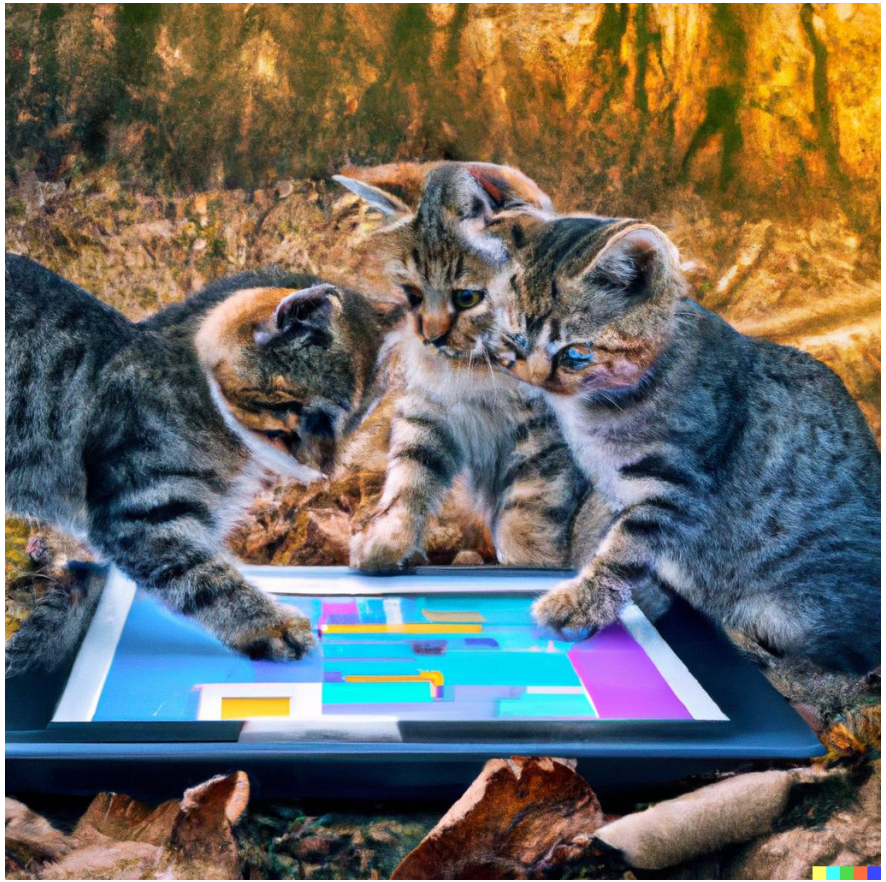
FALL 2023
DSE 12700
VISUAL ANALYTICS

Professor
Madeline Blount
she/her

Week 9
UNCERTAINTY



Dall-E2, tabby kittens creating colorful digital charts in a forest, photorealistic style

🧹 housekeeping:

- midterm feedback: by end of next week Nov. 10th
- Midterm project grade, labs/attendance grade, current standing in class
- Feedback on work!

📊🗺️ FINAL PROJECT! Coming up fast …

- Will have full description by next class
- Generally: choose your team, choose your dataset, build interactive visualization
- Suggest using both Python (analysis) and JS (visualization)

📊🗺️ FINAL PROJECT! Coming up fast …

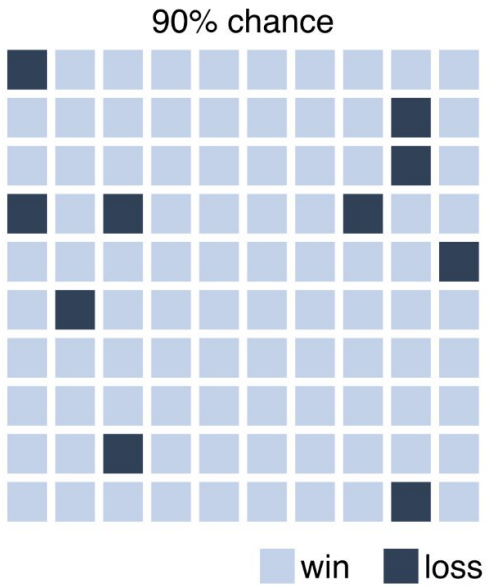
- Next week **INSTEAD of FOUND VISUALIZATION:**
- 1 post stating 2 data interests, with example datasets
- Suggest your strengths, or what areas you want to work on, for the project (writing/presenting? Data analysis/python? Javascript? Design?)
- Post due before class **Nov. 8th** (next week)
- Final groups due with informal proposal **Nov. 15th**
- Groups: 3 = ideal! 4 = ok, scope

