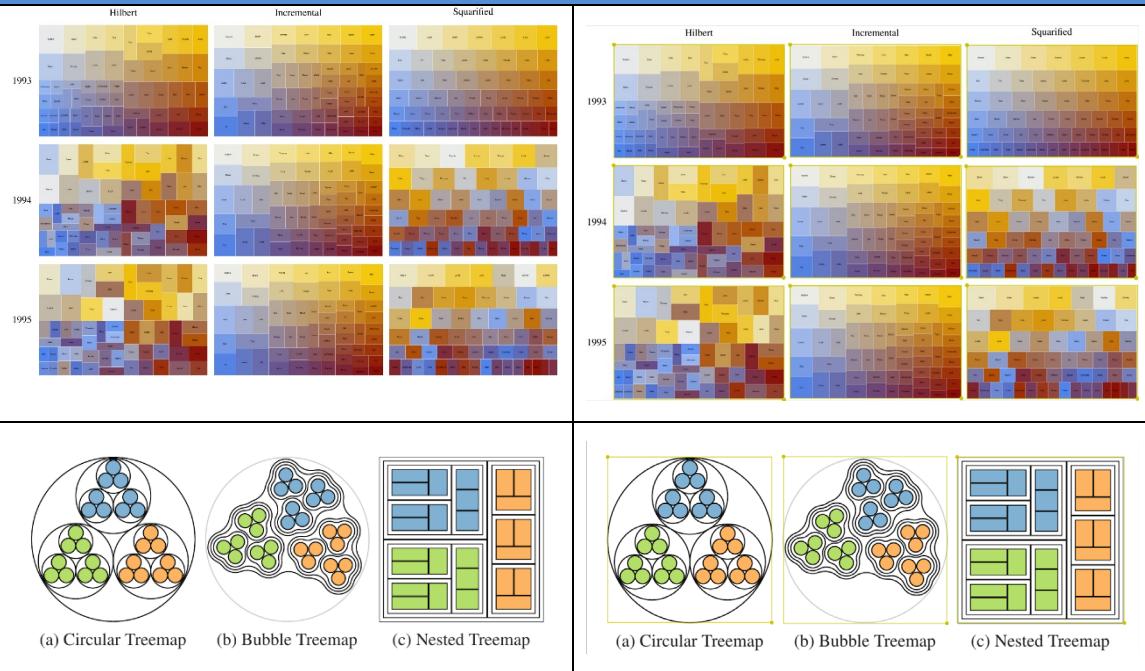
24. Treemap ([back to top](#))

Treemap displays hierarchical (tree-structured) data as a set of nested rectangles. Each branch of the tree is given a rectangle, which is then tiled with smaller rectangles representing sub-branches. A leaf node's rectangle has an area proportional to a specified dimension of the data. Often the leaf nodes are colored to show a separate dimension of the data. Treemap emphasizes the hierarchical relationship between nodes, and the sibling nodes are mutually exclusive.



