6 CHARTING TAXONOMY

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CRASH COURSE ON EFFECTIVE CHARTING

Dona M. Wong
Guide to Information Graphics
The Dos and Don’ts of Presenting Data, Facts, and Figures
W. W. Norton & Company
CHARTING EXAMPLES

median income (USD)

Honolulu  |  Maui  |  Kalawao county  |  Kauai  |  Hawaii

$70,000  |  $60,000  |  $50,000  |  $40,000  |  $30,000
CHARTING EXAMPLES

<table>
<thead>
<tr>
<th>Location</th>
<th>Median Income (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honolulu</td>
<td>$60,000</td>
</tr>
<tr>
<td>Maui</td>
<td>$50,000</td>
</tr>
<tr>
<td>Kalawao county</td>
<td>$45,000</td>
</tr>
<tr>
<td>Kauai</td>
<td>$40,000</td>
</tr>
<tr>
<td>Hawaii</td>
<td>$30,000</td>
</tr>
</tbody>
</table>
CHARTING EXAMPLES

stock price (USD)

Nov 1, 2016  Dec 1, 2016  Jan 1, 2017
CHARTING EXAMPLES
CHARTING EXAMPLES
CHARTING EXAMPLES

May these charts be improved? Why? How?
CHARTING EXAMPLES

- **Pie Chart**
  - Providence: 627,000
  - Other counties: 82,900, 49,900, 127,000, 166,000

- **Bar Chart**
  - Providence: 627,000
  - Kent: 200,000
  - Washington: 150,000
  - Newport: 100,000
  - Bristol: 50,000

Number of inhabitants range from 0 to 600,000.
Fonts

Typographic parts of a glyph:
1) x-height; 2) ascender line; 3) apex; 4) baseline; 5) ascender; 6) crossbar; 7) stem; 8) serif; 9) leg; 10) bowl; 11) counter; 12) collar; 13) loop; 14) ear; 15) tie; 16) horizontal bar; 17) arm; 18) vertical bar; 19) cap height; 20) descender line.

Font size = (1) + (2) + (20) = (19) + (20)
Fonts: General Rules

- Leading should be 2 points larger than type size
- Avoid too small or condensed type faces
- Keep style simple: use **bold** or *italic* to emphasize a word (better not both)
- Avoid **ALL CAPS**
- Avoid *styled fonts*
- Avoid C***C Sans Serif
- Reduce type at an angle
- Avoid **tracking**

Fonts are meant to describe, not to adorn
**TYPOGRAPHY IN CHARTS**

**Don’t**

- Use all caps or high contrast white type out of black.

**Do**

- Use bold for axis.

**HEADLINE OF THE CHART**

- A brief description that outlines what the data shows.

**A brief description that outlines what the data shows**
TYPOGRAPHY IN CHARTS

Don’t

Title of y-axis

Title of x-axis

Headline of the chart

Do

Title of y-axis

Title of x-axis

Headline of the chart
# Typography in Charts

Many elements in bold. Which part is highlighted? Give emphasis to relevant results.
DATA-INK RATIO

Visual Display of Quantitative Data
Edward Tufte, 1983
DATA-INK RATIO

Data-Ink Ratio = \frac{\text{Data ink}}{\text{Total ink used in graphic}}
DATA-INK RATIO

Data-Ink Ratio = \frac{\text{Data ink}}{\text{Total ink used in graphic}}
BAR CHARTS

Represent discrete quantities

Town A  |  Town B  |  Town C  |  Town D
---      | ---      | ---      | ---
8        | 6        | 4        | 2
Avoid non-functional adornation
BAR CHARTS: BASELINE
BAR CHARTS: BASELINE
BAR CHARTS: ORDERING

- France: 1,1
- Germany: 4,1
- Italy: 6,1
- China: 9,1
- USA: 7,1

- France: 1,1
- Germany: 4,1
- Italy: 6,1
- US: 7,1
- China: 9,1
PIE CHARTS

• Pie Charts compares relative sizes and contributions
PIE CHARTS: ORDERING SLICES
CHARTING EXAMPLES

May these charts be improved? Why? How?
TAKEAWAY MESSAGES

• Charts exploit position on scale VV
• Best practice to reduce biases and misinterpretation of charts
Visualization Taxonomy

Information Graphics
A Comprehensive Illustrated Reference

Visual Tools for Analyzing, Managing, and Communicating

Robert L. Harris
Chart Suggestions—A Thought-Starter

### Comparison

**What would you like to show?**

### Relationship

- **Scatter Chart**: Two Variables
- **Bubble Chart**: Three Variables

### Distribution

- **Column Histogram**: Few Data Points
- **Line Histogram**: Many Data Points

### Composition

- **Changing Over Time**: Few Periods, Many Periods
- **Static**: Three Variables

### Diagram Components

- **Stacked 100% Column Chart**
- **Stacked Column Chart**
- **Stacked 100% Area Chart**
- **Stacked Area Chart**
- **Pie Chart**
- **Waterfall Chart**
- **Stacked 100% Column Chart with Subcomponents**

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Visual Analytics
va602aa
BARS VS. LINES

Line implies trends. Do not use for categorical data.
TREND OVER TIME

WILLIAM PLAYFAIR
1759-1823
PATTERNS OVER TIME

Marey’s diagram, 1885
TREND OVER TIME
TREND OVER TIME

Budget Forecasts, Compared With Reality

Just two years ago, surpluses were predicted by 2012. How accurate have past White House budget forecasts been?

Latest forecast

Today, with a better understanding of the severity of the economic downturn, the deficit situation is much more dire.

