Data Visualisation

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Visual+ Interactive Data

outline for today

- What is data visualisation?
- How are data visualisations created?
- What is the purpose of data visualisation?
- Visualisation to facilitate research processes
- Critical perspectives on data visualisation
- Additional pointers
 - Visualization tools
 - Readings

what is data visualisation?

what is data visualization?

Data and information visualization is concerned with showing quantitative and qualitative information, so that a viewer can see patterns, trends or anomalies, constancy or variation, in ways that other forms—text and tables—do not allow.

Michael Friendly, 2008

M. Friendly. The Golden Age of Statistical Graphics. Statistical Science, 2008, Vol.23, No. 4, 502-535.

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showing trends, patterns, and anomalies

1			II		III		IV	
х		у	х	у	х	у	x	у
1	0.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8	.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
1	3.0	7.58	13.0	8.74	13.0	12.7 4	8.0	7.71
9	.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
1	1.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
1	4.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6	.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4	.0	4.26	4.0	3.10	4.0	5.39	19.0	12.5 0
1	2.0	10.8 4	12.0	9.13	12.0	8.15	8.0	5.56
7	.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5	.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

Anscombe's Quartet

showing trends, patterns, and anomalies

• Some statistical measures

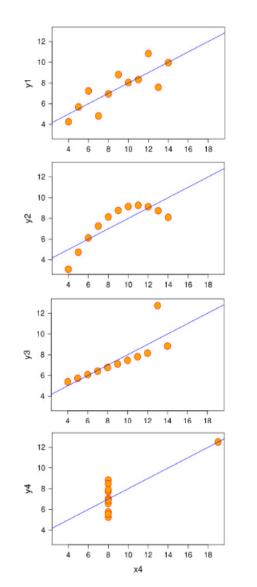
– Mean

- x = 9.0
- y = 7.5
- Variance
 - x = 10
 - y = 3.75
- Correlation
 - 0.816

I		П		III		IV	
x	у	x	у	x	у	x	у
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.7 4	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.5 0
12.0	10.8 4	12.0	9.13	12.0	8.15	8.0	5.56
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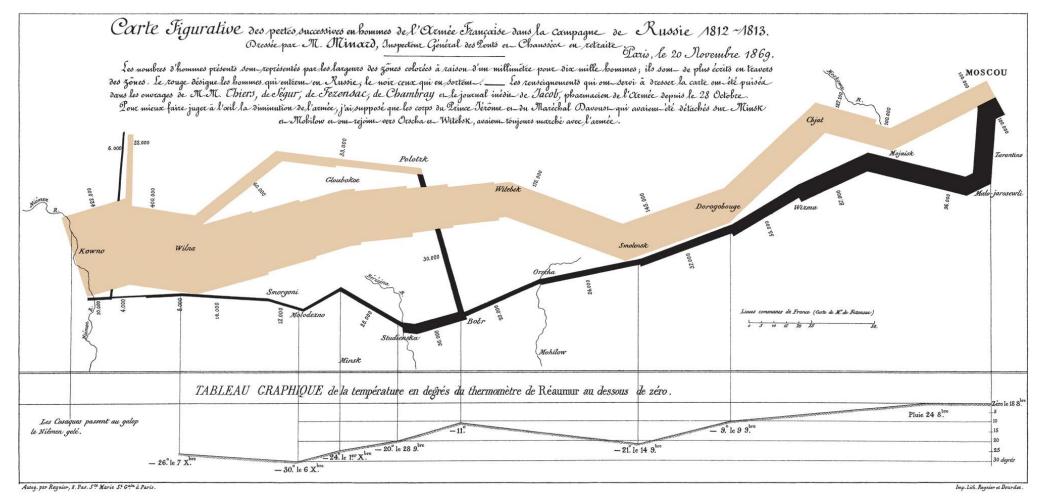
Anscombe's Quartet

