

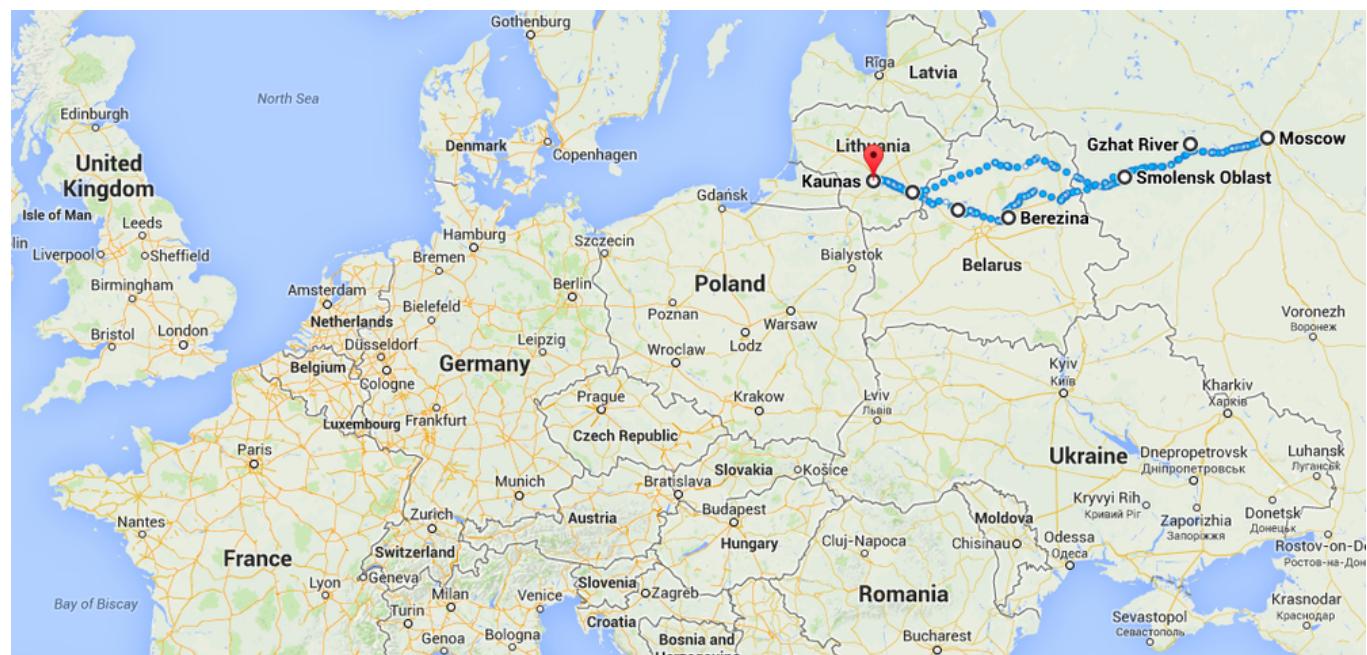
In [1]:

```
1 # setup notebook
2 # notebook formatting
3 from IPython.core.display import display, HTML
4 display(HTML("<style>.container { width:90% !important; }</style>"))
5
6 # pretty print all cell's output and not just the last one
7 from IPython.core.interactiveshell import InteractiveShell
8 InteractiveShell.ast_node_interactivity = "all"
9
```

