

Refugee Crisis in 6 Minutes

<http://9gag.com/tv/p/az2bNN/the-european-refugee-crisis-and-syria-explained>

ADS ML – Week 4

Visualization design principles

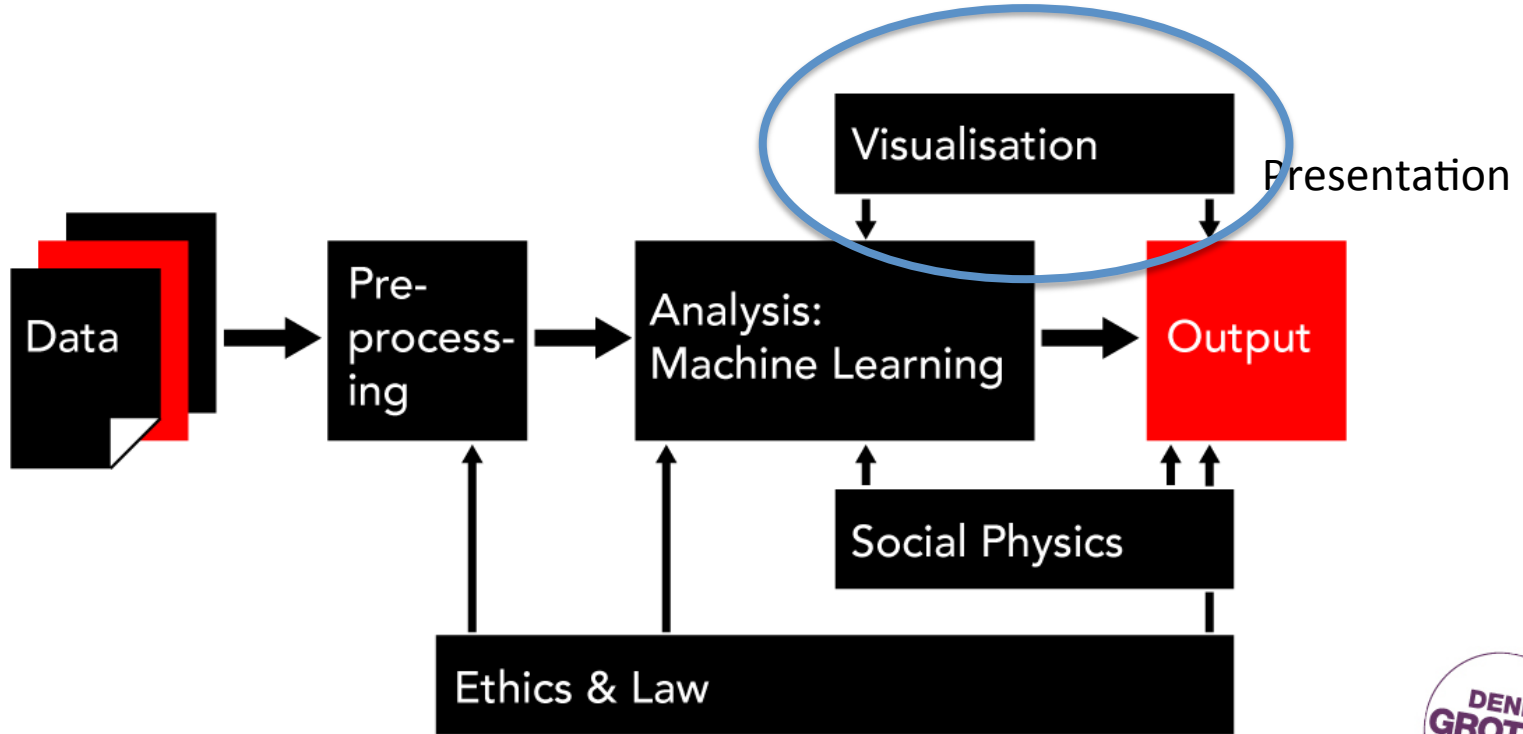
Goals: At the end of this lesson ...

- You can make a proper choice for a chart type based on datatypes and design guidelines.
- You can point out design flaws in charts and improve them based on a set of guidelines and design rules.
- You can make plots that convey a message effectively without resorting to chart lies.

Contribution to the learning objectives

- **create** a visualization from any data set that is not misleading and that clearly shows clustering, outliers and trends,
- **motivate** every design choice in a created visualization,
- **motivate** the next step in a data analysis based on a given visualization,
- **present** data analysis and visualizations as part of reproducible research,
- **apply** narrative techniques in visualizations,
- **create** engaging visualizations that allow for data exploration and story progression.