“Nearly every dataset we work with has some uncertainty” - Wilke

Concrete techniques: error bars, frequency framing …

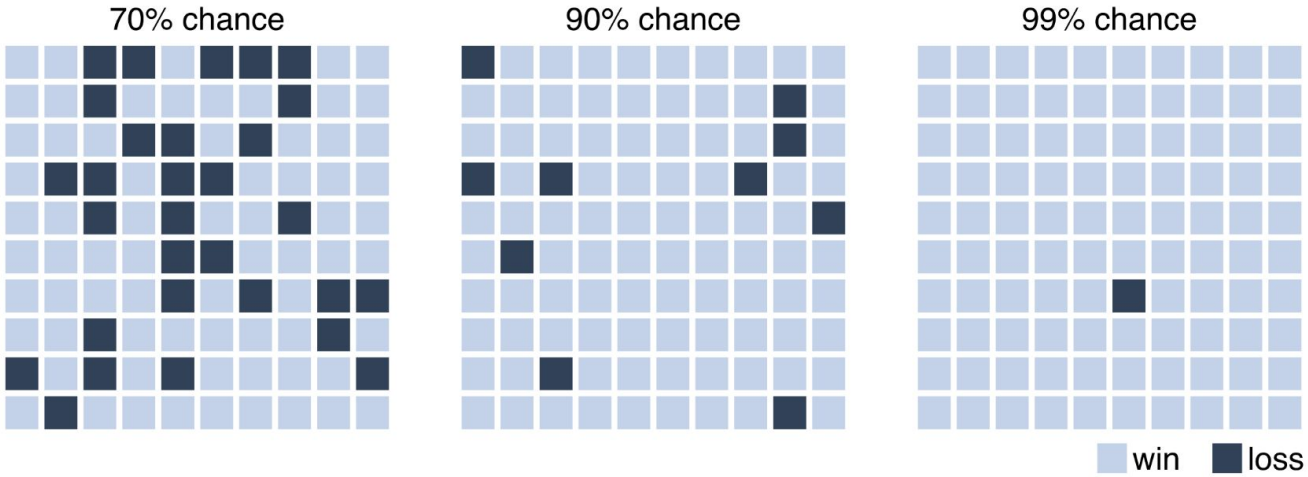
BUT: we’re bad @ judging uncertainty

It helps to visualize a set of possible outcomes



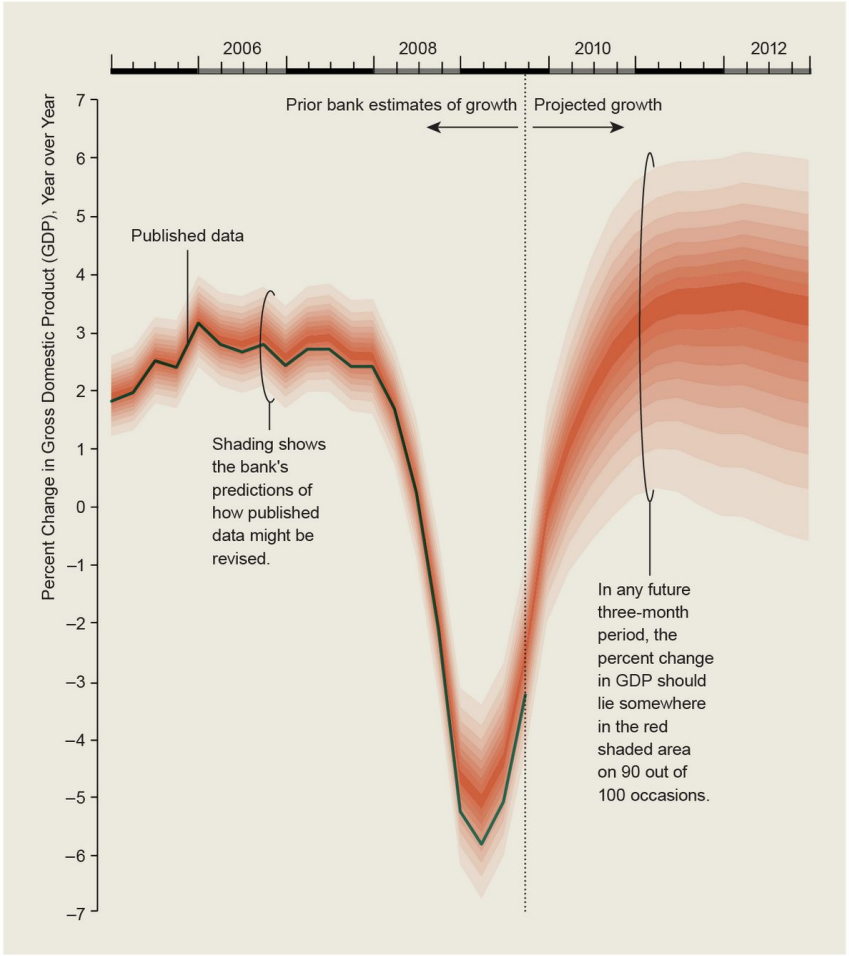
Possible outcomes from 100 individual games played

