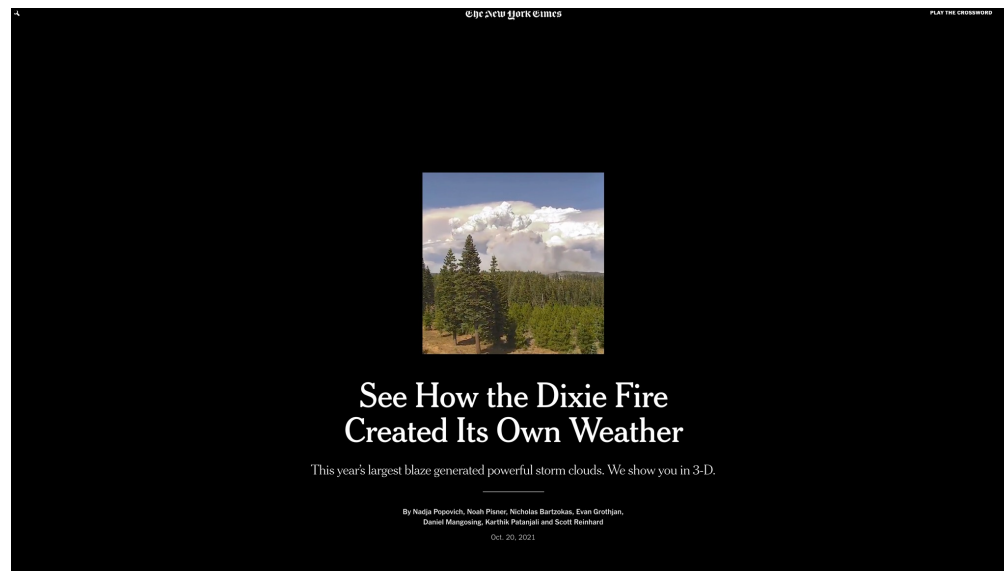


# VISUAL EXPLAINERS

CS 448B | Fall 2025

MANEESH AGRAWALA

1



2

## READING RESPONSE: QUESTIONS/THOUGHTS

When we were speaking about using interactivity with *the zipcode finder*:

I found myself wondering **how you know if you should include an aspect of interactivity**. There was mention of people often not actually using interactive features especially when it is unclear what question that feature is supposed to answer.

Additionally, oftentimes interactivity seems to be used just to increase engagement or make a visualization more stimulating, but not necessarily more expressive. **How do you know when a visualization would benefit from interactivity rather than using multiple graphs, and if you do decide to use an interactive feature how do you encourage users to use it in the correct manner?**

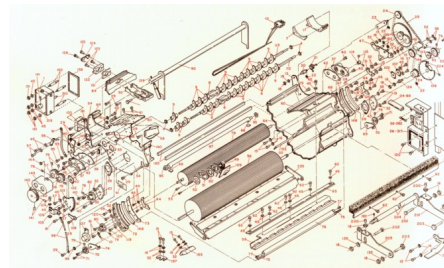
3

## READING RESPONSE: QUESTIONS/THOUGHTS

The reading on **layering and separation** was likewise interesting. .... there was an example, in which vertical box and whisker plots were minimized to vertical lines and dots that represented the averages. While I agree that this reduces the noise in the plot, it makes comparing the plots much harder. ...

**where should we draw the line between reducing noise and oversimplifying a visualization?**

**... a question that I have is: would drawing a diagram or map in 3D be another effective way to layer information?** I imagine that the extra layer of depth and perspective can enhance the sense of relation between multiple objects. If so, is modeling a visualization in 3D feasible?

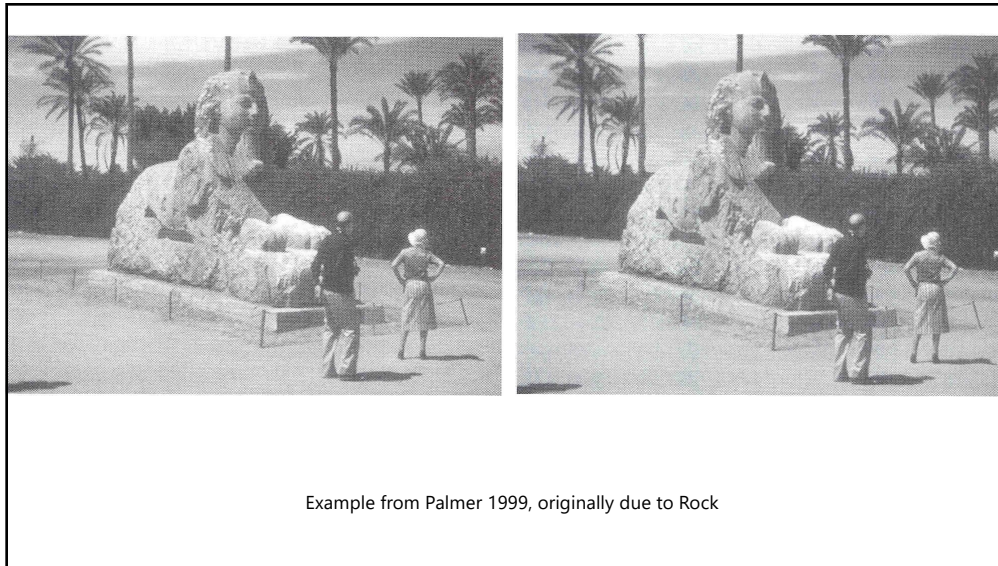


[Tufte 1990]

4

# CHANGE BLINDNESS

5



6



7



8

## RENSINK'S DEMONSTRATIONS



<https://www.csc2.ncsu.edu/faculty/healey/PP/>

9

## SUMMARY

Choosing effective visual encodings requires knowledge of visual perception

### Visual features/attributes

- Individual attributes often preattentive
- Multiple attributes may be separable, often integral

**Gestalt principles** provide higher level design guidelines

We don't always see everything that is there

10

# ANNOUNCEMENTS

11

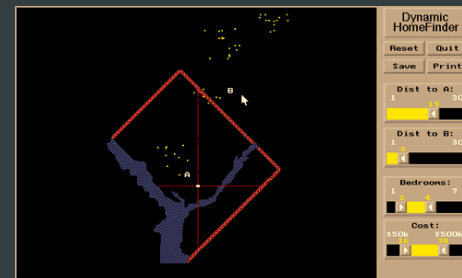
## ASSIGNMENT 3: INTERACTION

**Due 10/27 10:30am**

Create a small interactive dynamic query application similar to HomeFinder, but for San Francisco film locations.