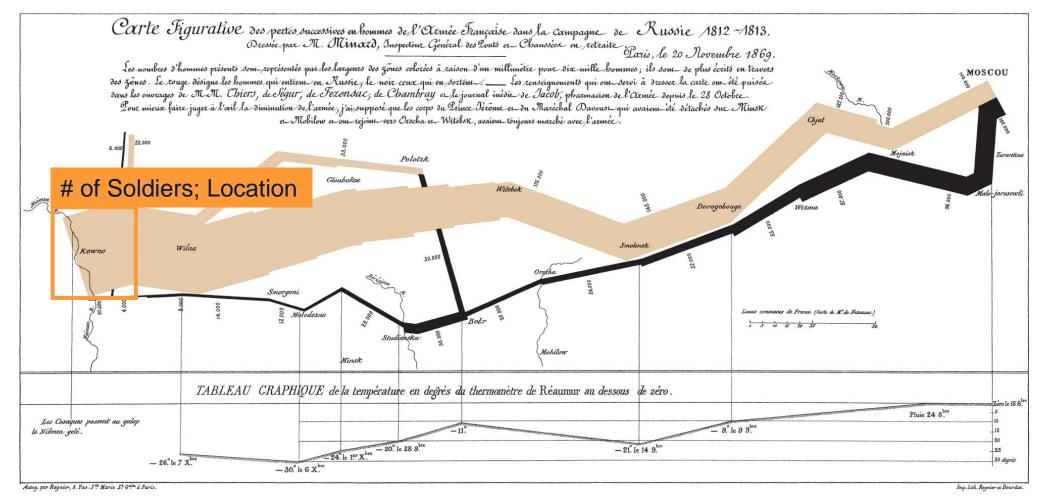
showing trends, patterns, and anomalies

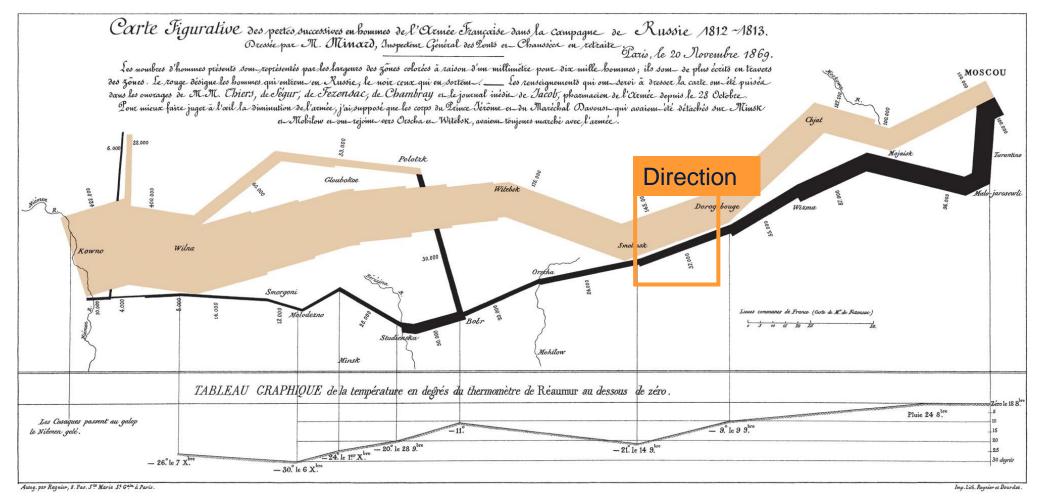


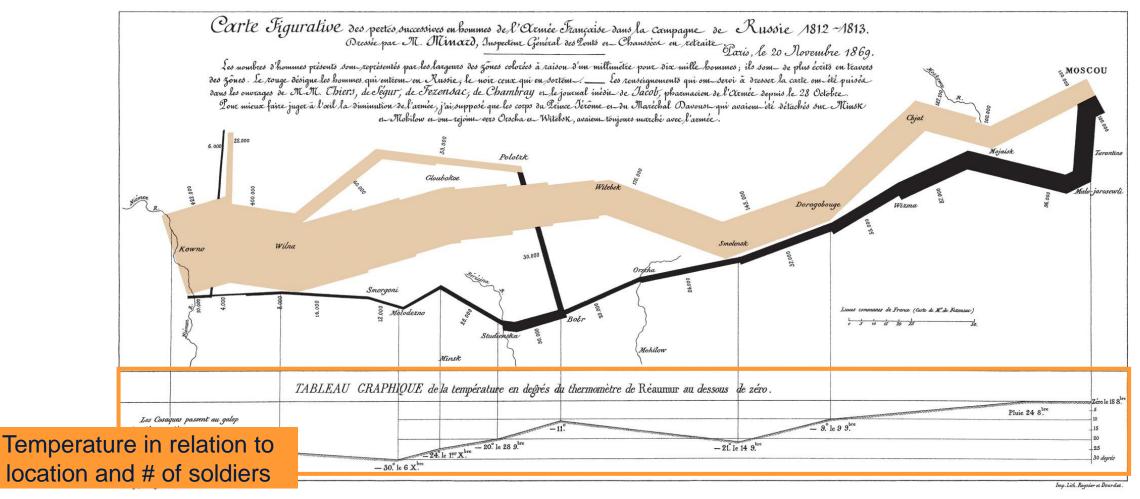
Ι		Ш		III		IV	
x	у	x	у	x	у	х	у
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.7 4	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
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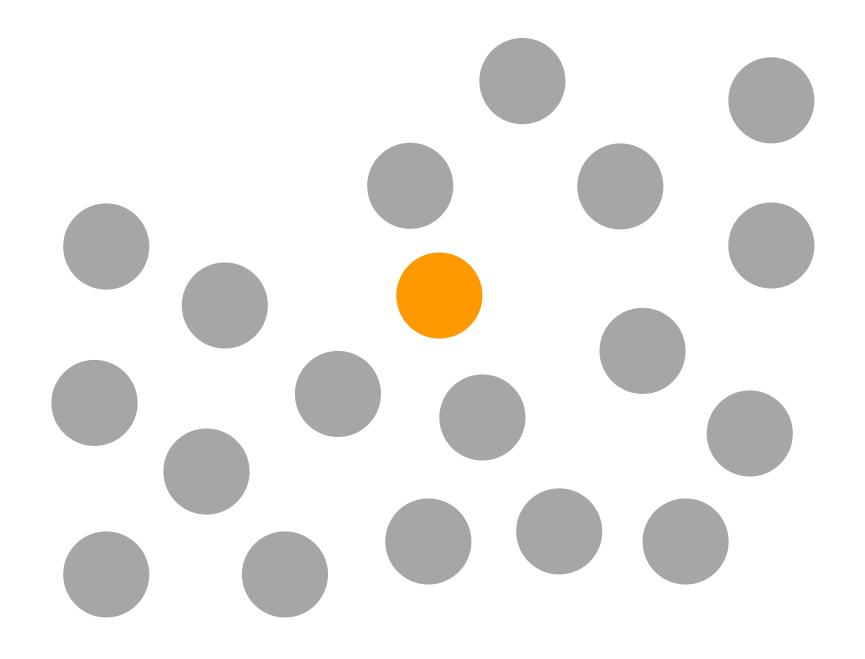






why is data visualization so powerful?

- Visualization leverages the human visual system to facilitate
 - Understanding
 - Discovery
 - Decision making
 - Communication
 - Memory
- Our brain is capable of quick and efficient visual information processing at a pre-conscious level



visualizing two quantities

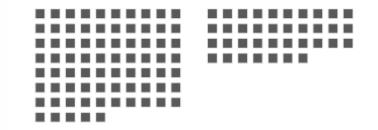
- Take a sheet of paper and a pencil
- Given a data set that consists of two quantities: 75 and 37
- Find as many ways as possible to visualize this data set!
- Sketch your visualisations
- Quantity goes over quality!

1. writing, number notation



The familiar indo-arabic numerals notation in a, and the babylonian numbers notation in b.