https://wilkelab.org/SDS375/slides/visualizing-uncertainty.html#23



This type of visualization is called "frequency framing"

https://wilkelab.org/SDS375/slides/visualizing-uncertainty.html#23



Credit: Jen Christiansen Source: *Inflation Report*, Bank of England, February 2010

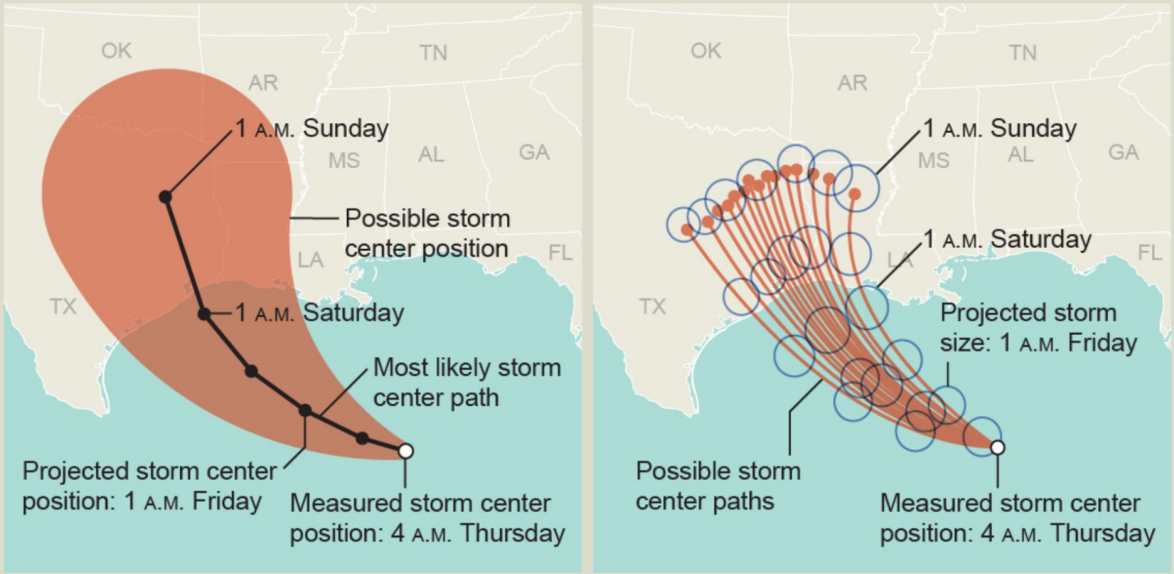
WIND **simulation/prediction** maps:

https://mapbox.github.io/webgl-wind/demo/

https://earth.nullschool.net/#current/wind/surface/level/orthographic

https://project-ukko.net/map.html#

“Cone of uncertainty” (*left*) shows where a hurricane may head, according to a group of forecasts. An alternative is to show the specific path predicted by each forecast (*right*). Both approaches have pros and cons in helping people judge the risk they may face, but the one on the right makes it clearer that the path is difficult to predict.