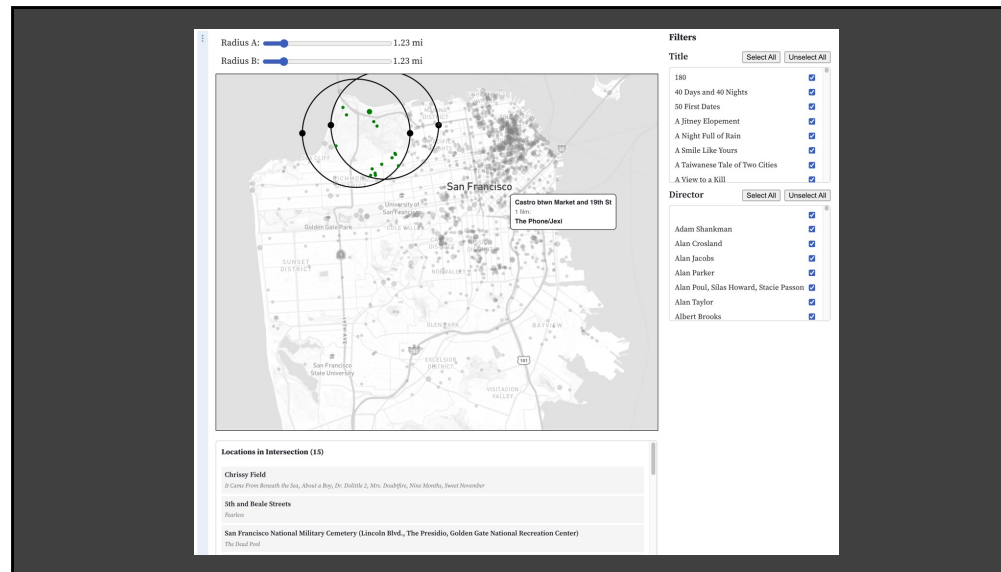
1. Implement interface
2. Submit the application as a website and a short write-up on canvas

Can work alone or in pairs



12





13

# TODAY

## Learning Objectives

1. How stories are constructed in journalism and especially with data.
2. Using interactivity and sequencing to visually convey narrative.

14

# STORYTELLING

15

## ALL MEDIA TELL STORIES

**PEOPLE** TELL STORIES

**WORDS** TELL STORIES

**IMAGES** TELL STORIES

**COMICS** TELL STORIES

**MOVIES** TELL STORIES

**VISUALIZATIONS** TELL STORIES

17



**narrative** (n): An account of a series of events, facts, etc., given in order and with the establishing of connections between them

*"... require[s] skills like those familiar to movie directors, beyond a technical expert's knowledge of computer engineering and science."*

- Gershon & Page '01

18

August 26, 2010

## Generals Wary of Move to Cut Their Ranks

By GINGER THOMPSON and THOM SHANKER

WASHINGTON — Maj. Gen. Paul D. Eaton, a retired Army officer, is familiar with the perks and pitfalls of power, having commanded tens of thousands of troops at Fort Benning, Ga., managed budgets exceeding \$2 billion in Iraq, and overseen layers upon layers of staff members who helped manage both his professional duties and his personal life.

He has experienced the full range of lifestyles that come with military leadership, living at one point in an elegant antebellum mansion, and at another, with eight other officers crowded in a marble bathhouse behind one of Saddam Hussein's old palaces.

When he traveled, he was occasionally able to justify the use of military aircraft, but most times, he said, he flew coach. And today he lives on a pension worth 75 percent of his military salary, with health benefits that cover everything except dental and eye care for himself and his wife.

"We are well compensated, and we live very comfortable lives," General Eaton said, referring to the military's most senior leaders. "But when you look at all the things going on around a general, the nation is getting a very, very high return on its money."

Not everyone at the Pentagon agrees. Two weeks ago, Defense Secretary Robert M. Gates announced a sweeping effort to improve efficiency that, among other things, takes aim at the military's sacrosanct corps of generals and admirals, ordering his staff to cut at least 50 positions, and making clear that he would be happier if they cut more.

19

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**Anecdotal Lead (1<sup>st</sup> paragraph called Lede)**

20

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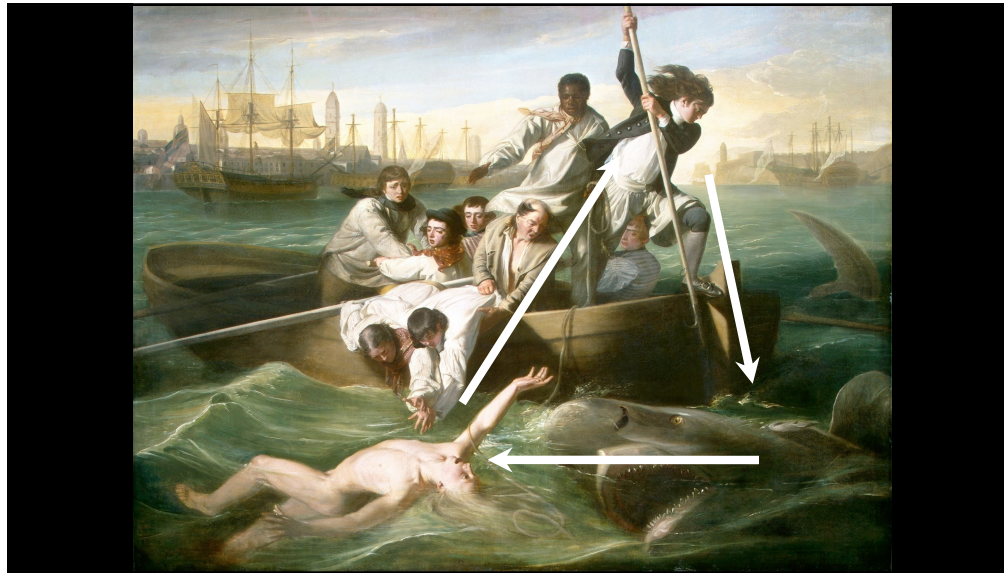
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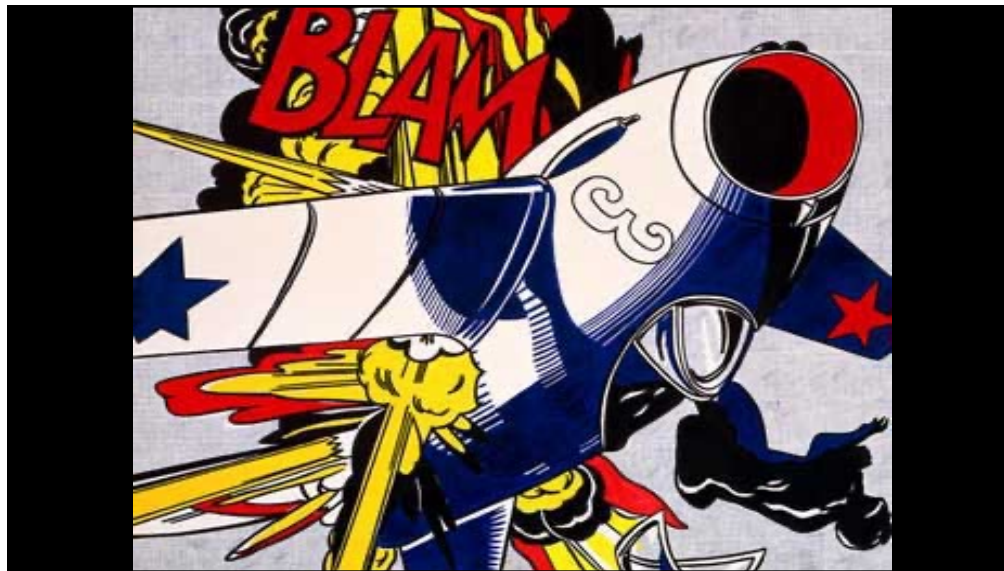
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**Nut Graph**