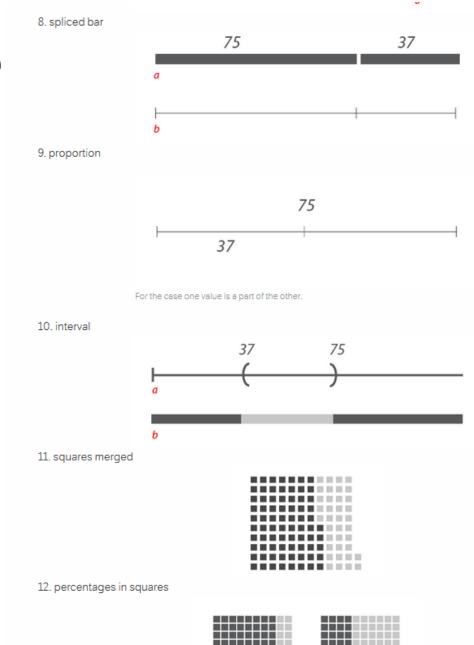
2. squares



3. repeated icon

45 ways to communicate two quantities 4. hundreds, tens, units, decimals... represented by squares

5, bars а С 6. line graph 75 75 75 37 37 37 0 0 a b C 7. percentages bars n



13. pie charts

45 ways to communicate two quantities



14. donut chart



It differs from the pie chart because it can be nested into other donut charts in order to create a more complex visualization.

15. circle areas

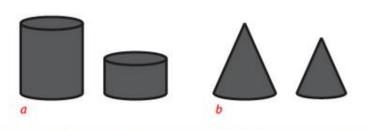
16. semi-circle areas



https://visual.ly/blog/45-ways-to-communicate-two-quantities/

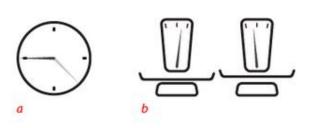
a 21. square surfaces 22. shape surfaces 23. different shape surfaces F 24. icon surfaces

20. shape divided



In *a* the volume is proportional to the object's height, not the case for *b*, which is very difficult to read.

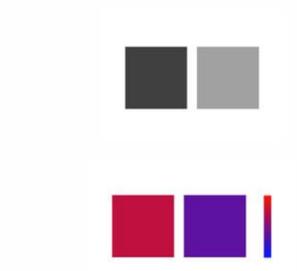
27. special metaphors

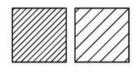


... for special units: a gauge for speeds, balances for weights

28. gray tones

29. color scale





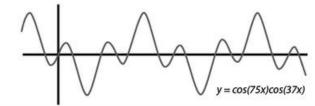
similar to 28 gray tones and 36 density.

39. nodes and connections in a network

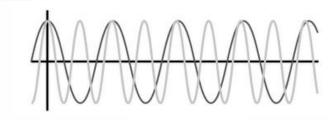


As we don't have more than the quantitative information, this visualization is only a way to have a first glance of the external structure of the network (the relations are chosen randomly).

40. parameters of a mathematical function



41. harmonic frequencies



reflections on the exercise

- There are many, many ways to visualise (even a small) dataset
- There is no "best" way to visualise a dataset!
- Visualisation design depends on
 - Data semantics: what do the numbers stand for?
 - Size of the dataset: the number of data points
 - The context in which the data is to be interpreted
 - The audience who will read and interpret the data
 - The messages/stories to be conveyed
- Visualisations are subjective and situated!

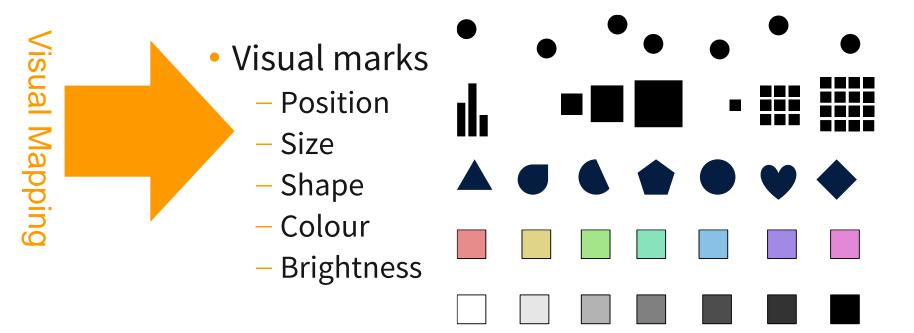
how are data visualisations created?

data attributes

- Data attributes
 - Categorical (e.g., movie genre, countries, types of animals...)
 - Ordered (e.g., rankings of all sorts, shirt sizes S, M, L...)
 - Quantitative (e.g., temperature, height, stock prices, word counts...)