Credit: Tiffany Farrant-Gonzalez; Sources: National Hurricane Center (*cone of uncertainty*); “Visualizing Uncertain Tropical Cyclone Predictions Using Representative Samples from Ensembles of Forecast Tracks,” by Le Liu et al., in *IEEE Transactions on Visualization and Computer Graphics*, Vol. 25; August 20, 2018 (*multiple storm paths*)

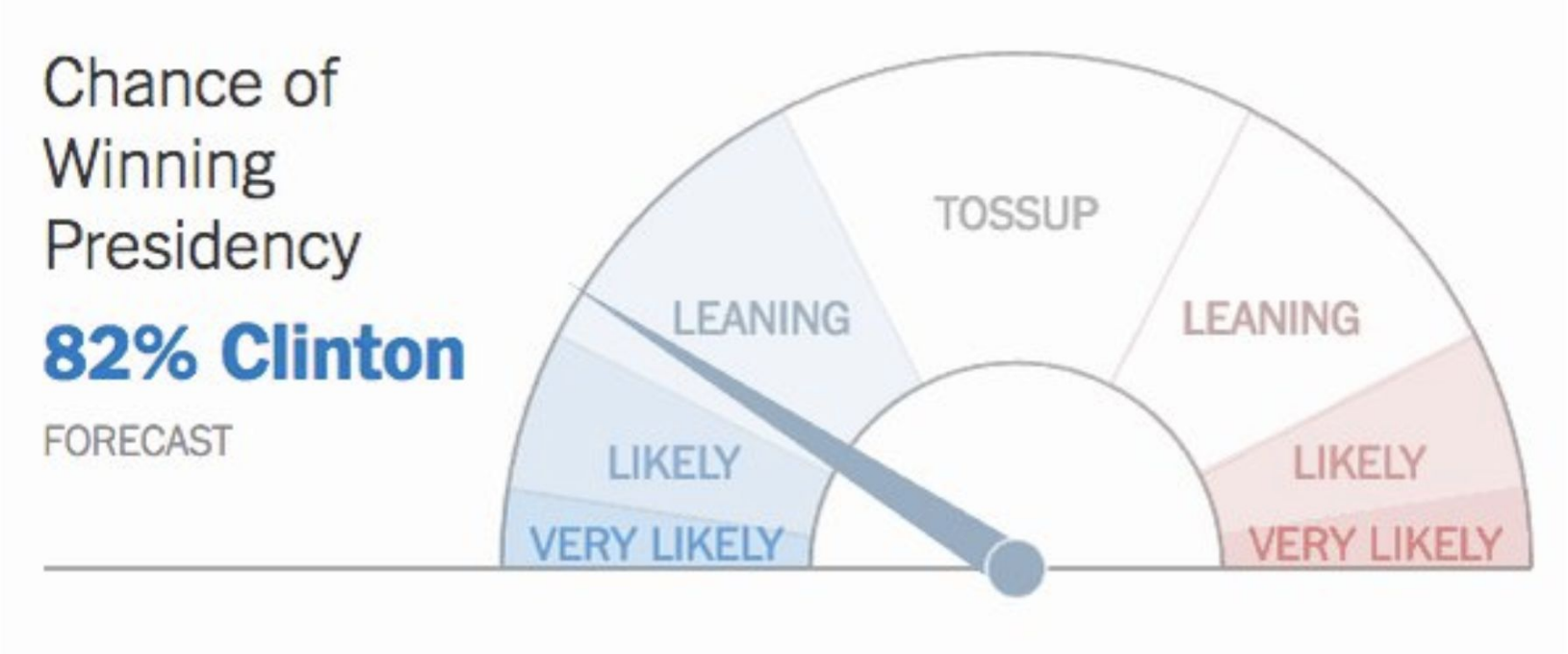
HURRICANE **CONE OF UNCERTAINTY:**

https://www.nytimes.com/interactive/2019/08/29/opinion/hurricane-dorian-forecast-map.html

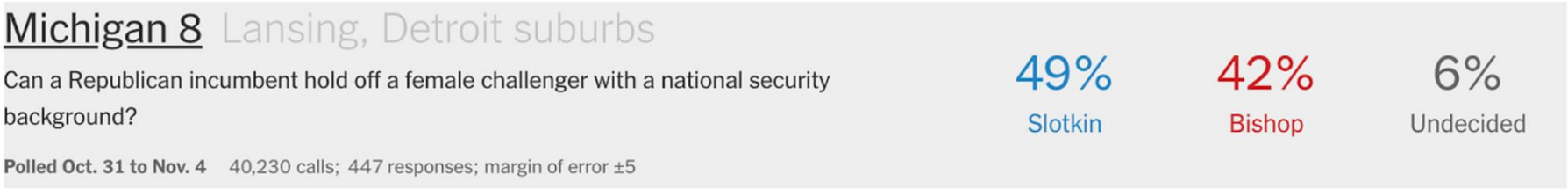
About **data literacy:**

“data visualizations wield a tremendous amount of rhetorical power“ - D’Ignazio (same author as housing data article)