What are we doing?



Home work: cheat sheets!

Homework?

- Did you make a summary of the different datatypes?
- Did you include visual cue order in visualizations?
- Did you include a list of design rules by Tufte or another authority?
- Did you include general tips and guidelines you found on the way?



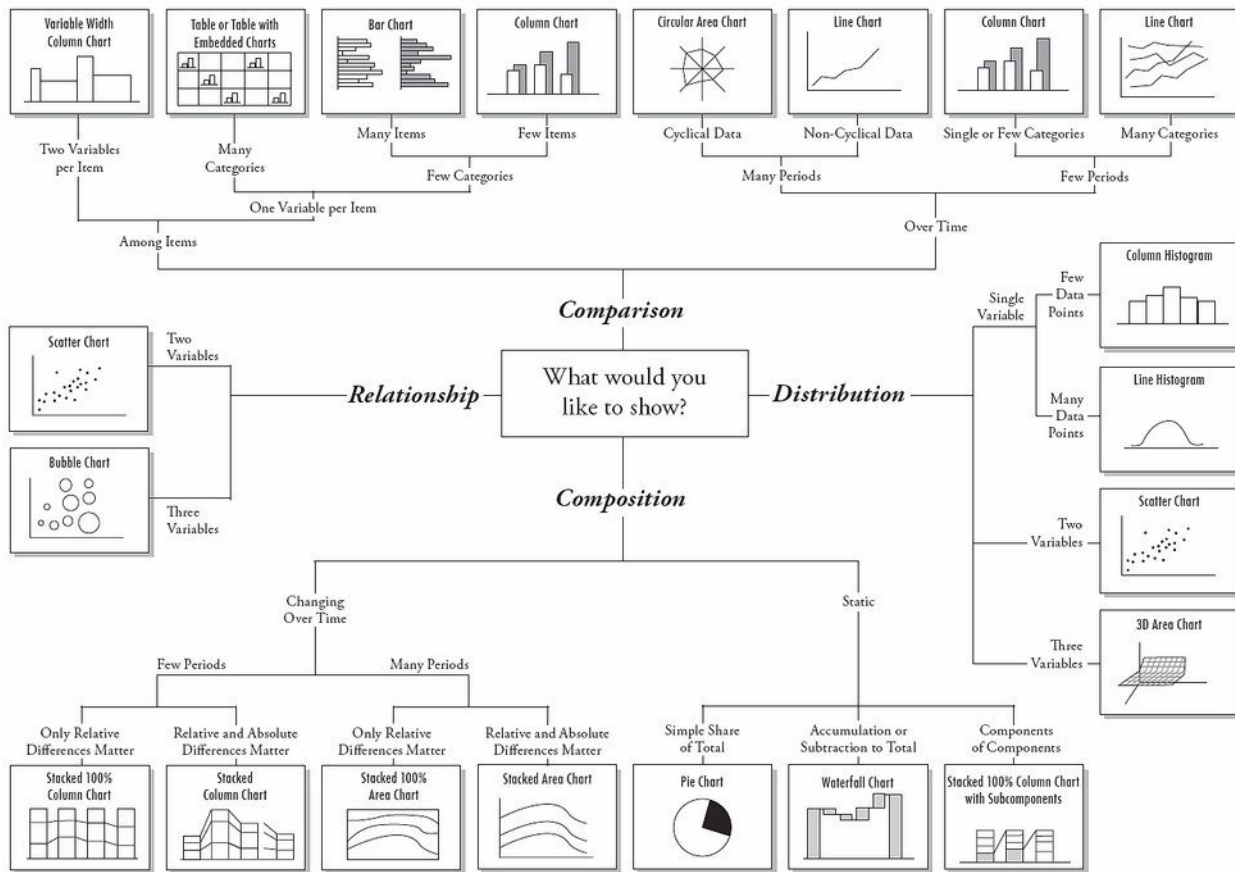
Choosing a Chart Type

Exercise





































































- In how many ways can you visualize the dataset: 75, 37?