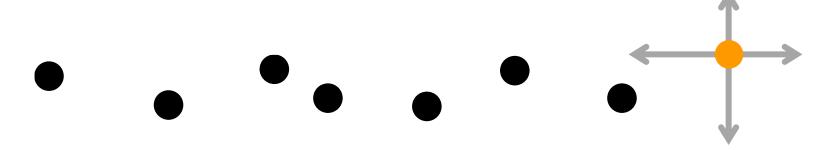
data attributes & visual variables

- Data attributes
 - Categorical
 - Ordered
 - Quantitative



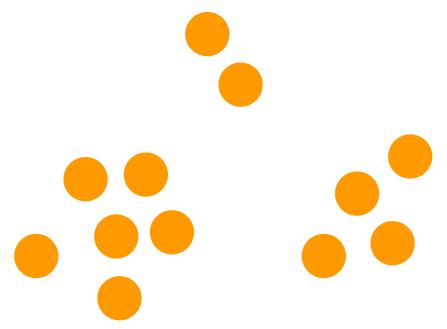
Position

- Order can be perceived
- Quantitative differences can be perceived



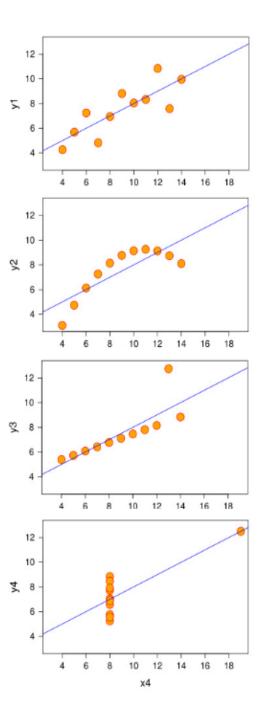
Position

- Order can be perceived
- Quantitative differences can be perceived
- Groupings and distinctions between groups can be perceived
- Scales well to large data sets



example use of position

Scatterplot



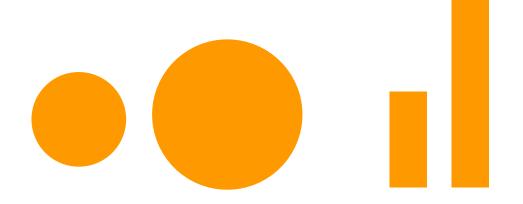
- Size: changes in length, area, repetition
 - Order can be perceived



- Size: changes in length, area, repetition
 - Order can be perceived
 - Quantitative differences can be perceived, BUT it depends on how size is used



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 - Quantitative differences can be perceived, BUT it depends on how size is used
 - → Choice of mapping matters



- Size: changes in length, area, repetition
 - Order can be perceived
 - Quantitative differences can be perceived, BUT it depends on how size is used
 - → Choice of mapping matters
 - → Alignment matters

• Colour (hue)

- Order cannot be perceived at a pre-conscious level (without a legend)
- Quantitative differences cannot be perceived



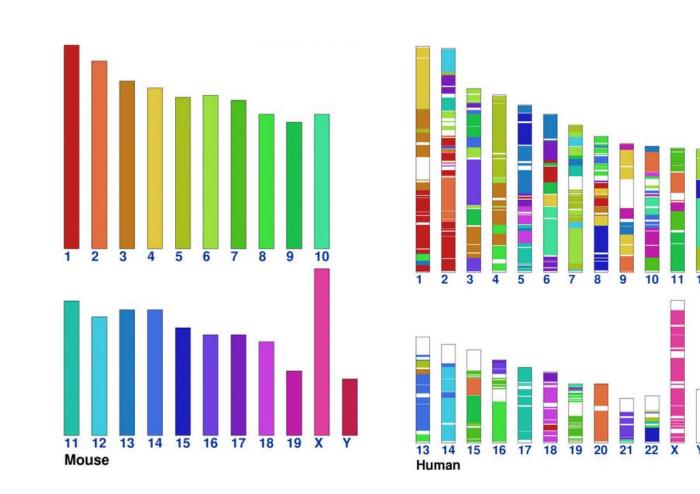
• Colour (hue)