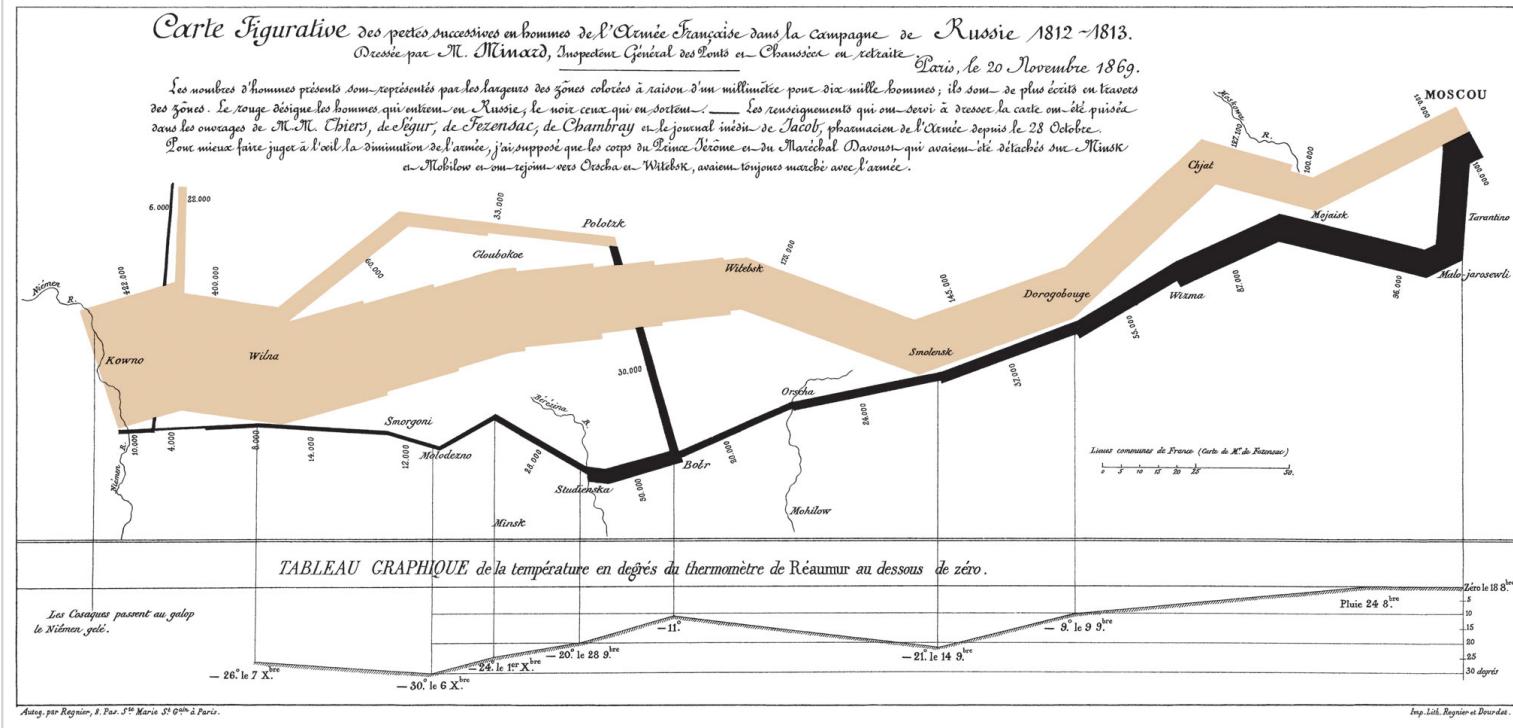
executed in 8ms, finished 13:11:39 2019-11-21

## Why visualization is important: *Create Understanding*

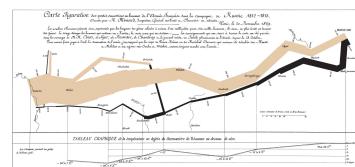
### Napoleon's March to Moscow



# Charles Minard's Map of the March to Moscow



## What does this map say to you?



- 422,000 vs 10,000
- includes evidence/sources
- old temperature scale
- what are the main causes of losses?

[link: charles minard - wikipedia](#)

([https://en.wikipedia.org/wiki/Charles\\_Joseph\\_Minard#The\\_map\\_of\\_Napoleon%27s\\_Russian\\_campaign](https://en.wikipedia.org/wiki/Charles_Joseph_Minard#The_map_of_Napoleon%27s_Russian_campaign))

[link: information design analysis on this map](#) (<https://www.chezvoila.com/blog/minard-map>)

## ▼ Anti-war map that stresses catastrophic human losses

**Effectively integrates six datatypes in two dimensions (in 1869!)**

- number of Napoleon's troops
- the distance traveled
- temperature;
- latitude and longitude
- direction of travel
- location relative to specific dates

## ▼ Gapminder



(<https://www.youtube.com/watch?v=jbkSRLYS0jo>)