36e5b257/figure/1

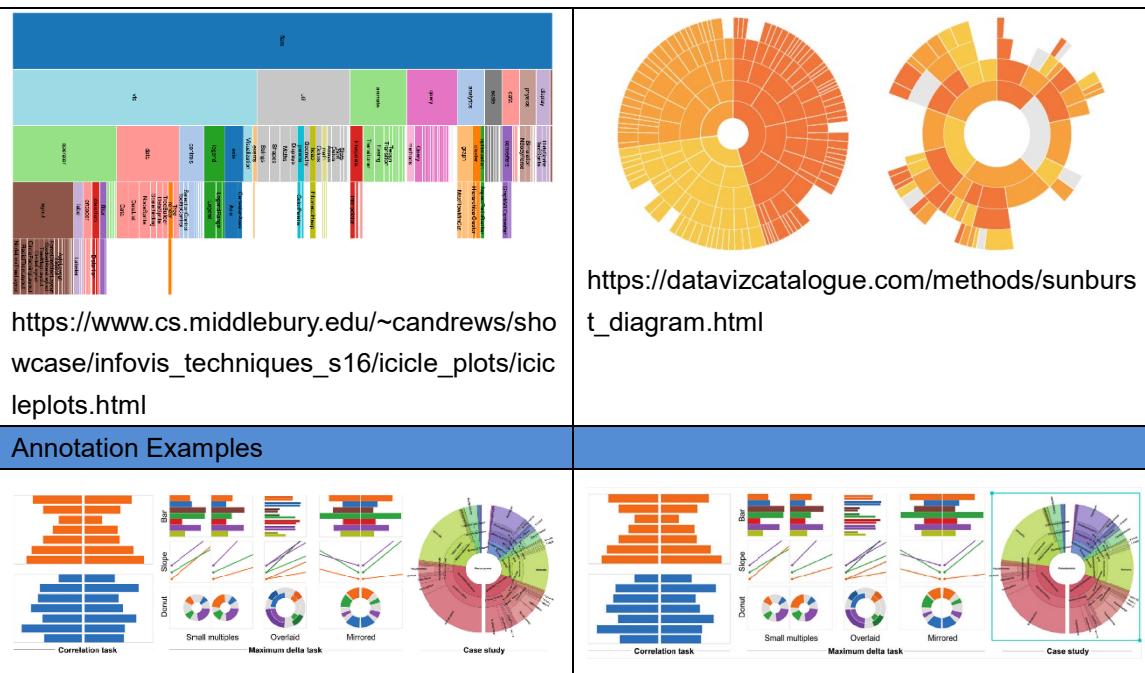
Annotation Examples

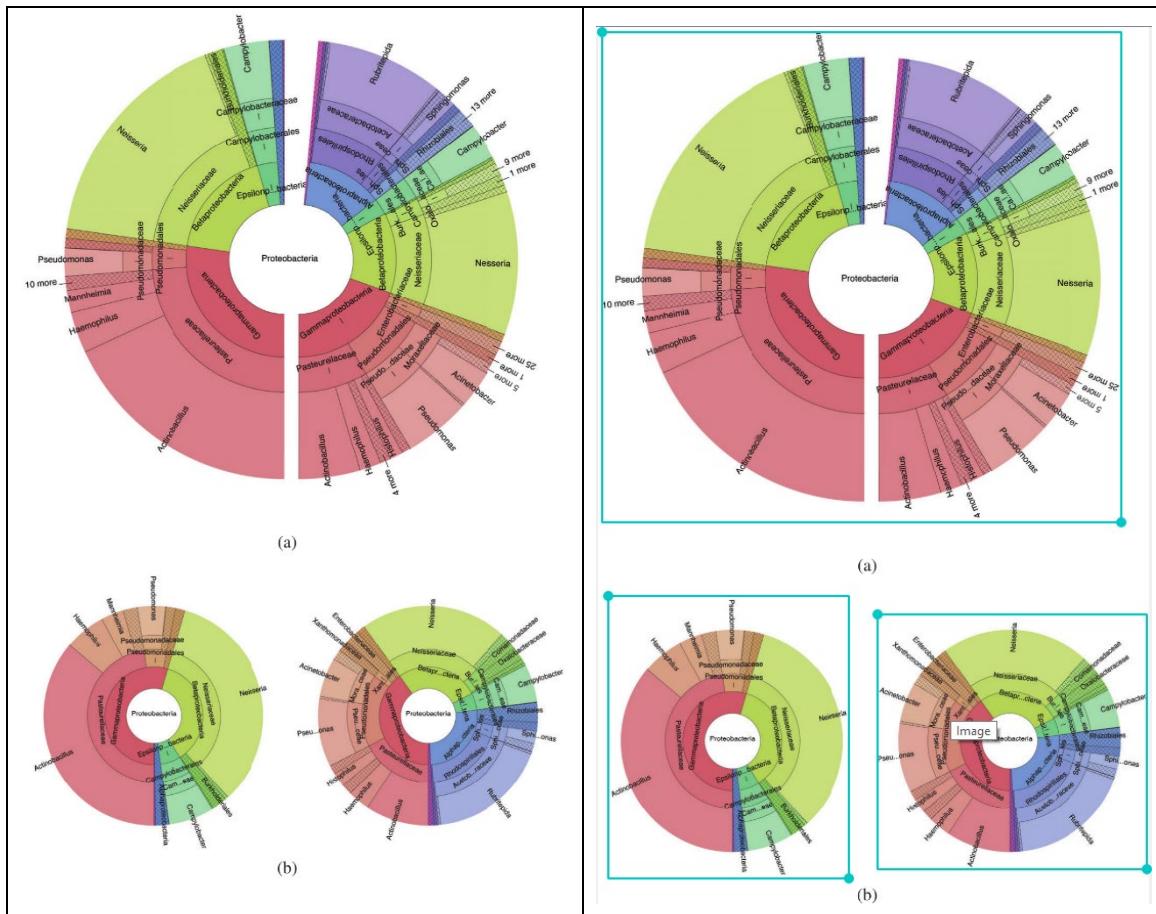


25. Sunburst/ icicle chart ([back to top](#))

Sunburst Charts are generally used to display hierarchical data, with each ring representing a level of the hierarchy. The sunburst contains a circle displaying the total value; the innermost ring represents the first hierarchy, or hierarchy level, and the outermost ring represents the last hierarchy or level. Each ring is divided into segments representing the member elements in that hierarchy; segment size is driven by value. Each segment is colored according to the first hierarchy (inner ring) to which it belongs.

The Icicle Chart is similar to the Sunburst Chart, but changes from a circular structure to a linear one.





26. Table ([back to top](#))

Table is an arrangement of data in rows and columns, or possibly in a more complex structure. Table is a common form of visualization in daily life, and the grids are filled with text, numbers, symbols, or graphics for easy data displaying.

	Total defects	A	B	C	D	E
A4636	131	37	21	28	45	
A2524	86	20	24	21	1	20
A3713	75	17	13	18		27
A4452	73	5	33	17		18
A4088	72	14	16	12	2	28
A2103	68	14	13	14	1	26
A2156	68	16	13	19	2	18
A3681	66	12	16	9	1	28
A1366	50	11	15	12		12
A2610	39	5	7	12		15
Total	728	151	171	162	7	237

ID	Latest Order Date	Lifetime Order Count	Average Sales per Order
1	2020-07-21	5	\$44.74
2	2020-07-20	1	\$14.94
3	2020-07-20	2	\$91.46
4	2020-07-20	2	\$84.49
5	2020-07-20	3	\$65.33
6	2020-07-20	4	\$29.16
7	2020-07-20	8	\$42.63
8	2020-07-20	8	\$47.62
9	2020-07-20	7	\$57.15
10	2020-07-20	4	\$44.78
11	2020-07-20	3	\$52.67
12	2020-07-20	3	\$34.76
13	2020-07-20	12	\$39.28
14	2020-07-20	5	\$25.93

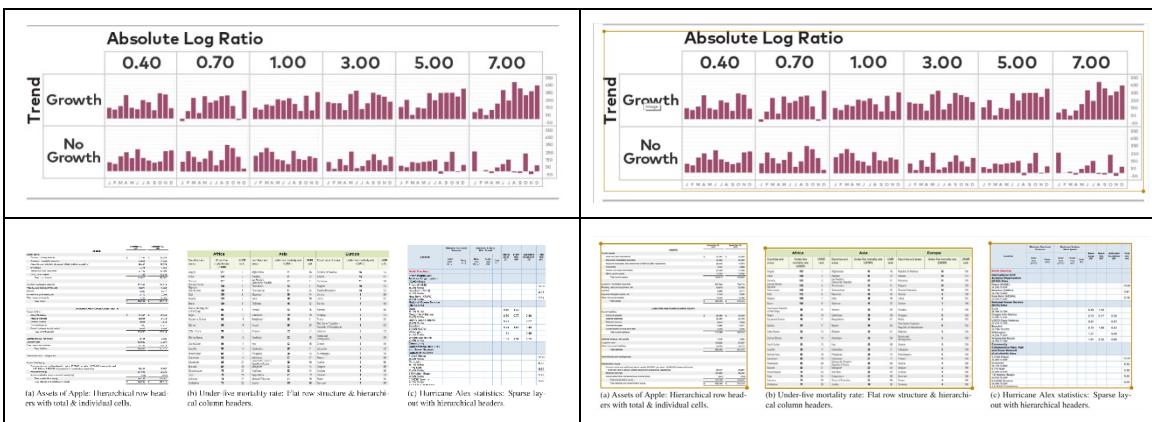
<https://learnche.org/pid/data-visualization/tables-as-a-form-of-data-visualization>

<https://docs.looker.com/exploring-data/visualizing-query-results/table-next-options>

Annotation Examples

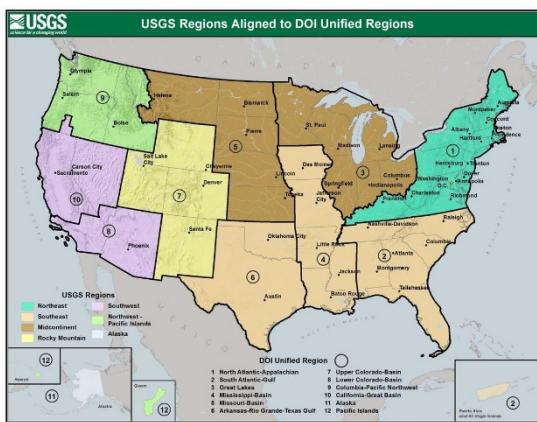
Goal	Cluster	# Examples	Purpose		Audience	Visual Features	Data Semantics
			Strategic	Tactical			
Decision-Making	Strategic Decision-Making	16	Y	Y	-	N	O
	Operational Decision-Making	14	N	Y	Y	O	-
Awareness	Static Operational	10	N	N	Y	N	O
	Static Organizational	8	-	-	N	O	M
Motivation and Learning	Quantified Self	7	N	N	Y	N	I
	Communication	13	-	-	Y	P	M
	Dashboards Evolved	15	-	-	P	H	-

Goal	Cluster	# Examples	Purpose		Audience	Visual Features	Data Semantics
			Strategic	Tactical			
Decision-Making	Strategic Decision-Making	16	Y	Y	-	N	O
	Operational Decision-Making	14	N	Y	Y	O	-
Awareness	Static Operational	10	N	N	Y	N	O
	Static Organizational	8	-	-	N	O	M
Motivation and Learning	Quantified Self	7	N	N	Y	N	I
	Communication	13	-	-	Y	P	M
	Dashboards Evolved	15	-	-	P	H	-

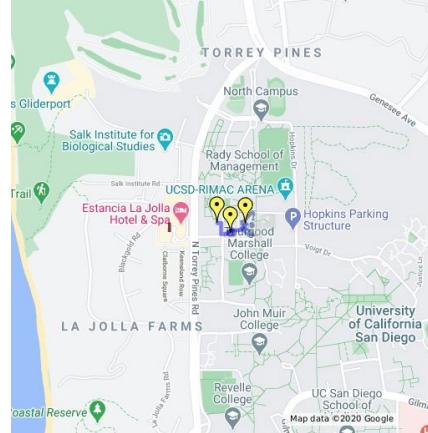


27. Map ([back to top](#))

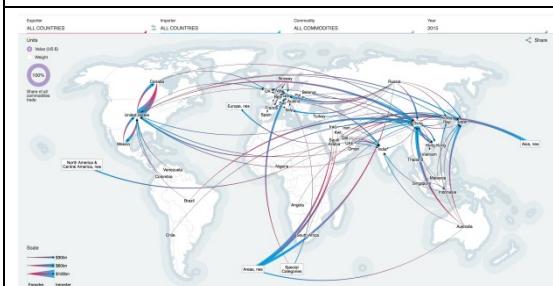
Map is a symbolic depiction emphasizing relationships between elements of some space, such as objects, regions, or themes.