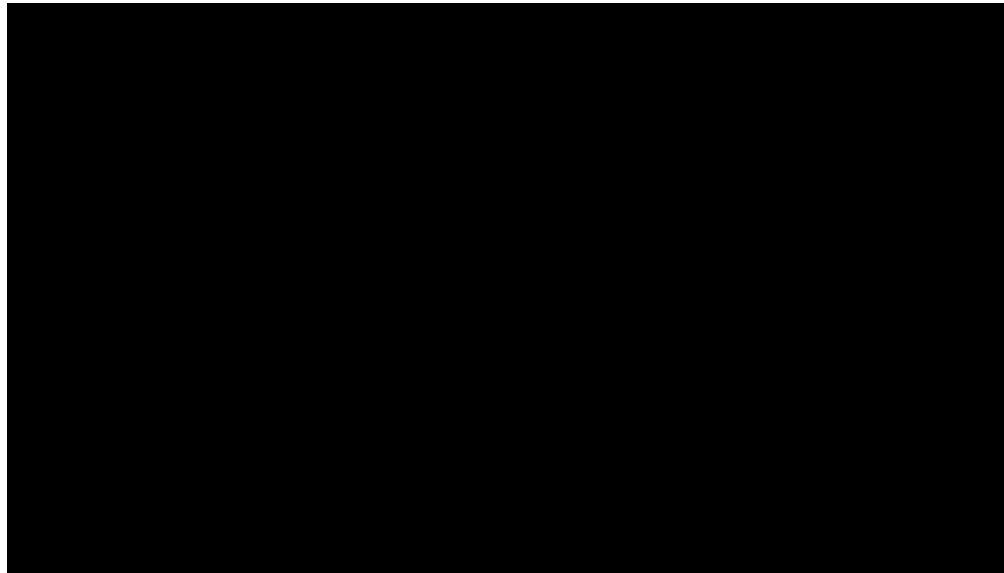
21



22



23



26



### Montage / editing

- Prescribed order
- Where you look explicitly directed
- Little reader/viewer agency



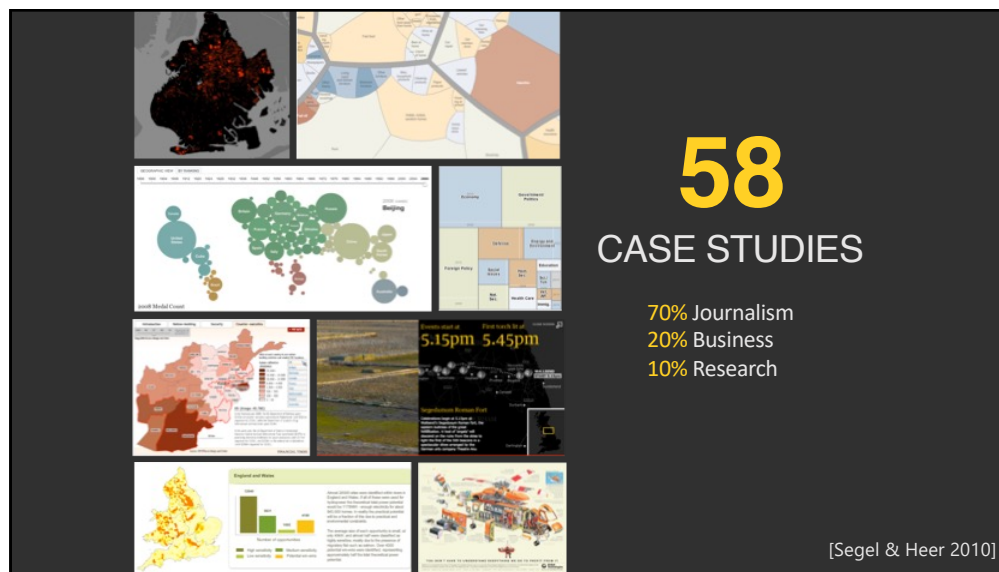
### Ensemble staging / direction

- Less prescribed order
- Salience, structure nudges you to look
- More reader/viewer agency