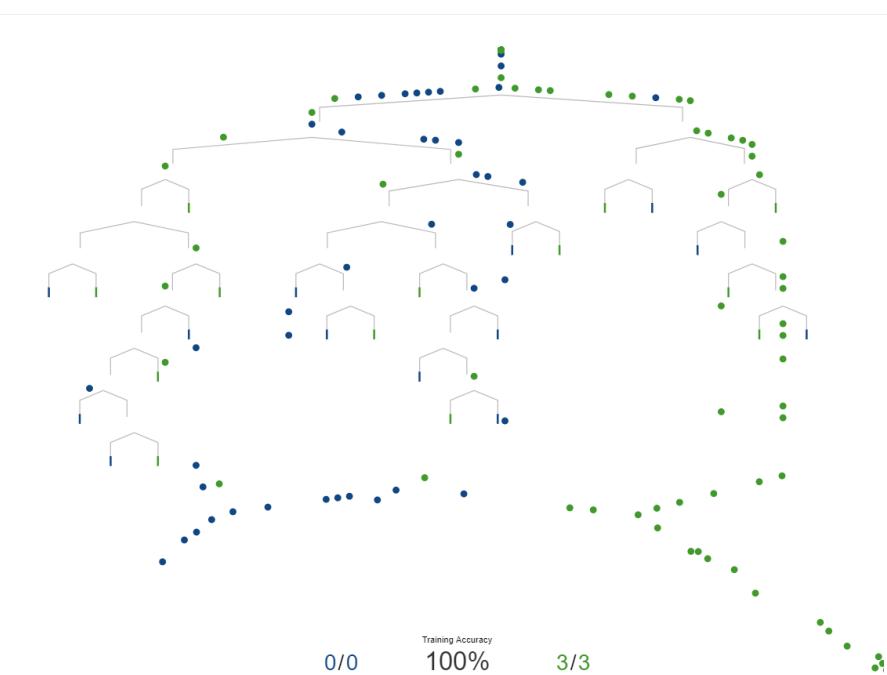
Hans Rosling Video - Animating Income vs. Life Expectancy (<https://www.youtube.com/watch?v=jbkSRLYS0jo>).  
Gapminder - Income vs. Life Expectancy ([https://www.gapminder.org/tools/#\\$chart-type=bubbles](https://www.gapminder.org/tools/#$chart-type=bubbles)).

## Visualizing Machine Learning - R2D3

R2D3 - visual intro to machine learning explainer (<http://www.r2d3.us/visual-intro-to-machine-learning-part-1/>)