The 1995 forecast for 1999 did not predict a surplus...

but the 2008 forecast for 2012 did.

Use the slider to isolate a single year’s forecast.
The Ebb and Flow of Movies: Box Office Receipts 1986 — 2008

Summer blockbusters and holiday hits make up the bulk of box office revenue each year, while contenders for the Oscars tend to attract smaller audiences that build over time. Here’s a look at how movies have fared at the box office, after adjusting for inflation.

NYT
Six Ways to Find Value in Twitter’s Noise

1. Listen to the experts. The people you follow on Twitter can provide valuable insights into industry trends and emerging topics. Use tools like Twitpic and Twitterfall to identify key influencers and monitor their conversations.

2. Look for unexpected trends. Sometimes the most interesting data can be found by mining the noise. For example, during the BlackBerry outage in April, we discovered that many users were tweeting about the impact of the outage on their businesses.

3. Focus on the community. Twitter is a social network, and its value lies in its ability to connect people. Look for discussions and conversations that are happening outside of the mainstream media. Identify key hashtags and follow the people who are leading the conversation.

4. Use Twitter to understand your customers. Twitter is a great way to gauge customer sentiment and identify areas for improvement. Monitor your brand mentions and engage with your customers to improve customer satisfaction.

5. Leverage Twitter’s search capabilities. Twitter has a powerful search function that allows you to search for specific keywords and phrases. Use this feature to find relevant conversations and identify key influencers.

6. Integrate Twitter into your analysis. Twitter data can provide valuable insights into consumer behavior and market trends. Use tools like R and Python to analyze Twitter data and integrate it into your overall analysis framework.
Pie vs Bar Charts

65% of the market is controlled by companies B and C
Pies vs Bar Charts

Furthermore, we present the distribution of attacks towards employees in detail in Fig. 10 right. The blue employees are secretaries, the green ones are administrators and the red ones are scientific employees. The number following the name is the number of times that person was attacked. All of the names are pseudonyms for real people. The person that suffered the most attacks is Monja a secretary with overall 8 attacks. In contrast, all other victims suffered between 1 and 3 attacks.
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SHOWING CHANGES

**Silicon Alley Insider**  
**Chart of the Day**

**Total Digital Traffic Market Share (U.S.)**

- **Jun. '11**
  - Windows (Desktop): 79.47%
  - Mac (Desktop): 13.27%
  - iOS: 4.91%
  - Android: 2.42%
  - Other: 2.95%

- **Dec. '11**
  - Windows (Desktop): 77.98%
  - Mac (Desktop): 13.15%
  - iOS: 4.91%
  - Android: 2.95%
  - Other: 2.85%

Source: comScore

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**Market Share Change (Jun-Dec 2011)**

<table>
<thead>
<tr>
<th>Platform</th>
<th>Jun 2011</th>
<th>Dec 2011</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows (Desktop)</td>
<td>79.6%</td>
<td>78.0%</td>
<td>(1.6%)</td>
</tr>
<tr>
<td>Mac (Desktop)</td>
<td>13.3%</td>
<td>13.2%</td>
<td>(0.1%)</td>
</tr>
<tr>
<td>iOS</td>
<td>3.5%</td>
<td>4.9%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Android</td>
<td>2.4%</td>
<td>2.7%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Other</td>
<td>1.3%</td>
<td>1.3%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>
SHOWING CHANGES
DENSITY PLOT
2D DENSITY PLOTS

Points

Heatmap

Points

Heatmap
BOX PLOTS

- High value
- 75th percentile
- Median (50th percentile)
- 25th percentile
- Low value

Spread (100% of the values)
Midspread (50% of the values)
SCATTERPLOT

http://xkcd.com/388/
CLUTTERING, OVERPLOTTING
alpha=1/10

alpha=1/100
A FEW EXAMPLES AND CASE STUDIES
The Office for National Statistics (ONS) said gross domestic product (GDP) expanded by 0.7 per cent in the fourth quarter – an increase from the 0.6 per cent calculated on the watchdog’s first look at the economy.

Source: http://www.dailymail.co.uk/news/article-4248690/Economy-grew-0-7-final-three-months-2016.html
Procent użytków rolnych w gospodarstwach > niż 50 ha:

1989

25\%
CAMEAR INDUSTRY FACTS 2009-2016

Amount of Total Cameras Manufactured by Year

*in millions

35% DROP in SHIPPED CAMERAS IN 2016

12% DROP in SHIPPED LENSES IN 2016

DSLR vs. Mirrorless 2013-2016

*in millions

2013 2014 2015 2016

13 12 11 10

22 21 20 19

4% DECREASE IN MIRRORLESS PRODUCED & 17% DROP in DSLR PRODUCED in 2016

Cameras Manufactured Between 2010-2016

Interchangeable vs. Non-Interchangeable

Camera Market Overview 2013-2016

THE ENTIRE CAMERA MARKET in 2016 SAW 81% DROP COMPARED TO 2010

Lensvid.com is THE place to find the most interesting, informative, professional and inspiring photography videos on the web.

SOURCE: https://lensvid.com/gear/lensvid-exclusive-happened-photography-industry-2016/
VISUAL TAXONOMY

The Data Visualisation Catalogue

Search by Function

View by List

Arc Diagram
Area Graph
Bar Chart
Box & Whisker Plot
Brainstorm
Bubble Chart
Bubble Map
Calendar
Chord Diagram
Choropleth Map
Circle Packing
Connection Map

http://www.datavizcatalogue.com/
TAKEAWAY MESSAGES

• Appropriate chart type for specific data type and visualization task