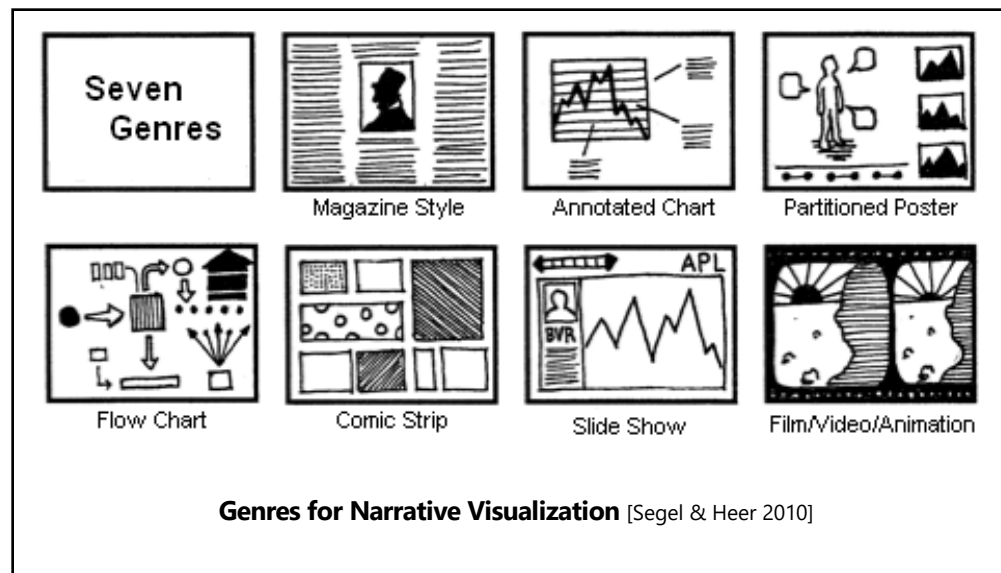
27

## DESIGN SPACE OF NARRATIVE VISUALIZATION

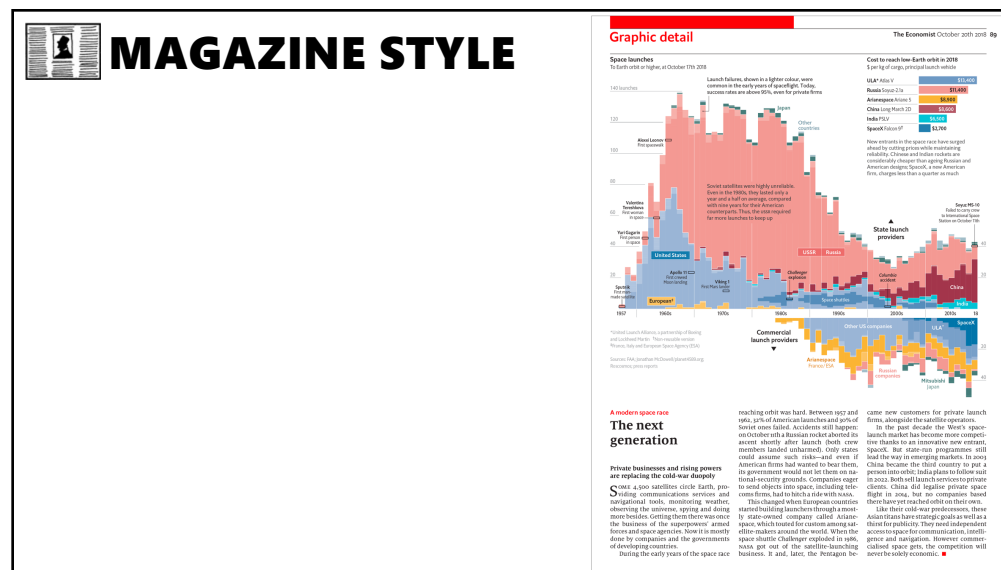
28



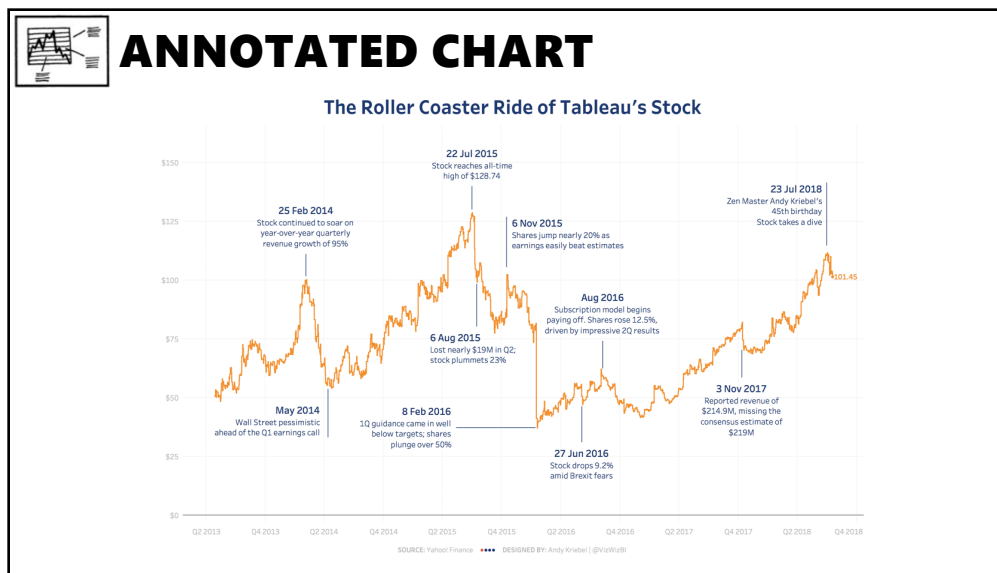
29



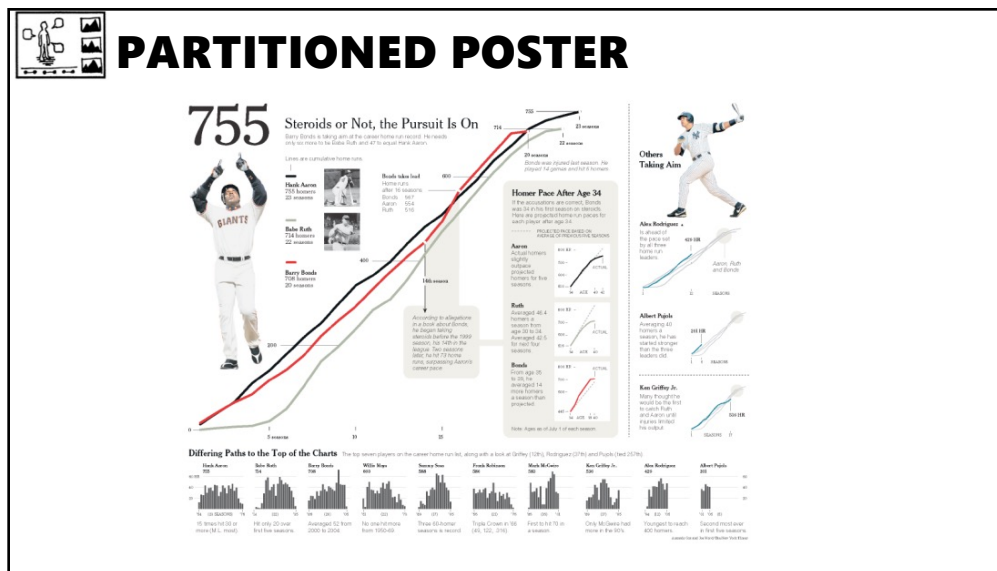
30



31

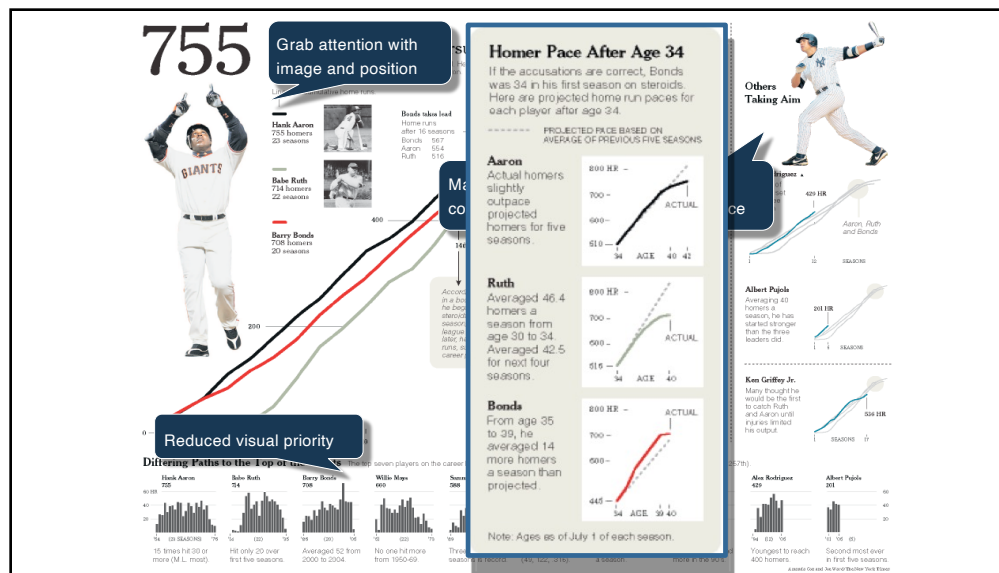


32

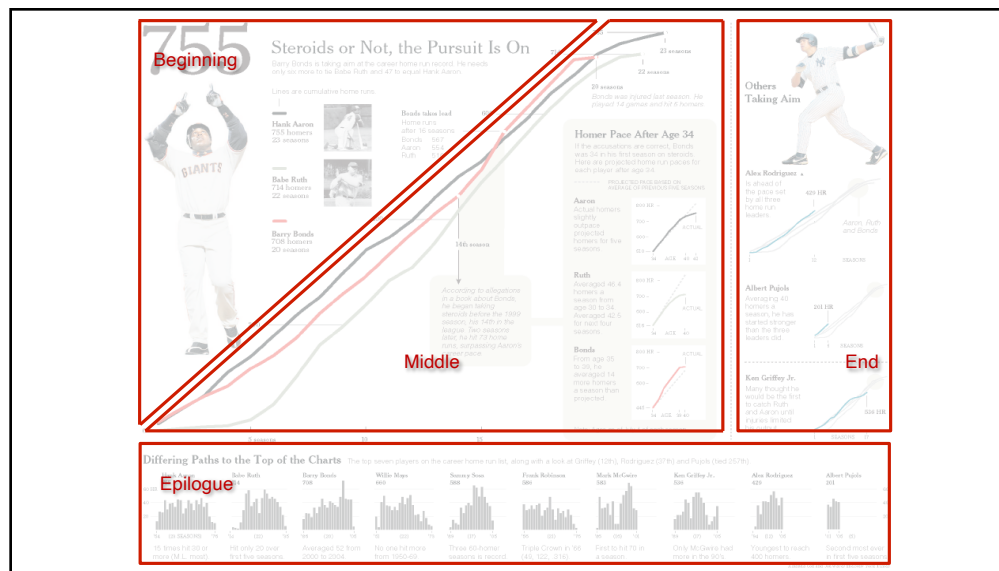


33





34