## Making predictions

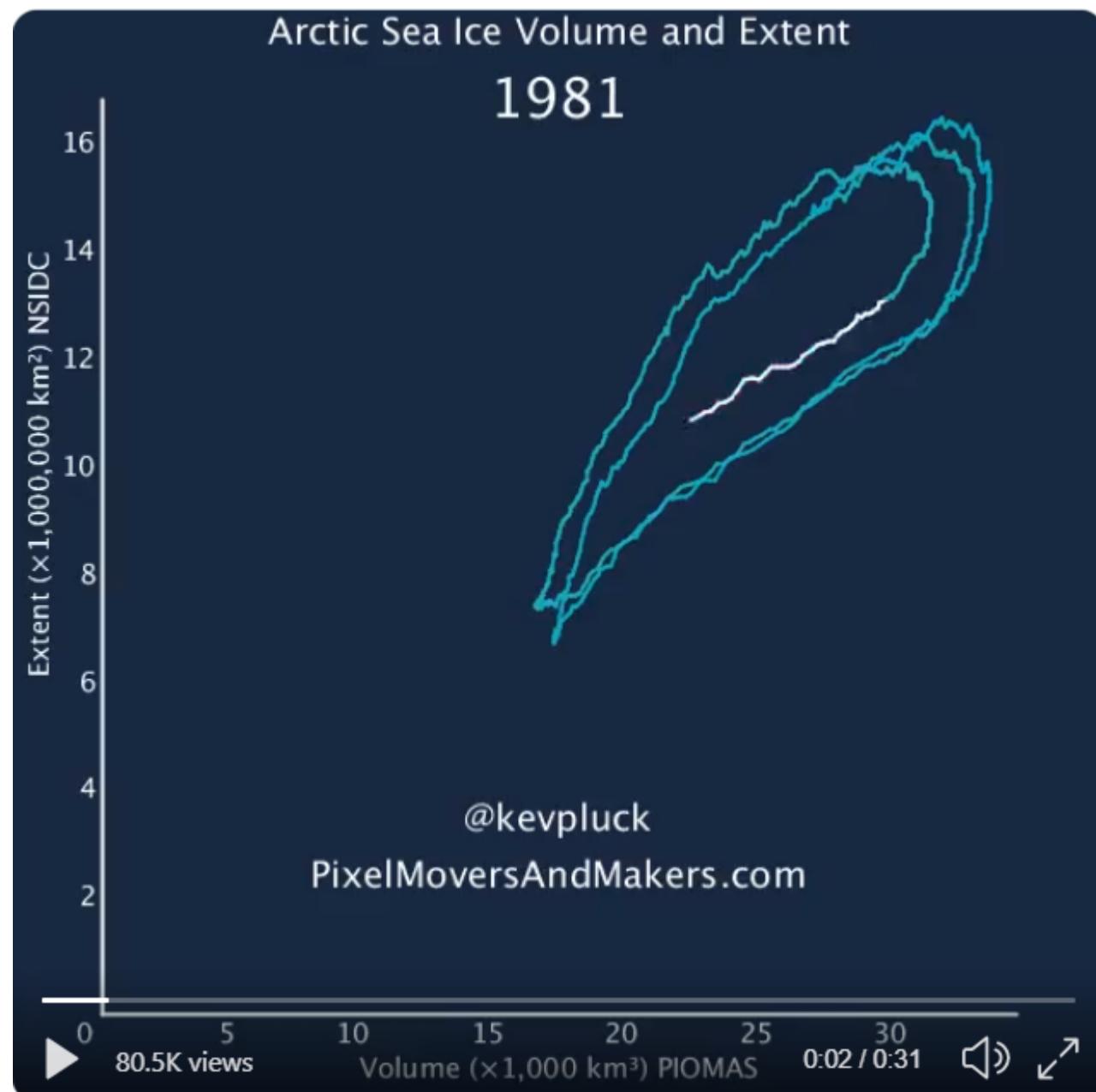
The newly-trained decision tree model determines whether a home is in San Francisco or New York by running each data point through the branches.