Chart Suggestions—A Thought-Starter



A PERIODIC TABLE OF VISUALIZATION METHODS

 C continuum	 Data Visualization Visual representations of quantitative data in schematic form (either with or without axes)										 Strategy Visualization The systematic use of complementary visual representations in the analysis, development, formulation, communication, and implementation of strategies in organizations.										 G graphic facilitation	
 Tb table	 Ga cartesian coordinates	 Information Visualization The use of interactive visual representations of data to amplify cognition. This means that the data is transformed into an image, it is mapped to screen space. The image can be changed by users as they proceed working with it										 Metaphor Visualization Visual Metaphors position information graphically to organize and structure information. They also convey an insight about the represented information through the key characteristics of the metaphor that is employed										 Ct cartoon
 Pi pie chart	 L line chart	 Concept Visualization Methods to elaborate (mostly) qualitative concepts, ideas, plans, and analyses.										 Compound Visualization The complementary use of different graphic representation formats in one single schema or frame										 Ri rich picture
 B bar chart	 Ac area chart	 R radar chart cobweb	 Pa parallel coordinates	 Hy hyperbolic tree	 Cy cycle diagram	 T timeline	 Ve venn diagram	 Mi mindmap	 Sq square of oppositions	 Cc concentric circles	 Ar argument slide	 Sw swim lane diagram	 Gc gantt chart	 Pm perspectives diagram	 D dilemma diagram	 Pr parameter ruler	 Kn knowledge map					
 Hi histogram	 Sc scatterplot	 Sa sankey diagram	 In information lense	 E entity relationship diagram	 Pt petri net	 Fl flow chart	 Cl clustering	 Lc layer chart	 Py minto pyramid technique	 Ce cause-effect chains	 Tl toulmin map	 Dt decision tree	 Cp cpm critical path method	 Cf concept fan	 Co concept map	 Ic iceberg	 Lm learning map					
 Tk tukey box plot	 Sp spectrogram	 Da data map	 Tp treemap	 Cn cone tree	 Sy system dyn./ simulation	 Df data flow diagram	 Se semantic network	 So soft system modeling	 Sn synergy map	 Fo force field diagram	 Ib ibis argumentation map	 Pr process event chains	 Pe pert chart	 Ev evocative knowledge map	 V Vee diagram	 Hh heaven 'n' hell chart	 I informal					

Cy Process Visualization

Hy Structure Visualization

☀ Overview
☐ Detail
☀☐ Detail AND Overview
< > Divergent thinking
> < Convergent thinking

Note: Depending on your location and connection speed it can take some time to load a pop-up picture.

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version 1.5

>☀< Su supply demand curve	>☀< Pc performance charting	>☀< St strategy map	>☀< Oc organisation chart	<☐> Ho house of quality	>☀< Fd feedback diagram	☐ Ft failure tree	>☀< Mq magic quadrant	>☀< Ld life-cycle diagram	>☀< Po porter's five forces	<☐> S s-cycle	>☀< Sm stakeholder map	☀ Is ishikawa diagram	☀ Tc technology roadmap
☀ Ed edgeworth box	>☀< Pf portfolio diagram	☀ Sg strategic game board	>☀< Mz mintzberg's organigraph	<☐> Z zwicky's morphological box	<☐> Ad affinity diagram	☐ De decision discovery diagram	>☀< Bm bcg matrix	>☀< Stc strategy canvas	>☀< Vc value chain	<☐> Hy hype-cycle	>☀< Sr stakeholder rating map	>☀< Ta taps	<☐> Sd spray diagram

Data types, visual encoding & Design rules

MOOC lesson 1a, 2a

Exercise – improve in steps

LACK OF DIVERSITY

Reports by Apple, Yahoo, Google, Facebook, LinkedIn, Twitter and eBay show that seven of the tech sector's largest companies are largely white and male. Apple has slightly more Hispanics and blacks, probably due to greater diversity at its retail stores.



1667



344



82



183

1 APPLE

2 YAHOO

3 GOOGLE

4 FACEBOOK

5 LINKEDIN

6 TWITTER

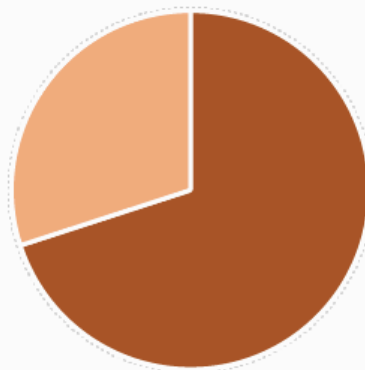
7 EBAY



WORKFORCE BY GENDER AND ETHNICITY

Mostly male

August 2014 global staff

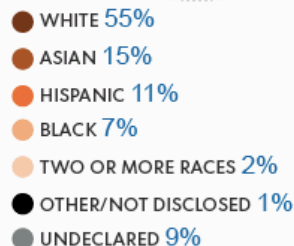
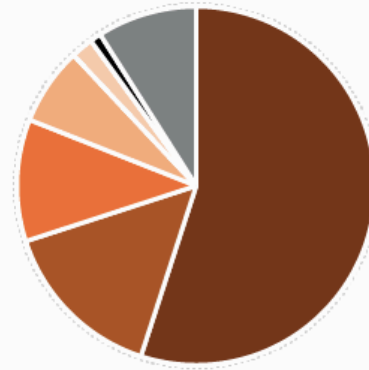


