TELLING STORIES WITH DATA VISUALIZATION

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Science-ness
LET'S TALK ABOUT...
LETS TALK ABOUT...

VISUALIZATIONS
LET'S TALK ABOUT...

VISUALIZATIONS

COMMON MISTAKES AND HOW TO FIX THEM
LETS TALK ABOUT...

VISUALIZATIONS

COMMON MISTAKES AND HOW TO FIX THEM

CASE STUDY
VISUALIZATIONS ARE IMPORTANT
“Numerical calculations are exact, but graphs are rough”

- other people
ALBERTO CAIRO
@ALBERTOCAIRO
THEFUNCTIONALART.COM
ANSCOMBE’S QUARTET
<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th>X</th>
<th>Y</th>
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\[ y = 3.00 + 0.500x \]

\[ x = 9 \]

\[ y = 7.50 \]

\[ \text{Var}(y) = 4.125 \]
TONS OF TOOLS
D3
Raphael
Matplotlib
Graphviz
Canvas
Excell
“TELLING STORIES”
“The viewer can see the entire narrative”
- me just now
I live here
“Some people are less than a mile from [the utility’s] service area but, by law, can’t get its broadband”
Gigabit or 100 mbps connections in EPB coverage area

Percent of homes and businesses with 100 mbps or more

Source: EPB, April 2014
Graphic by Mary Helen Miller
“Facebook’s offer price was $38 a share, giving the company a valuation of $104 billion, nearly four times larger than google in 2004”

- Washington Post
Facebook

Facebook’s offer price was $38 a share, giving the company a valuation of $104 billion, nearly four times larger than Google in 2004.
Facebook's offer price was $38 a share, giving the company a valuation of $104 billion, nearly four times larger than Google in 2004.
Contribution activity

October 2017

- Created 28 commits in 6 repositories
  - LeToteTeam/catalog: 10 commits
  - LeToteTeam/letote: 6 commits
  - tonic-sys/hclock: 5 commits
  - keathley/wallaby: 3 commits
  - keathley/elixir_rocksdb: 2 commits
  - tonic-sys/event_store: 2 commits

- Created 1 repository
  - keathley/elixir_rocksdb

- Created a pull request in keathley/wallaby that received 5 comments
  
  **Update dependencies.**
  
  Updating our dependencies.

- Opened 23 other pull requests in 6 repositories
  - LeToteTeam/catalog: 1 closed, 3 merged
  - LeToteTeam/letote: 1 closed, 3 merged, 3 open
  - tonic-sys/hclock
  - tonic-sys/event_store
  - keathley/wallaby
  - LeToteTeam/k8s.ops.letote.com

- Reviewed 34 pull requests in 7 repositories
Users get to draw their own conclusions.
HTTP RESPONSES
THE REAL WORLD

UNICORN
VISUALIZATION IS ONE VIEWPOINT
"THIS IS HOW THE SERVER IS DOING"
“THIS IS HOW OUR USERS ARE DOING”
UNCONSCIOUS} BIAS
COMMON MISTAKES AND HOW TO SOLVE THEM
PIE CHARTS
DON'T USE PIE CHARTS
COLOR IS FILLED WITH
SUBTLE BIAS
USE COLOR DELIBERATELY AND SPARINGLY
Avoid using red and green in the same display.
CHARTJUNK AND NOISE
Initial design goals
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<th>Value</th>
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<td>Damage Dealt</td>
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LABELS AND SCALES
USE LABELS TO PROVIDE CLARITY
PATTERN MATCHING
Gun deaths in Florida

Number of murders committed using firearms

2005 Florida enacted its ‘Stand Your Ground’ law

Source: Florida Department of Law Enforcement

C. Chan 16/02/2014
CORRELATION AND CAUSATION
Worldwide non-commercial space launches correlates with Sociology doctorates awarded (US)
Total revenue generated by arcades correlates with Computer science doctorates awarded in the US.
Per capita consumption of mozzarella cheese correlates with Civil engineering doctorates awarded
TYLER VIGEN

HTTP://TYLERVIGEN.COM/SPURIOUS-CORRELATIONS
THE CLUSTERING ILLUSION AND CONFIRMATION BIAS
“That looks great!”
- Our client
“That looks wrong”
-Us
Apophenia
CONFIRMATION BIAS

“I want this to be true and it looks like it is”
THE CLUSTERING ILLUSION

I've made the last 3 so I'm more likely to make this one.
CASE STUDY: LUNCH ATTENDANCE
**Weekly lunchtime talk series about all things software in Chattanooga & on the Internet.**

**Lightning Talks**

**Floor 5 at The Edney Innovation Center**

1100 Market Street, Suite 500, Chattanooga, TN (map)

Hosted by: Brett (Organizer)
HYPOTHESIS
AN HYPOTHESIS MUST...
AN HYPOTHESIS MUST...
MAKE AN ASSERTION
AN HYPOTHESIS MUST...

MAKE AN ASSERTION

BE FALSIFIABLE
HYPOTHESIS

HOW DO WE GET MORE PEOPLE TO SHOW UP TO OUR MEETUP?
HYPOTHESIS

PEOPLE ATTEND TOPICS THEY’RE INTERESTED IN
LET'S REMOVE THE CHART JUNK
MAXIMA
TODO: ADD EXAMPLE OF ATTENDANCE
CONSIDER THE VIEWPOINT
HYPOTHESIS

PEOPLE ATTEND TOPICS THEY’RE INTERESTED IN
TODO: MEMBERS WITH ATTENDANCE

TEAM PIZZA
TODO: MEMBERS WITH ATTENDANCE

TEAM PIZZA

LONG TAIL
HYPOTHESIS

PEOPLE ATTEND TALKS THAT THEIR FRIENDS ATTEND
CONCLUSION
Consider your biases
ITERATE
LET THE DATA SPEAK
RESOURCES

EDWARD TUFTE

ALBERTO CAIRO

INFORMATIONISBEAUTIFUL.NET
Thanks!

Chris Keathley / @ChrisKeathley / c@keathley.io