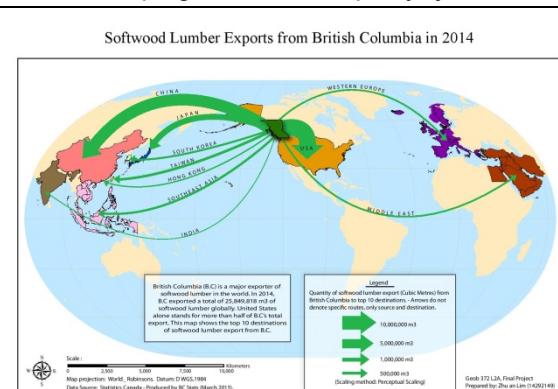
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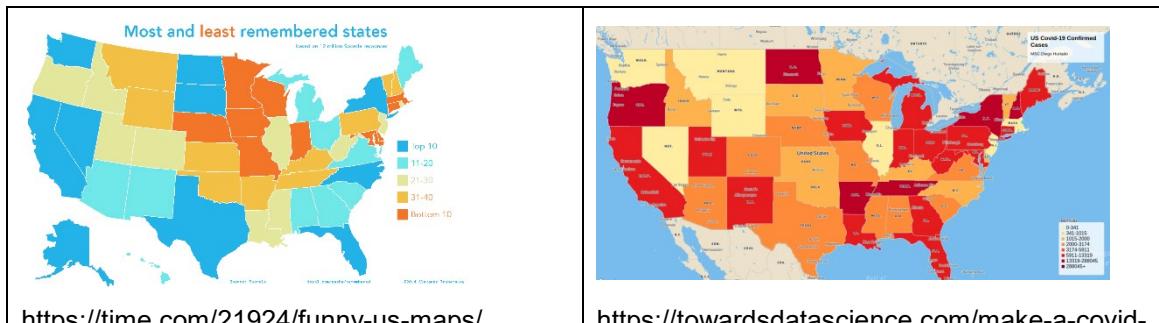
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<https://datavizproject.com/data-type/flow-map/>

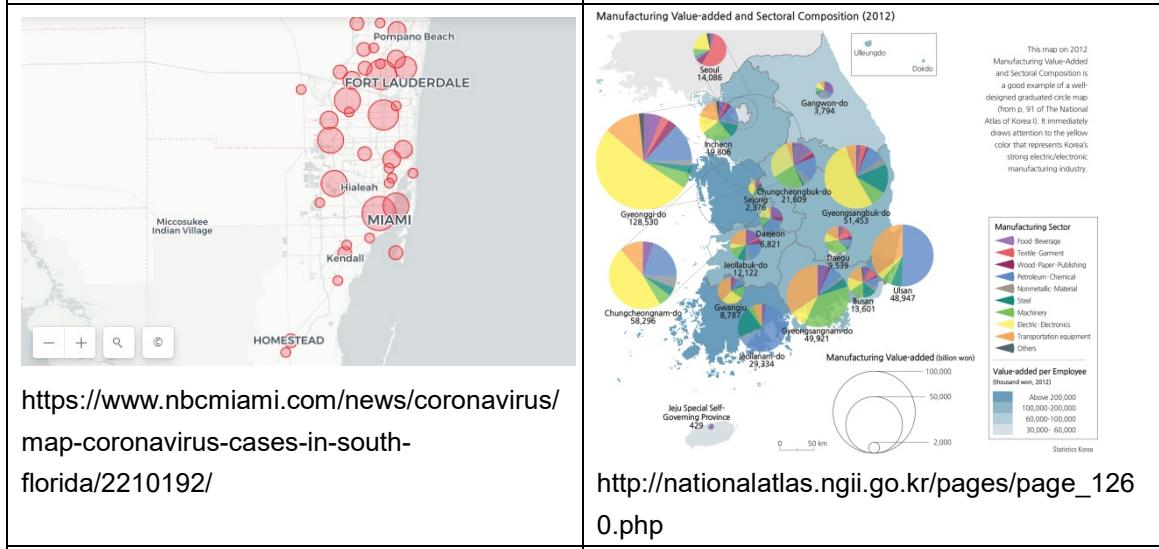


<https://blogs.ubc.ca/zhuanslim/2015/12/03/prop-optional-symbol-flow-map/>



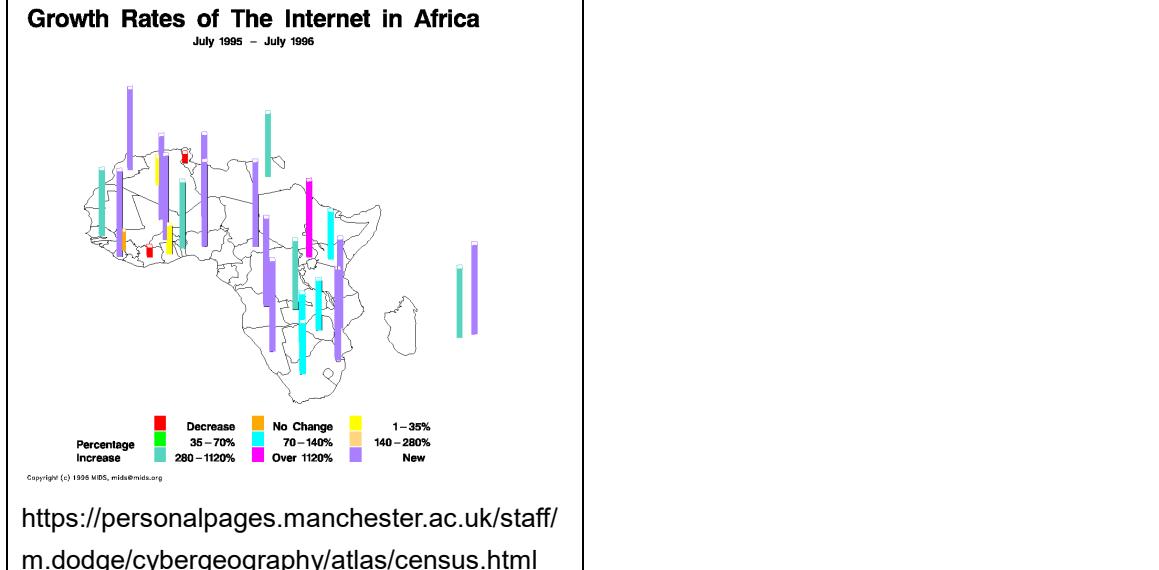
<https://time.com/21924/funny-us-maps/>

<https://towardsdatascience.com/make-a-covid-19-choropleth-map-in-mapbox-5c93ac86e907>