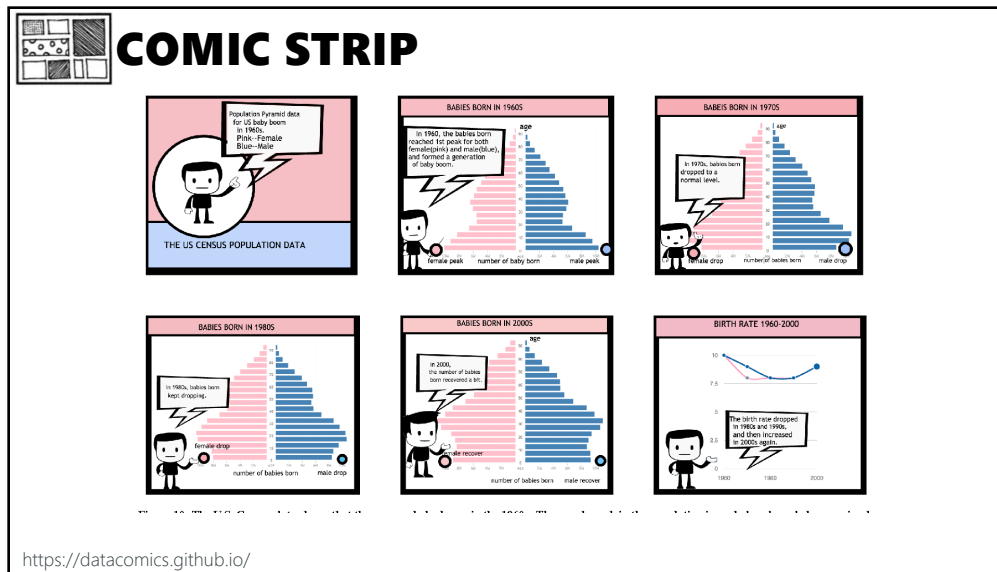


35

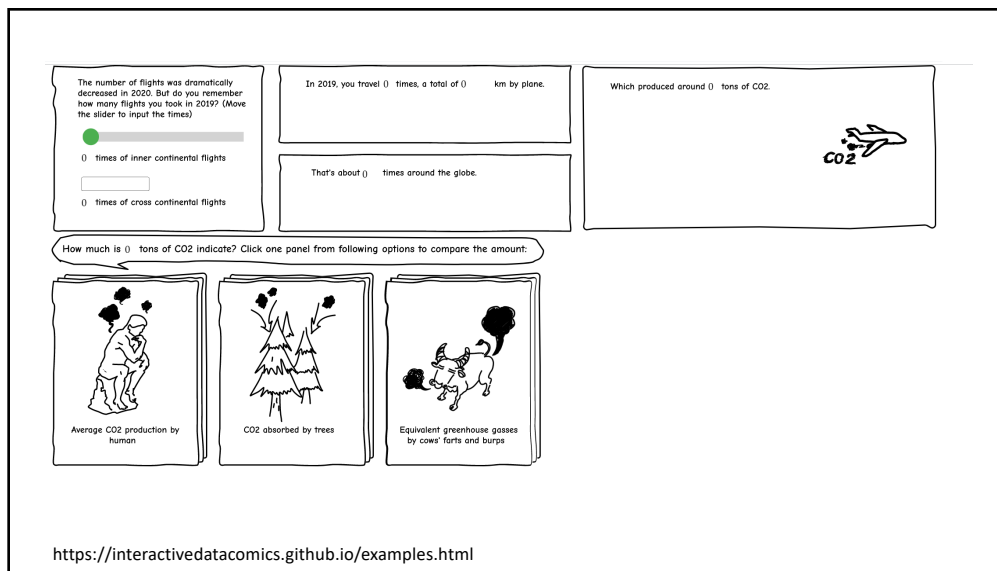
<http://www.r2d3.us/visual-intro-to-machine-learning-part-1/>

These ultimate branches of the tree are called **leaf nodes**. Our decision tree models will classify the homes in each leaf node according to which class of homes is in the majority.