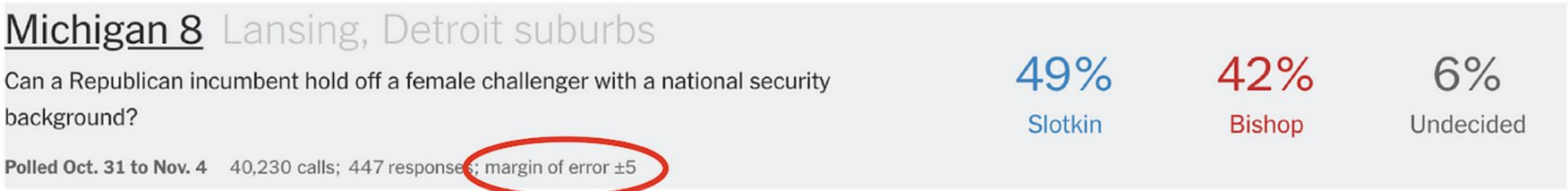
“if data visualizers don’t take on this **responsibility**, who does?”



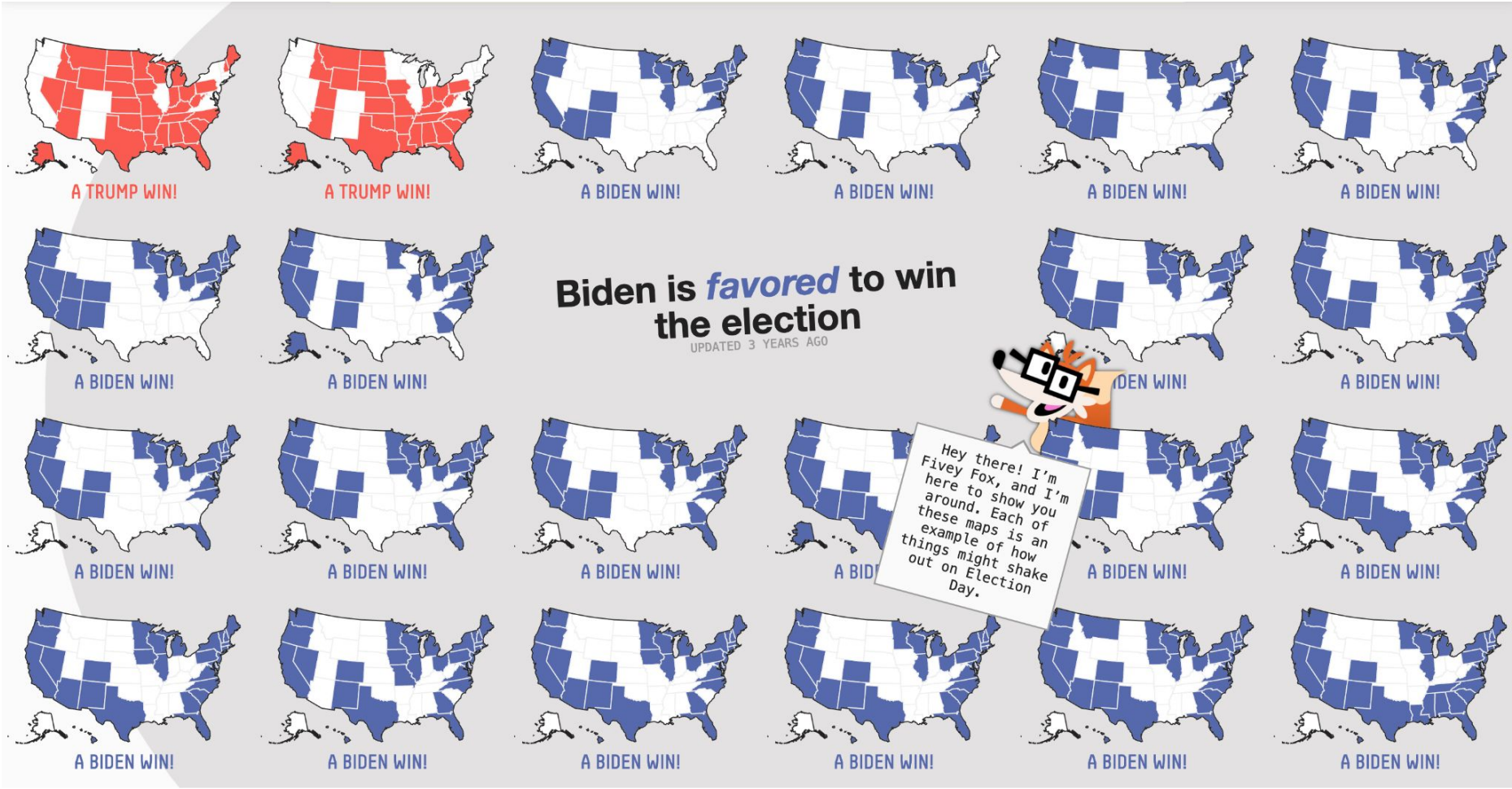
The *New York Times* election forecast needle as it appeared on election night in 2016 at 7:18 p.m. Eastern.