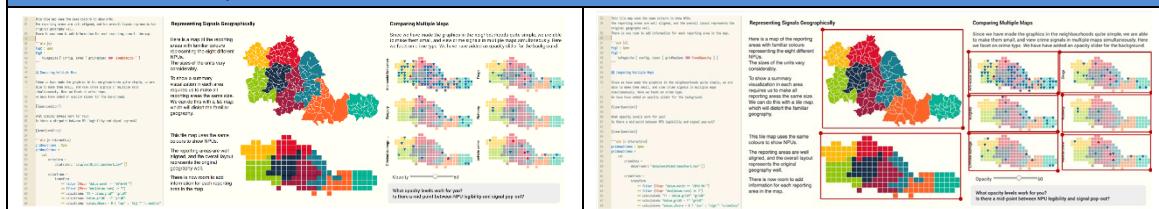
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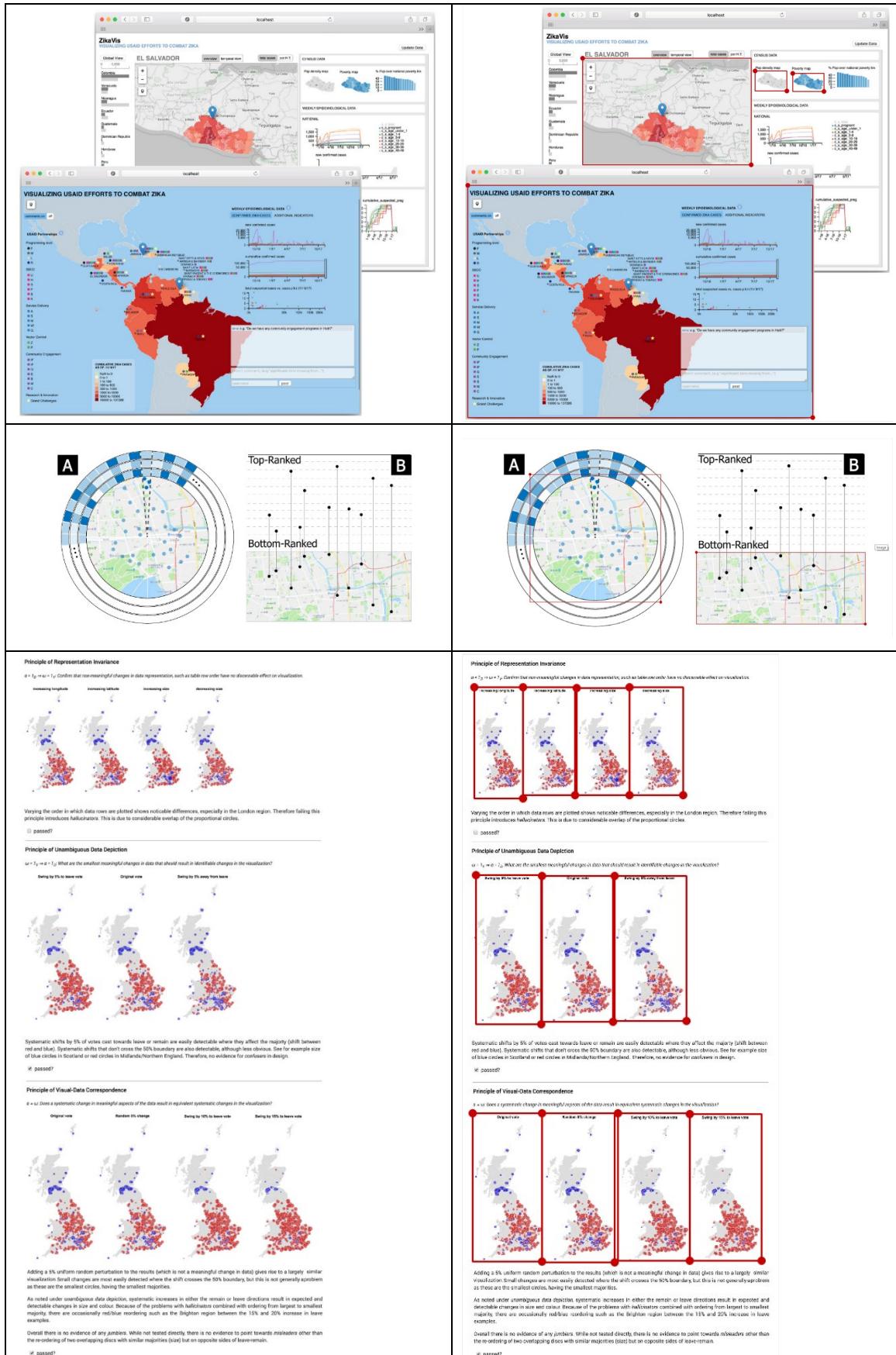
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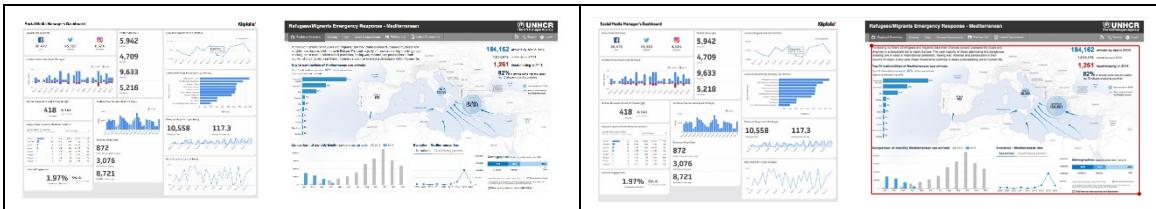


<https://personalpages.manchester.ac.uk/staff/m.dodge/cybergeography/atlas/census.html>