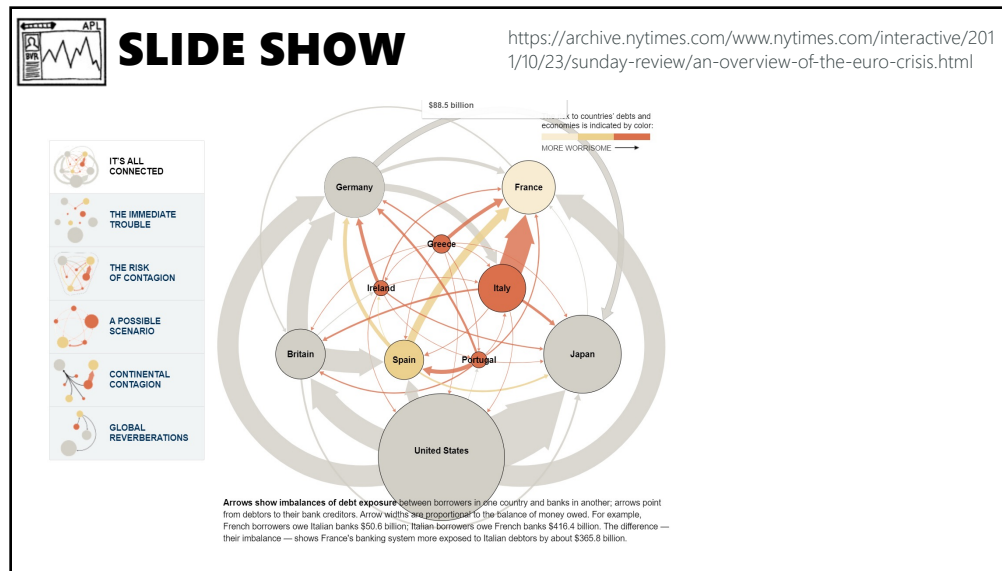
17



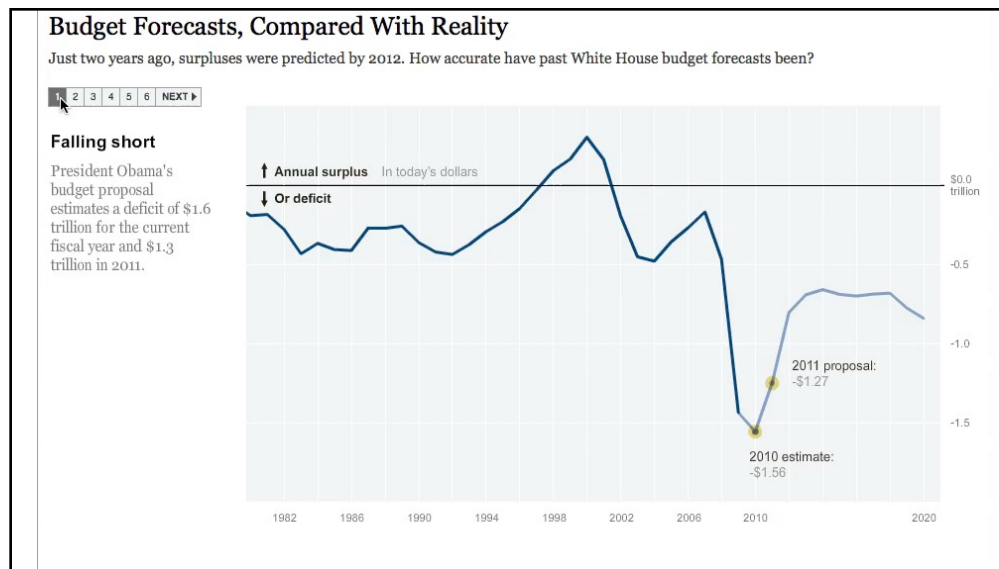
38



39



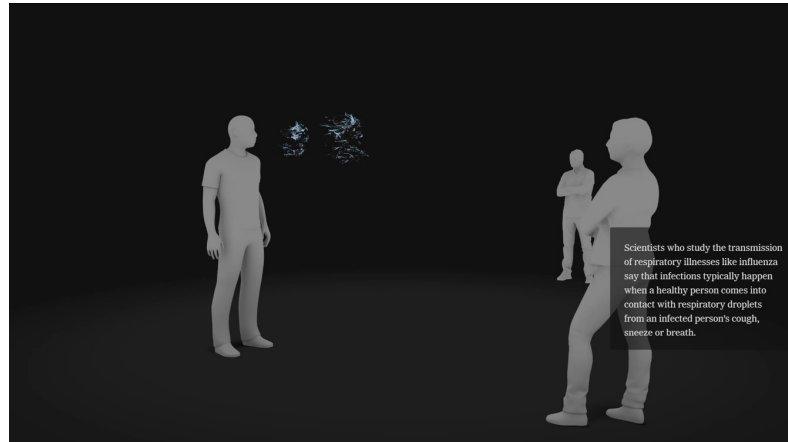
41



42



## FILM/VIDEO/ANIMATION

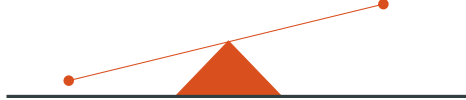


<https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html>

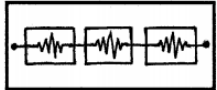
43

## GUIDANCE

47




**Author driven**  
 Prescribed ordering  
 Stronger messaging  
 Limited interactivity



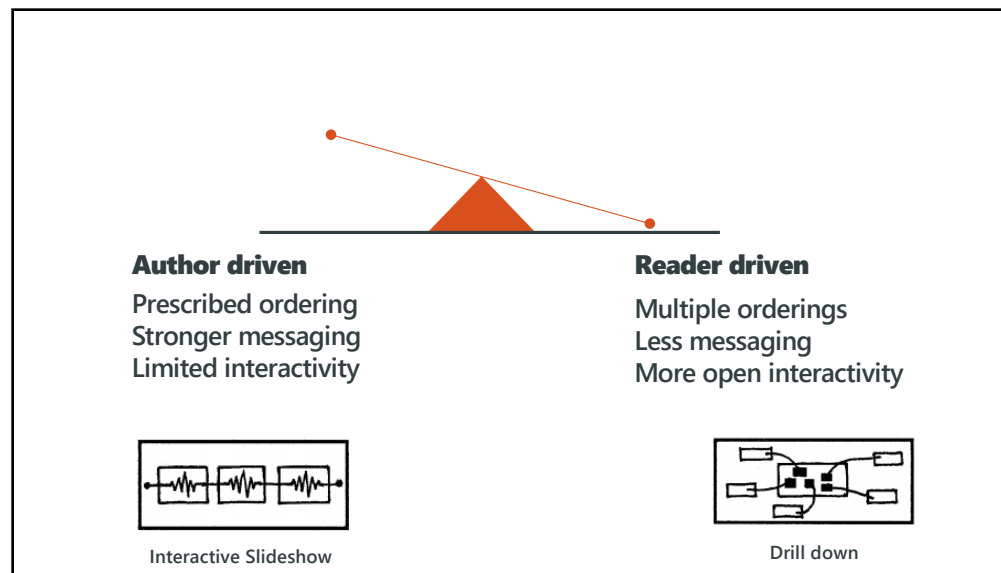
Interactive Slideshow

49



<https://archive.nytimes.com/www.nytimes.com/interactive/2013/10/09/us/yellen-fed-chart.html>

50



51

**Now Viewing:** Overview Up Close: Camp 15

**Major Prison Camps**

The existence of five main camps has been confirmed by survivors, escapees and former guards. Most prisoners work 12-hour days, making military uniforms, felling trees or tilling fields until they die of malnutrition-related illnesses, usually before the age of 50. North Korea allows no outsiders into the remote, mountainous camps.

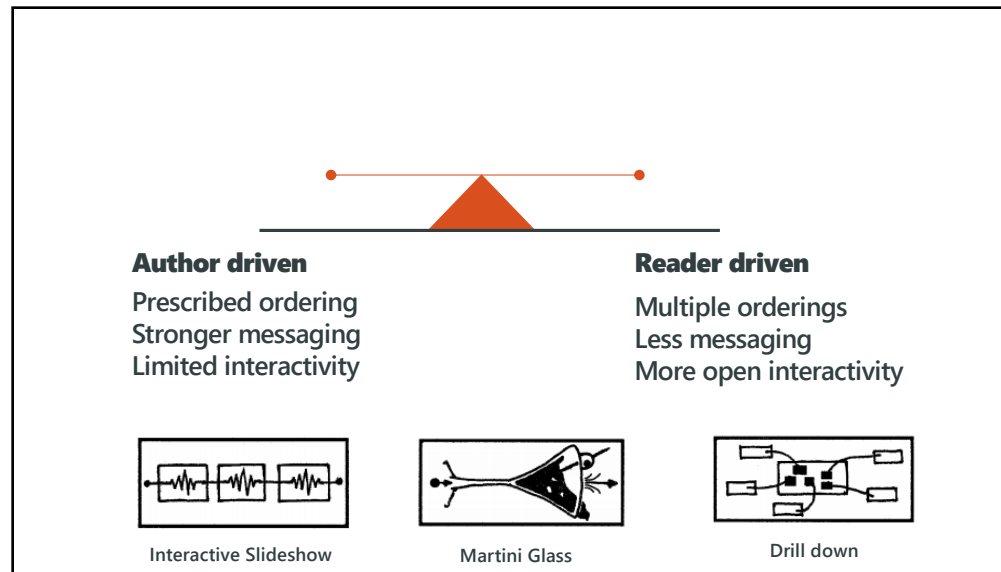
*Learn more about five major prison camps at right, or take a closer look at life in Camp 15.*

Scale varies in this perspective.  
 Distances from Pyongyang: 120 miles to Seoul, 427 miles to Vladivostok

<https://www.washingtonpost.com/wp-srv/special/world/north-korean-prison-camps-2009/>

52





53

The infographic features a background of a brown grid with scattered black squares. The title 'Stopping the spread' is in a large, white, sans-serif font, with the subtitle 'Reaching herd immunity through vaccination' in a smaller font below it. The authors 'By Simon Scarr and Manas Sharma' and the writer 'Writing by Jane Wardell' are listed, along with the publication date 'PUBLISHED AUG. 21, 2020'. The main text discusses the global coronavirus pandemic, herd immunity, and the role of vaccination. A URL is provided on the right side.