NOTE Data may not total 100% because of rounding



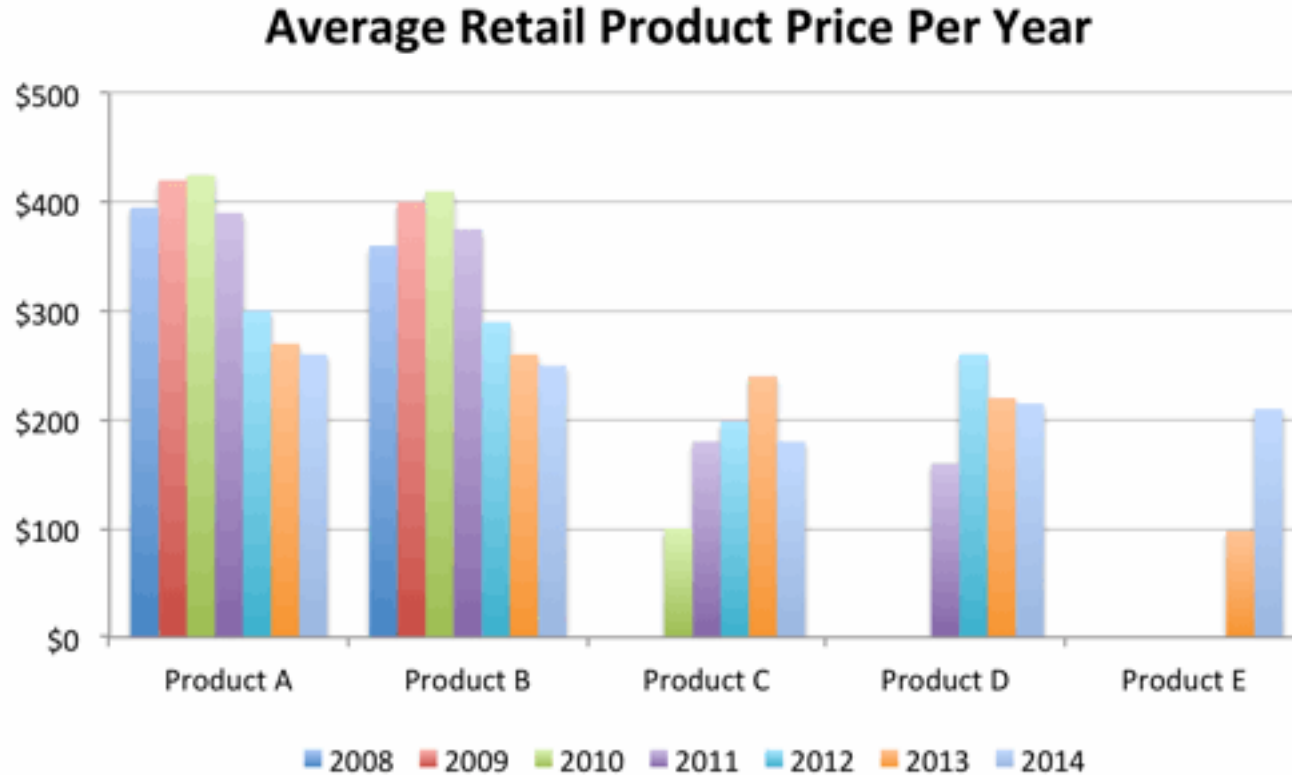
Mostly white

August 2014 U.S. staff



SOURCES Apple, Yahoo, Google, Facebook, LinkedIn, Twitter and eBay
Julie Snider USA TODAY

Exercise – improve in steps



Resources & Tips

Nice places for tips, help and examples.

- Modern book with theory:
<https://infoactive.co/data-design/>
- Tips & examples:
<http://www.storytellingwithdata.com/>
- Free feedback:
<http://helpmeviz.com/> (active contributions are bonus ++)
- More examples:
<http://chartporn.org/>

Assignments 1 - 2

- Create charts / simple infographics for an article.
- Redesign a bad chart.

Before week 6:

Watch lectures **1b** en **2b** of the Udacity MOOC **Data Visualization and D3.js** about D3 building blocks and dimple.js.

Before week 7:

Watch lecture 3 about narrative structures.