Annotation Examples

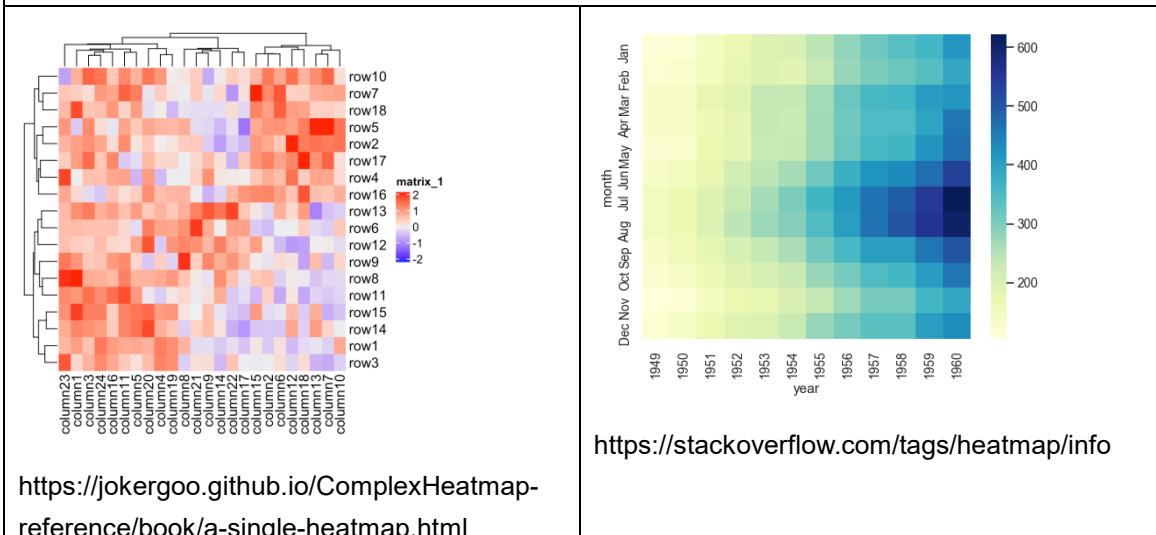




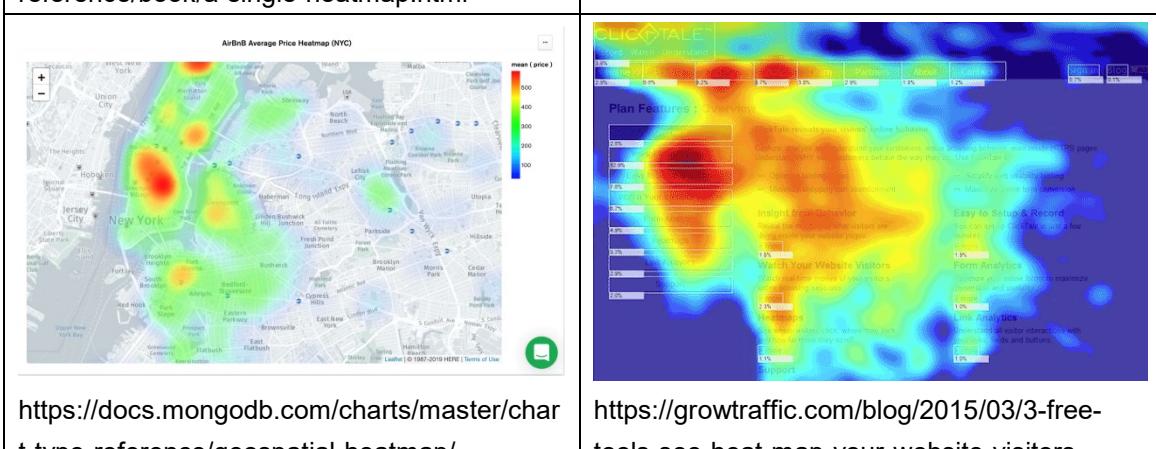


28. Heatmap ([back to top](#))

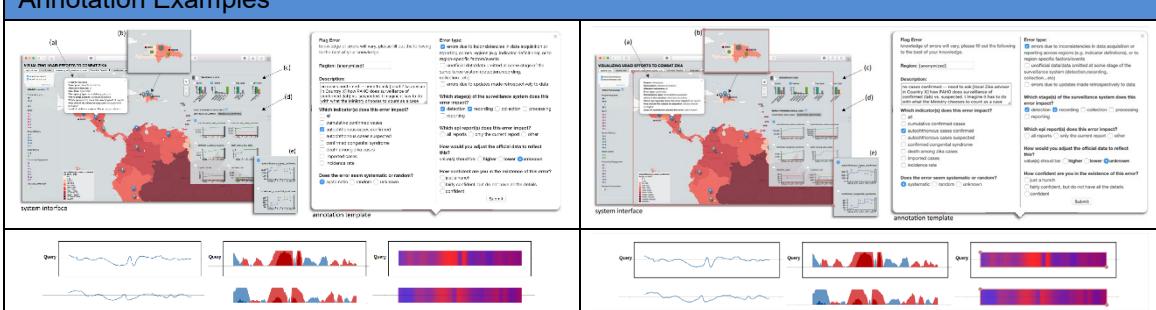
Heatmap is a data visualization technique that shows magnitude of a phenomenon as color in two dimensions. The variation in color may be by hue or intensity, giving obvious visual cues to the reader about how the phenomenon is clustered or varies over space.



<https://jokergoo.github.io/ComplexHeatmap-reference/book/a-single-heatmap.html>



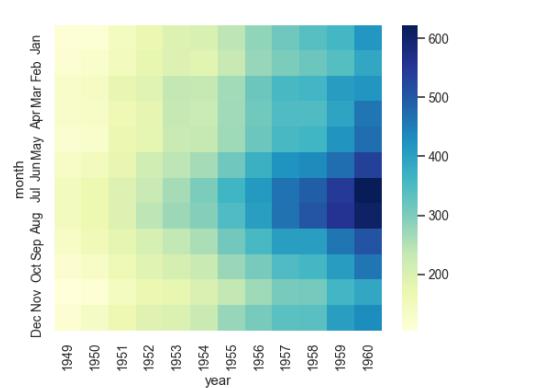
Annotation Examples



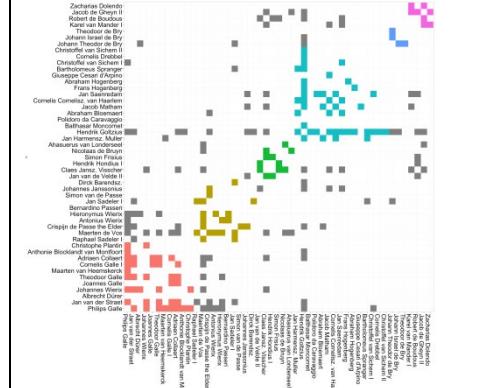
29. Matrix ([back to top](#))

A matrix is a rectangular array in which data nodes are mapped to the horizontal and vertical axes. Matrix contains rows and columns of data. However, a Matrix has additional features such

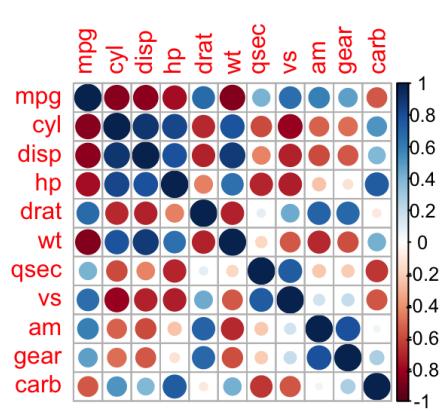
as hierarchy, not repeating values, etc.



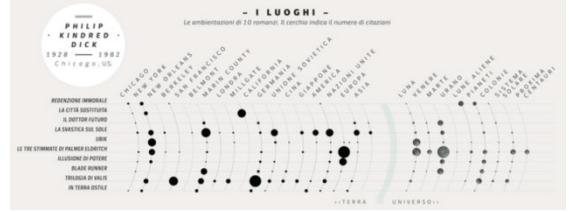
<https://stackoverflow.com/tags/heatmap/info>



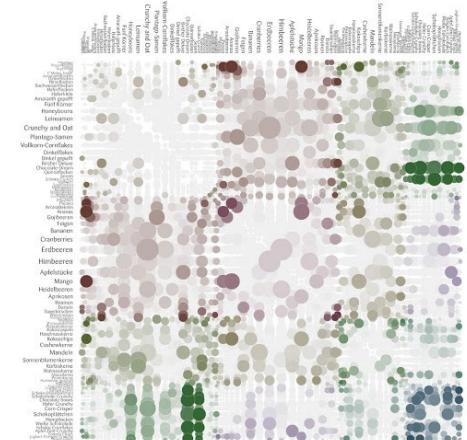
<https://matthewlincoln.net/2014/12/20/adjacency-matrix-plots-with-r-and-ggplot2.html>



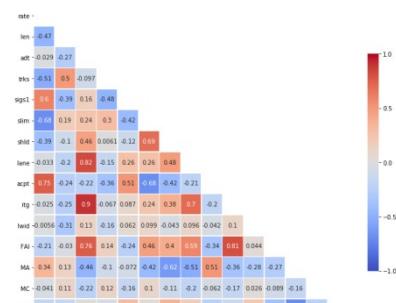
<https://www.pinterest.com/pin/540713498997873444/>



<https://datavizproject.com/data-type/matrix-diagram/>



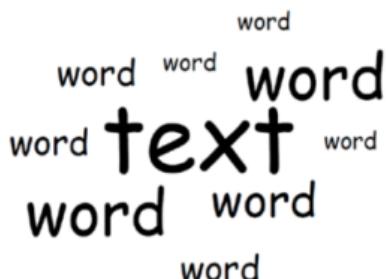
<http://archive.stefaner.eu/projects/multi-ingredient-network/>



<https://github.com/elastic/elastic-charts/issues/263>

30. Word Cloud ([back to top](#))

Word Cloud is to visualize the frequency of words. The larger a word, the more times it appears, and the position of each word has a tendency of concentration.



embarrassment

mason
smile
maneuver
account
perplexity
father
time
life
detard
letter
coat
childish
interest
home
count
graham
andrew
shirt
holiday
face
matter
intrigue
connection
daughter
state
ending
surroundings
má
arm
money
war
wedding
whirlpool
moment
possession
leg
affair
pierre
cause
self-derision
arrears
beginning
proposal
unconquerable
year
princess
son
natá
trouser
spring
consideration
family
joyousness
place
tenka
constraint
knowledge
feeling
everybody
dowry
instruction
rhetor
knee
breast
steward
intercourse
brother
promise
waistcoat
view
mamma
parent
society
man
boot
bullock
husband
nicholas
estate
mother
sho
foot
natasha's
serf
point
sake
nski
room