It just kind of jumps out at you, right? **RIGHT?**



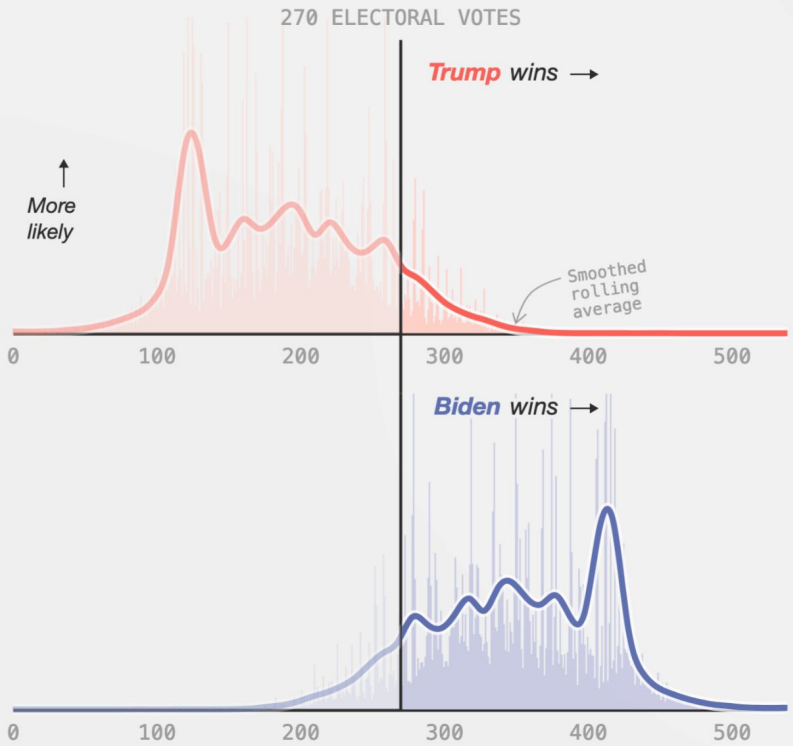
https://medium.com/multiple-views-visualization-research-explained/uncertainty-visualization-explained-67e7a73f031b



https://fivethirtyeight.com

Every outcome in our simulations

All possible Electoral College outcomes for each candidate, with higher bars showing outcomes that appeared more often in our 40,000 simulations



More bars to the right of the 270 line means more simulations where that candidate wins. Some of the bars represent really weird outcomes, but you never know!

We made this

FORECAST MODEL
Nate Silver

PROJECT MANAGEMENT
Christopher Groskopf

DESIGN
Ryan Best
Jasmine Mithani
Anna Wiederkehr

CONTENT EDITING
Micah Cohen
Sarah Frostenson
Christopher Groskopf
Nate Silver

ART DIRECTION
Emily Scherer

ILLUSTRATION
Fabio Buonocore
Joey Ellis

DEVELOPMENT
Ryan Best
Jay Boice
Aaron Bycoffe
Christopher Groskopf
Elena Mejía
Jasmine Mithani
Anna Wiederkehr
Julia Wolfe
Yutong Yuan

COPY EDITING
Colleen Barry
Jennifer Mason

DATA & RESEARCH
Aaron Bycoffe
Dhrumil Mehta
Mary Radcliffe
Derek Shan

Download the data: Polls Model outputs

Notice a 🍾? Send us an email.