- Order cannot be perceived (without a legend)
- Quantitative differences cannot be perceived
- Groupings and distinctions between groups can be perceived (within limits)



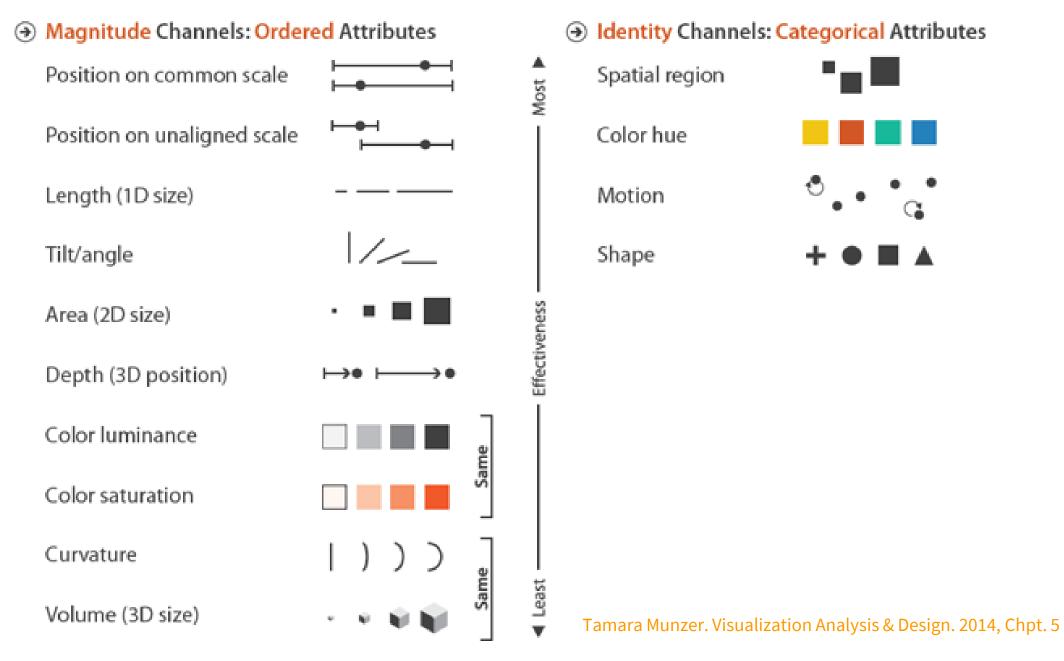
perceptual qualities of visual variables

Colour



Sinha and Meller, 2007

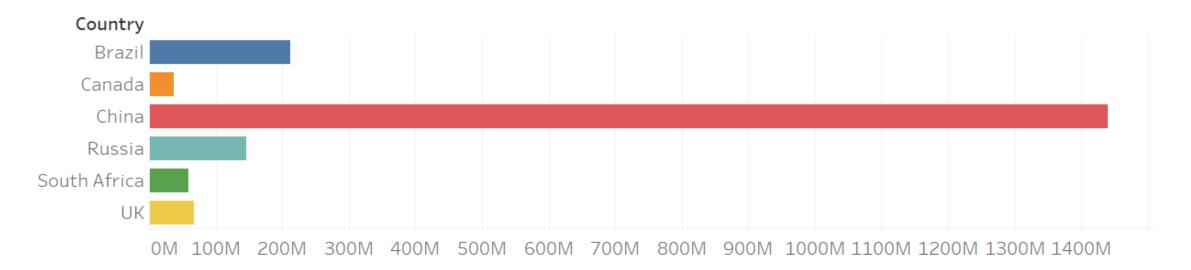
Channels: Expressiveness Types and Effectiveness Ranks