<https://www.keatext.ai/en/blog/artificial-intelligence/3-strengths-and-3-weaknesses-of-word-clouds/>

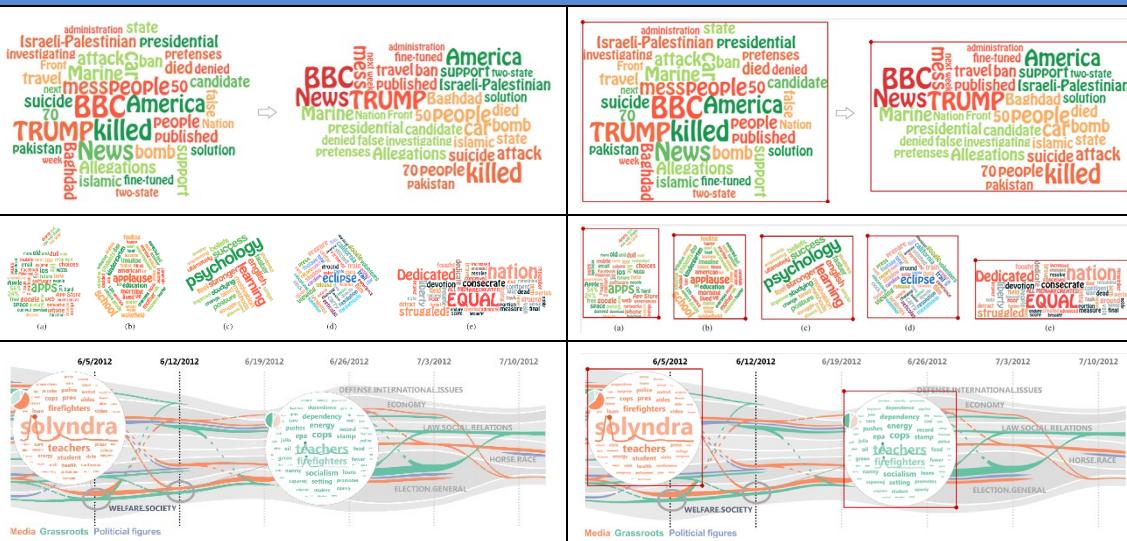


<https://slidelizard.com/en/blog/powerpoint-wordcloud>



<http://publish.illinois.edu/commonsknowledge/2017/01/05/introduction-to-web-based-word-cloud-generators/>

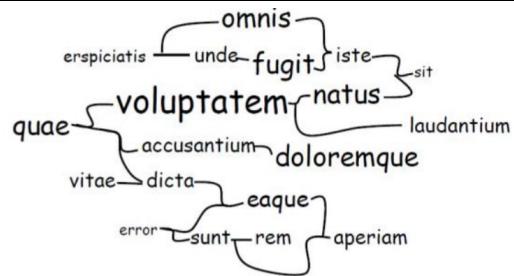
Annotation Examples



31. Phrase Net ([back to top](#))

A phrase net is a graph where words are nodes which are connected by phrases encoded in links.

<https://www.cg.tuwien.ac.at/courses/Visualisierung2/HallOfFame/2016/SkimmThisBook/Homepage/index.html#:~:text=A%20phrase%20net%20is%20a.link%20to%20an%20orange%20node.>



<https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130>

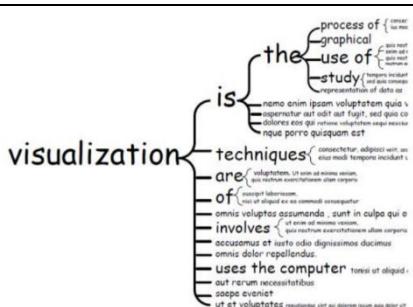


https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.betterevaluation.org%2Fen%2Fevaluation-options%2Fphrase_net&psig=AOvVaw0zanolMx4vvs-STr9JNeOMA&ust=1636719459735000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCP C3lpqlkPQCFQAAAAAdAAAAABAD

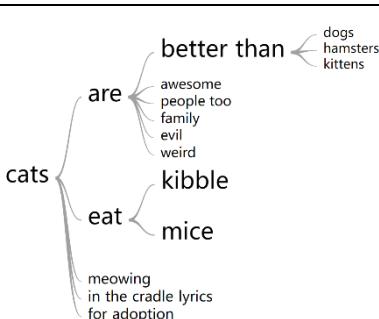
32. Word Tree ([back to top](#))

A word tree depicts multiple parallel sequences of words. It could be used to show which words most often follow or precede a target word (e.g., "Cats are...") or to show a hierarchy of terms (e.g., a decision tree).

<https://developers.google.com/chart/interactive/docs/gallery/wordtree>



<https://vcg.seas.harvard.edu/files/pfister/files/viztaxonomy2013.pdf?m=1446128130>

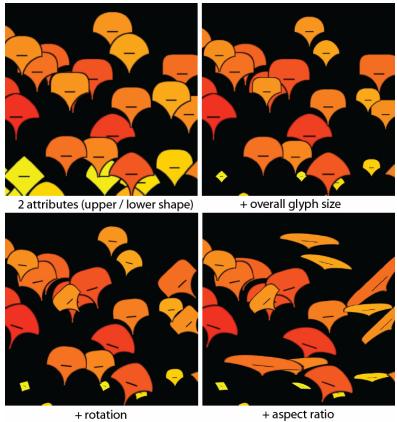
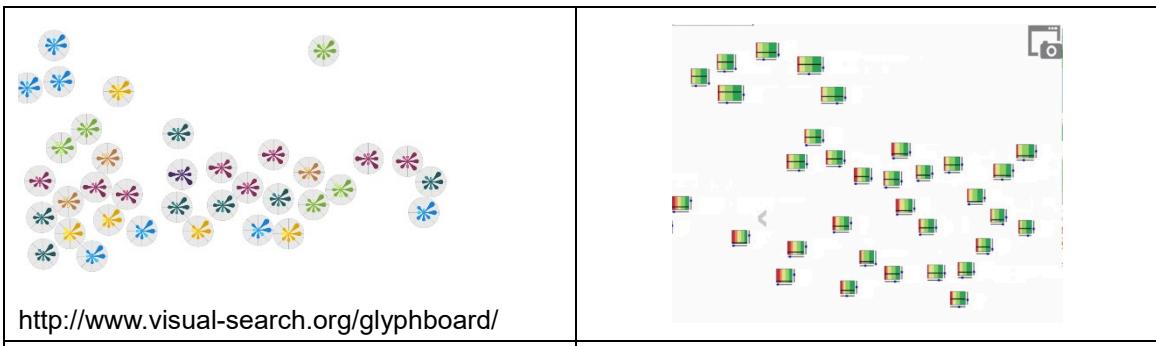


<https://developers.google.com/chart/interactive/docs/gallery/wordtree>

33. Glyph-based Visualization ([back to top](#))

Glyph-based Visualization encodes specific data attributes through custom-designed glyphs, and visually displays the values of various attributes of the data. Scatterplot, Small multiple emphasize the layout, that is, how each element is distributed, while Glyph-based emphasizes the design and encoding of the glyph itself.

Borgo, Rita, et al. "Glyph-based Visualization: Foundations, Design Guidelines, Techniques and Applications." Eurographics (State of the Art Reports). 2013.