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

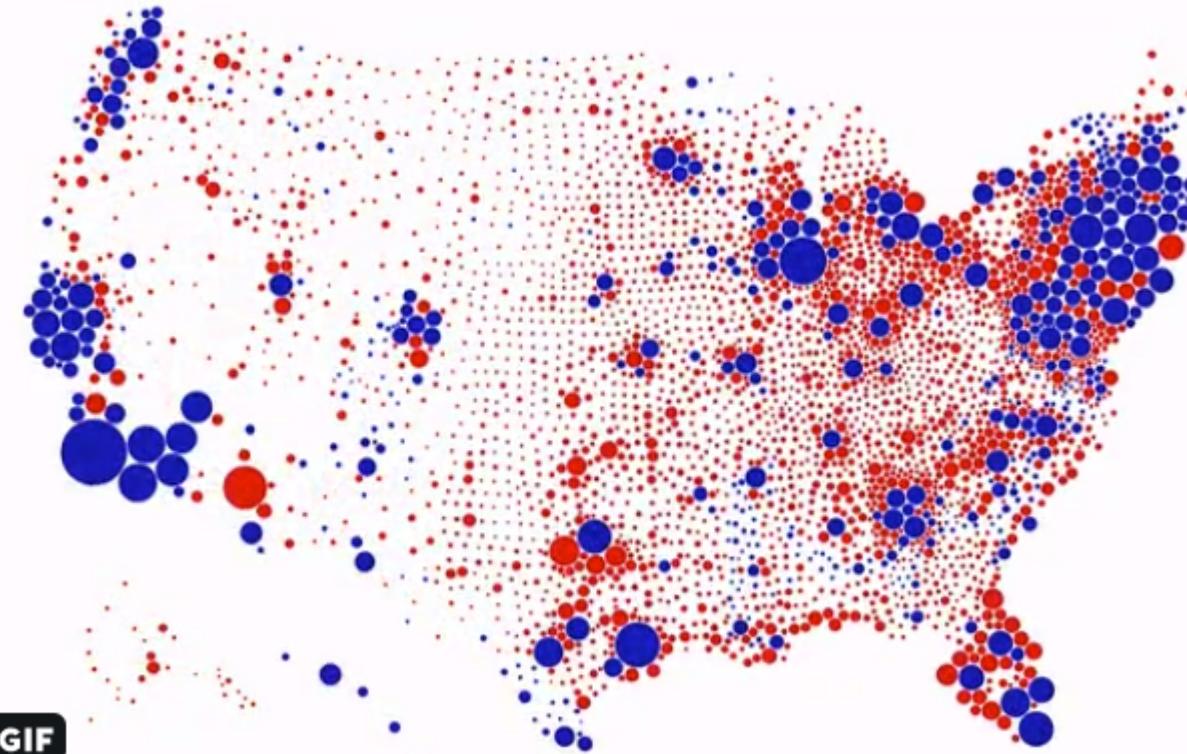
## Changes in Arctic Sea Ice

[Arctic Sea Ice Volume and Extent - Kevin Plunk / Twitter](#) (<https://twitter.com/kevpluck/status/1183014848403333128>)



## Challenge Accepted - US Political Alignment in 2019

[Challenge Accepted - Karim Douieb / Twitter](https://twitter.com/karim_douieb/status/1181695687005745153) ([https://twitter.com/karim\\_douieb/status/1181695687005745153](https://twitter.com/karim_douieb/status/1181695687005745153))



([https://twitter.com/karim\\_douieb/status/1181695687005745153](https://twitter.com/karim_douieb/status/1181695687005745153))

## ▼ New York Times - The Rich Really Pay Lower Taxes

Credit - New York Times by By David Leonhardt

[Original Article - The Rich Really Pay Lower Taxes by David Leonhardt](https://www.nytimes.com/interactive/2019/10/06/opinion/income-tax-rate-wealthy.html)  
(<https://www.nytimes.com/interactive/2019/10/06/opinion/income-tax-rate-wealthy.html>).

[Animated Video by author - David Leonhardt](https://twitter.com/i/status/1181004566088814594) (<https://twitter.com/i/status/1181004566088814594>)

## Challenge Accepted! Current US Political Alignment

Credit - Karim Douieb in d3.js on Observable HQ

[twitter - karim\\_douieb \(\[https://twitter.com/karim\\\_douieb/status/1181695687005745153\]\(https://twitter.com/karim\_douieb/status/1181695687005745153\)\)](https://twitter.com/karim_douieb/status/1181695687005745153)

[Original Live Code on Observable HQ - great resource! \(<https://observablehq.com/@karimdouieb/try-to-impeach-this-challenge-accepted>\)](https://observablehq.com/@karimdouieb/try-to-impeach-this-challenge-accepted)

## Nightingale



DATA  
VISUALIZATION  
SOCIETY

[Journal of the Data Visualization Society \(<https://www.datavisualizationsociety.com/>\)](https://www.datavisualizationsociety.com/)

[Nightingale - Medium Blog \(<https://medium.com/nightingale>\)](https://medium.com/nightingale)

## D3.js

d3.js is a low level javascript library for producing dynamic, interactive data visualizations in web browsers



The screenshot shows the official d3.js website. At the top, there is a navigation bar with links to Overview, Examples, Documentation, API, and Source. Below the navigation is the d3.js logo and the text "Data-Driven Documents". A large grid of various data visualizations is displayed, including maps, treemaps, network graphs, and other complex data structures. In the top right corner, there is an orange button with the text "Fork me on GitHub". At the bottom of the grid, there is a yellow banner with the text "Like visualization and creative coding? Try interactive JavaScript notebooks in Observable!".

[D3.js Gallery - inspiring examples \(https://github.com/d3/d3/wiki/Gallery\).](https://github.com/d3/d3/wiki/Gallery)

In [ ]:

1