**Stopping the spread**  
 Reaching herd immunity through vaccination

By Simon Scarr and Manas Sharma  
 Writing by Jane Wardell  
 PUBLISHED AUG. 21, 2020

The global coronavirus pandemic has raised questions about a phenomenon known as "herd immunity" and spurred hopes that it can help slow or end the outbreak. Herd immunity occurs when a large portion of a community - the herd - develops some degree of immunity to a virus, making the spread of a disease from person to person less likely. As a result, the whole community gains protection, not just those who are immune.

Evidence gathered so far by epidemiologists suggests that a person infected with COVID-19 passes the virus on to between two and three others, on average. Here's what that looks like across seven generations of infection, and how immunity can disrupt the chain.

[https://www.reuters.com/graphics/HEALTH-CORONAVIRUS/HERD%20IMMUNITY%20\(EXPLAINER\)/ygdvzmqqgpl/](https://www.reuters.com/graphics/HEALTH-CORONAVIRUS/HERD%20IMMUNITY%20(EXPLAINER)/ygdvzmqqgpl/)

54

# DRAW YOUR EXPECTATIONS

**TheUpshot**







## You Draw It: How Family Income Predicts Children's College Chances

By GREGOR AISCH, AMANDA COX and KEVIN QUEALY MAY 28, 2015

How likely is it that children who grow up in very poor families go to college? How about children who grow up in very rich families?

We'd like you to **draw your guess** for every income level on the chart below.

If you think the chances of enrolling in college (or vocational school) are about the same for everyone, you should draw something like this:

— If you think the odds are especially harsh for children from the poorest families, but higher for middle- and higher-income children, your drawing would instead look like this: . Or here is one for a situation in which chances level off after a certain income threshold: . Or for one that spikes  or dips  for the very richest.