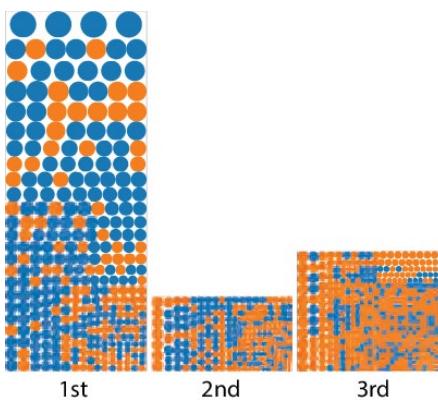


<https://www.cg.tuwien.ac.at/research/publications/2009/lie-2009-cri/>

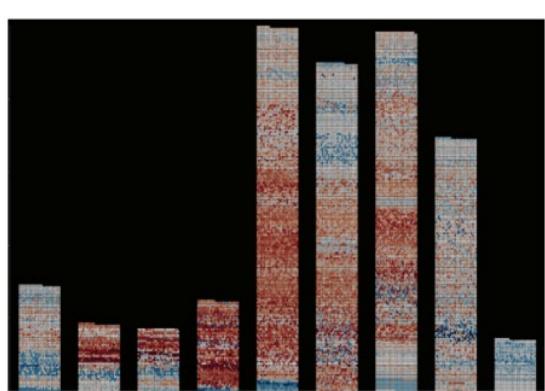
34. Unit Visualization ([back to top](#))

Unit visualizations are a family of visualizations where every data item is represented by a unique visual mark (a visual unit).

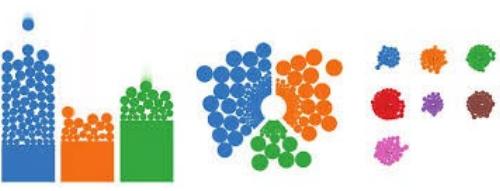
Park, Deokgun, et al. "Atom: A grammar for unit visualizations." IEEE Transactions on Visualization and Computer graphics 24.12 (2017): 3032-3043.



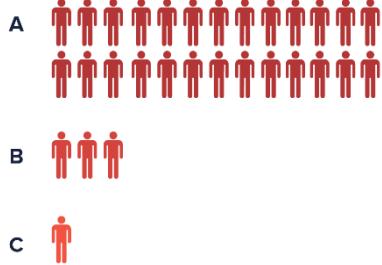
Park, Deokgun, et al. "Atom: A grammar for unit visualizations." IEEE transactions on visualization and computer graphics 24.12 (2017): 3032-3043.



Park, Deokgun, et al. "Atom: A grammar for unit visualizations." IEEE transactions on visualization and computer graphics 24.12 (2017): 3032-3043.



Park, Deokgun, et al. "Atom: A grammar for unit visualizations." *IEEE transactions on visualization and computer graphics* 24.12 (2017): 3032-3043.

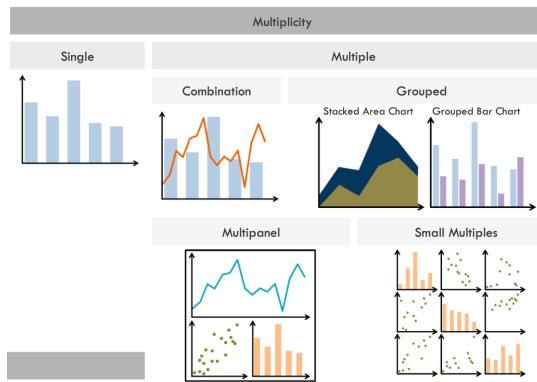


<https://datavizproject.com/data-type/pictorial-unit-chart/>

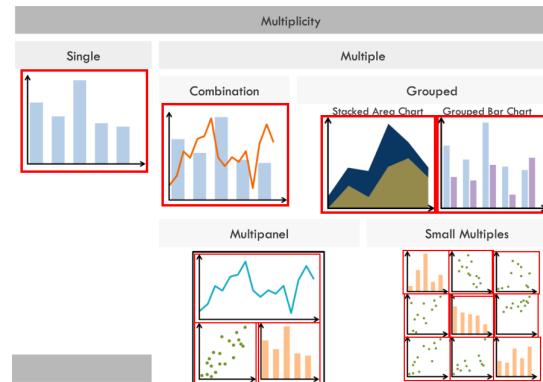
The Criteria of Bounding Box Annotation

1. Considering the diversity of visualizations and the knowledge required for understanding the types, it is recommended that each worker focuses on a specific type of visualization.
2. Given a specific type of visualizations, the bounding box should cover an instance of the type. There are two cases the visualizations:
 - a) When the visualization is equipped with coordinate axes, the bounding box should also cover the coordinate axes.

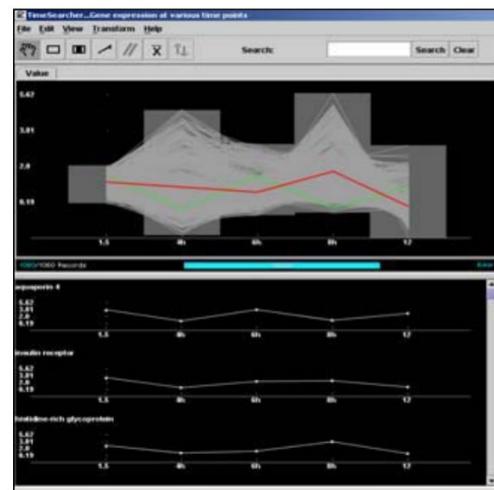
Example 1: original image:



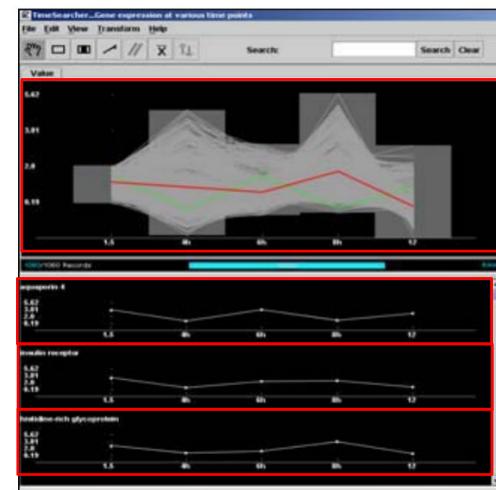
The annotation is shown below:



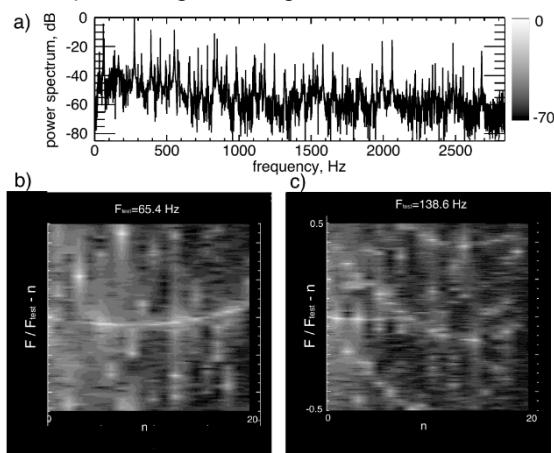
Example 2: original image:



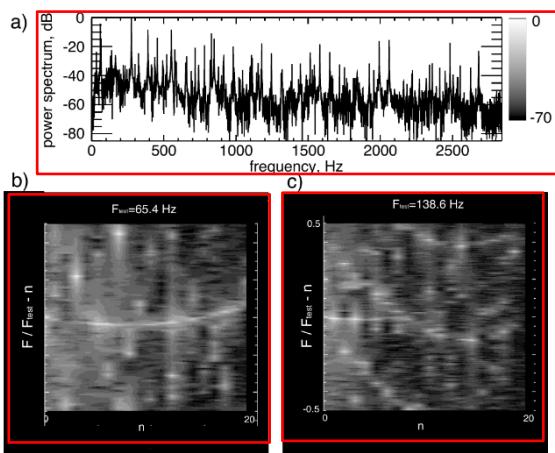
The annotation is shown below:



Example 3: original image:

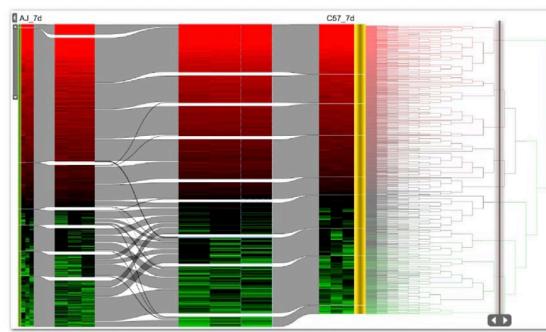


The annotation is shown below:



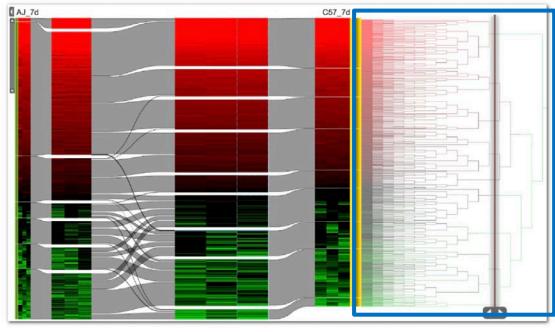
- b) For more complex layouts, we decompose the visualization and annotate the area that belongs to specific types of visualization.