Congrats, you made it to the bottom! If you're looking for the nitty-gritty of how our forecast works, check out the methodology.

Methodology: https://fivethirtyeight.com/features/how-fivethirtyeights-2020-presidential-forecast-works-and-whats-different-because-of-covid-19/

ANIMATIONS:

https://www.scientificamerican.com/article/how-to-get-better-at-embracing-unknowns/

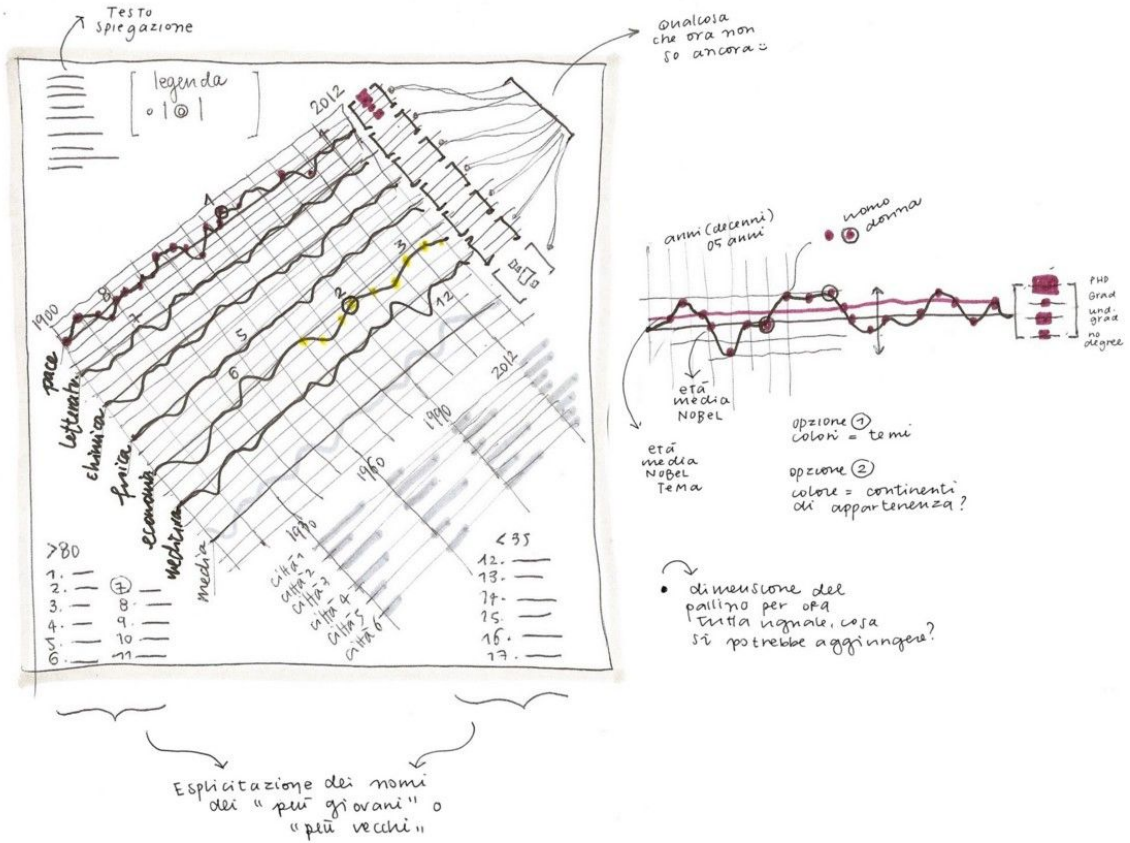
https://vallandingham.me/animating_uncertainty.html

From Lupi's DATA HUMANISM:

"One size does not fit all …"
don't throw technology @ the problem!

Sketching

"It's time to leave behind any presumption of absolute control and universal truth and embrace an informed depiction of the big numbers and small imperfections that work together to describe reality."



power of d3!! Sketch -> code

🎨 TASK OF VISUALIZERS:

- use techniques that visualize the uncertainty

- Invent, experiment with new techniques that visualize uncertainty - custom for each dataset + audience!

- Use language, methodology, context to problematize the concept of certainty in data, **GENERALLY**, not just in the dataset itself!