When you've finished drawing, we'll compare your line to the reality for children born in the same nation, based on research by a team of

<https://www.nytimes.com/interactive/2015/05/28/upshot/you-draw-it-how-family-income-affects-childrens-college-chances.html>

57



## I'm comfortable if a social media website . . .

collects detailed personal information about me, like my gender and interests

... and uses this to show targeted ads and marketing advertisements

[Click here to draw the line where shown](#)

... and lets companies upload customer lists, matching my phone or email with the one I've added to my profile, so they can send me targeted advertising

... and buys information about me from third parties, like my purchase history, to augment their profile about me

... and receives details about my activity from other websites on the internet, like things I buy and sites I visit

... and receives information on what I buy in physical stores

... and lets third parties download basic information on my friends without their consent

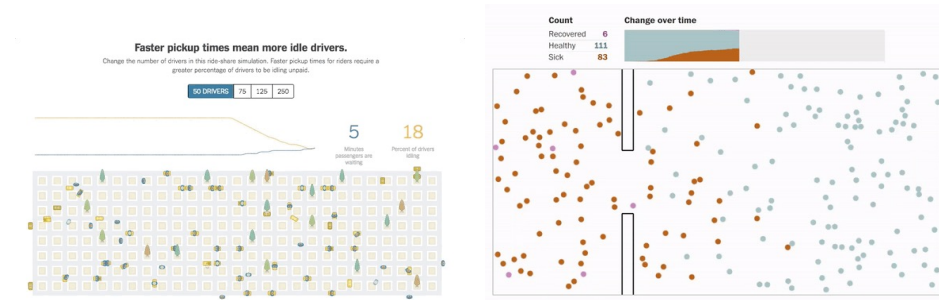
... and lets third parties download detailed information on my friends, like their relationship status and interests, without their consent

... and serves me targeted ads on a smart TV app that has a relationship with the website

<https://www.nytimes.com/interactive/2019/04/10/opinion/privacy-survey.html>

59

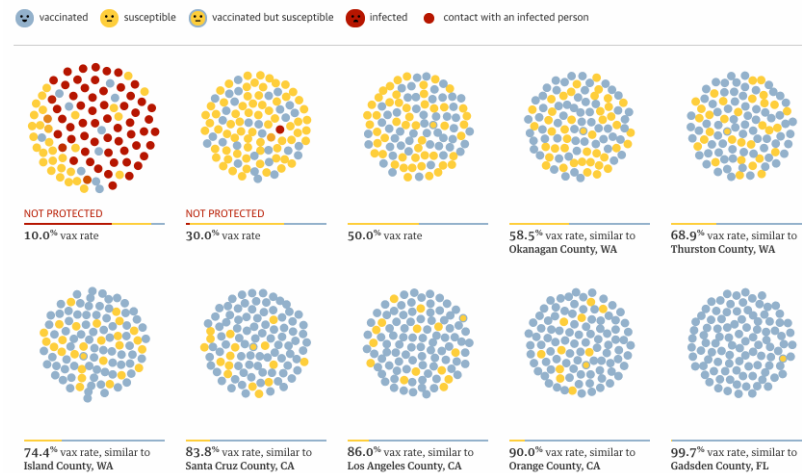
## SIMULATIONS



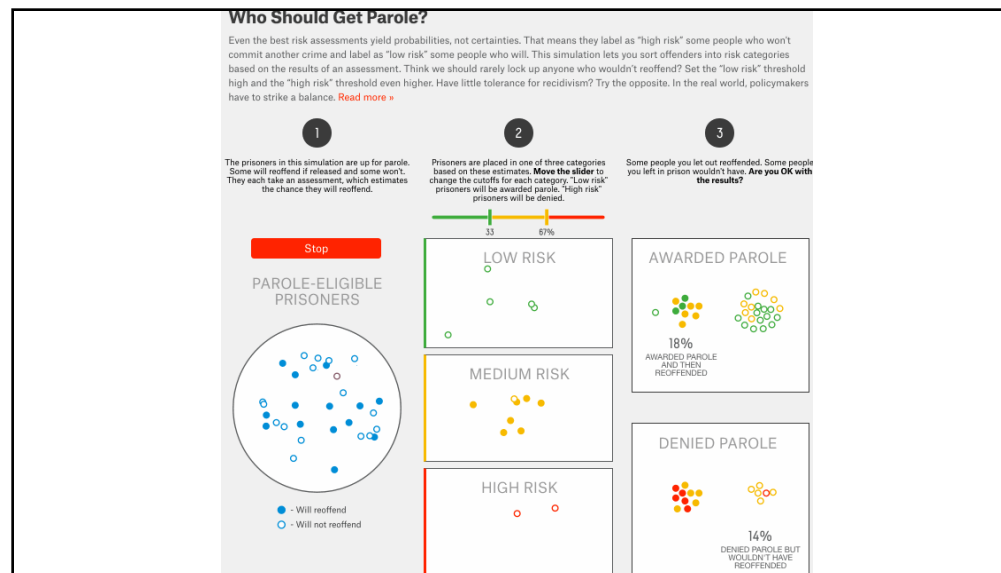
<https://www.nytimes.com/interactive/2017/04/02/technology/uber-drivers-psychological-tricks.html>  
<https://www.washingtonpost.com/graphics/2020/world/corona-simulator/>

61

## Watch how the measles outbreak spreads when kids get vaccinated - and when they don't



62



63



65

☆ Star

1,503

# idyll

A toolkit for creating data-driven stories  
and explorable explanations.

INPUT (EDITABLE)

```
# Hello World

[ var name:"x" value:5 / ]

The value of x is [ Display value:x format:"d" /. ]

[ Range value:x min:0 max:10 / ]
```

OUTPUT

## Hello World

The value of x is 5.

View Example Gallery

In my Equifax report, I deleted from both other credit reports has past the statute of limitations and still be actively reporting

Quick Start | Docs | GitHub | Chat | Twitter | Support Us

Idyll is a markup language and toolkit for writing interactive articles. Idyll's reactive document model and standard component library decrease the amount of code needed to create high quality multimedia narratives. Idyll uses web standards to produce output that will load quickly in any web browser and is fully extensible.

Idyll enables collaboration between programmers and journalists, researchers and designers. Those familiar with JavaScript can write custom components using tools like D3 or React.

PAUL & ALLEN SCHOOL  
OF COMPUTER SCIENCE & ENGINEERING

O'REILLY

EUTOPIA

RHIZOME

## SUMMARY

Narrative visualizations blend communication via **imagery and text** with interaction techniques

Specific strategies can be identified by studying what expert designers make

Tools to facilitate construction of effective explainers is an active area of Visualization research