Example 1: original image:



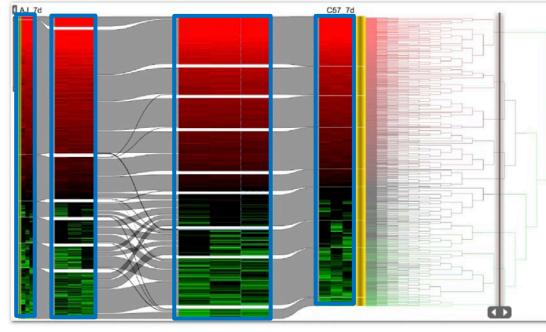
Task 1: Annotate the “tree visualization”.

Result: 1 bounding box



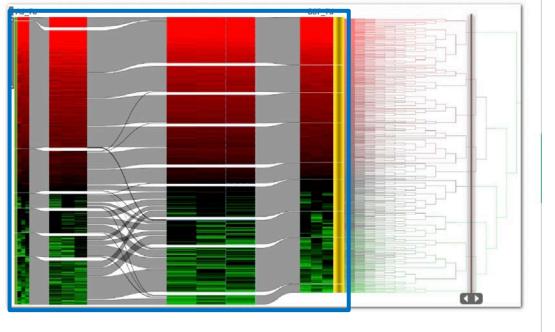
Task 2: annotate the “heatmap”.

Result: 4 bounding boxes

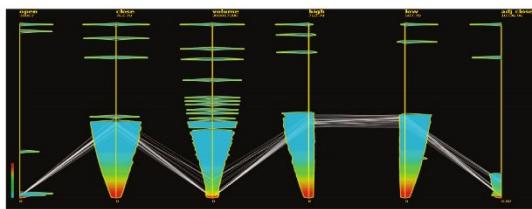


Task 3: Annotate the “Sankey diagram”.

Result: 1 bounding box

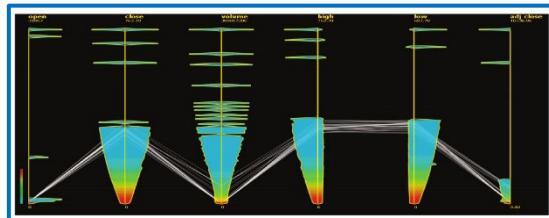


Example 2: original image:



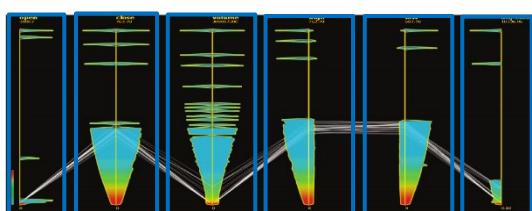
Task 1: Annotate the “parallel coordinates”.

Result: 1 bounding box



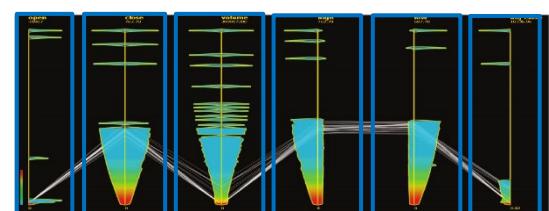
Task 2: Annotate the “area chart”.

Result: 6 bounding boxes



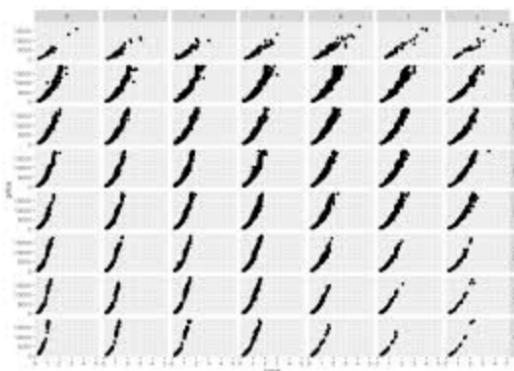
Task 3: Annotate the “heatmap”.

Result: 6 bounding boxes

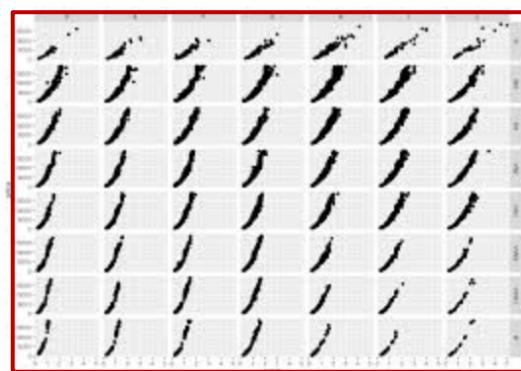


3 For small multiples where the number of the visualization instances is **greater than 10**, these visualizations can be annotated integrally and identified with a label of “small multiples”.

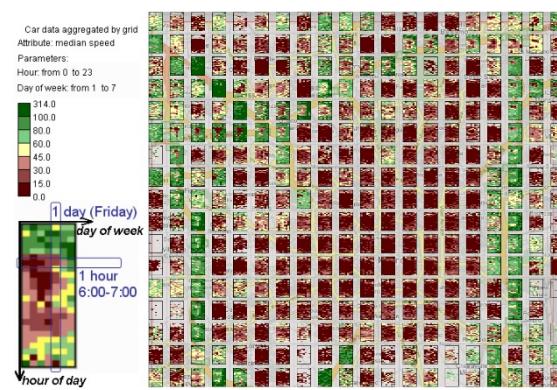
Example 1: The following example contains 8*7 scatterplots,



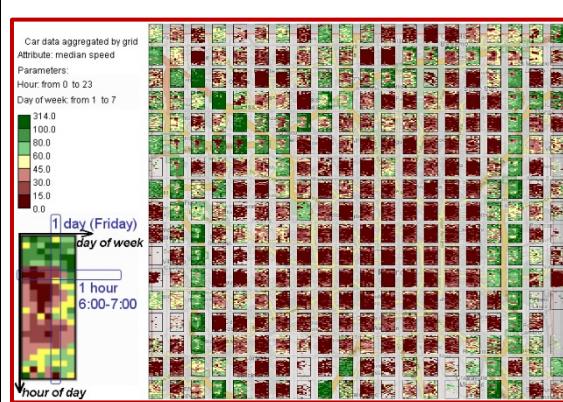
When annotating the “scatterplot”, the bounding box should cover all scatterplots.



Example 2: the image contains 20*17 heatmaps.



When annotating the “heatmap”, the bounding box should cover all heatmap



- 4 The annotated bounding box has the following requirements:
- a. Covering all the content of the visualization.
 - b. The bounding box should be as tight as possible.
 - c. If the visualization has auxiliary components, such as legend and title, and these components are placed next to the visualization, the bounding box should cover the auxiliary components.