- Expressiveness principle
- Effectiveness principle

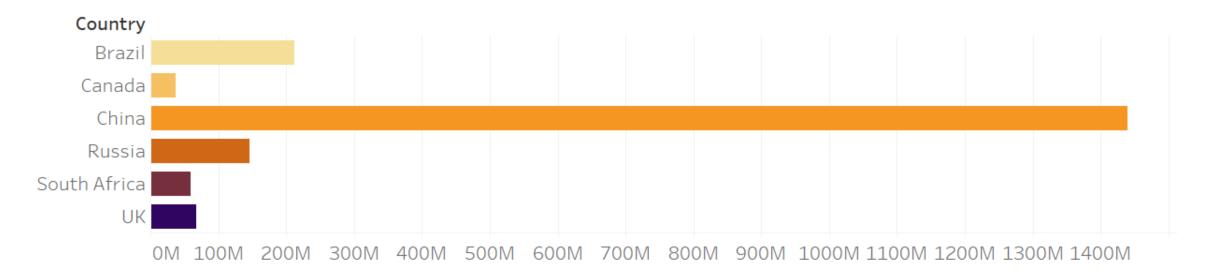
• Expressiveness principle

The visual encoding should express all of, and only, the information in the dataset attributes.



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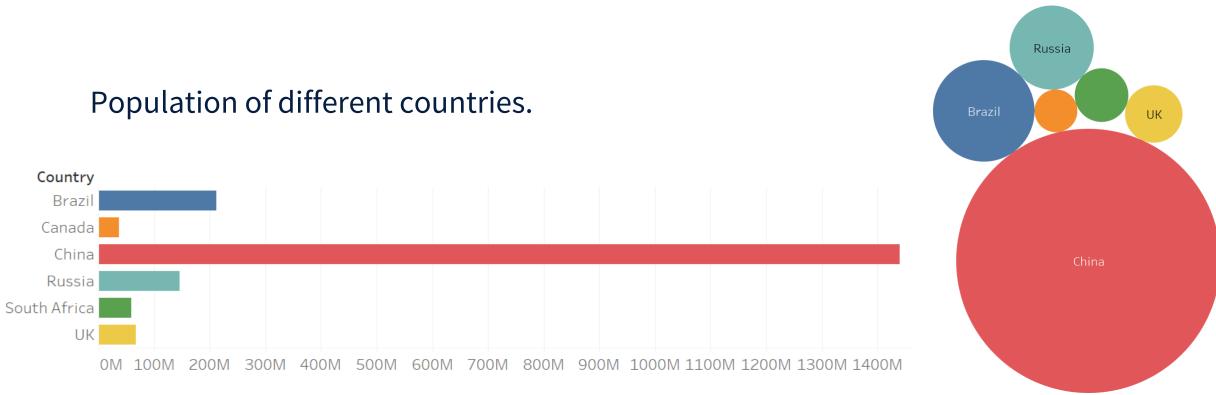
• Expressiveness principle

The visual encoding should express all of, and only, the information in the dataset attributes.

• Effectiveness principle

The importance of the data attribute should be encoded with the most effective visual variable, in order to be noticeable.

Which visualisation could be considered more effective?



Bar chart

Bubble chart

what is the purpose of data visualisation?

what is the purpose of data visualisation?

Data visualization is the graphical display of abstract information for two purposes: sense-making (also called data analysis) and communication.

Stephen Few

Data Visualisation for Human Perception. The Encyclopedia of Human-Computer Interaction, 2nd Edition https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/data-visualisation-for-human-perception

what is the purpose of data visualisation?

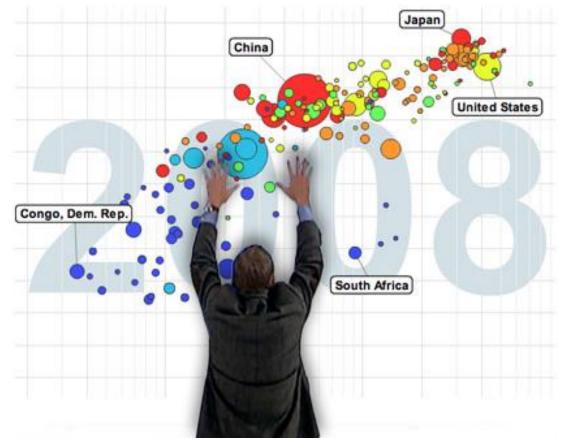
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visualization for communication

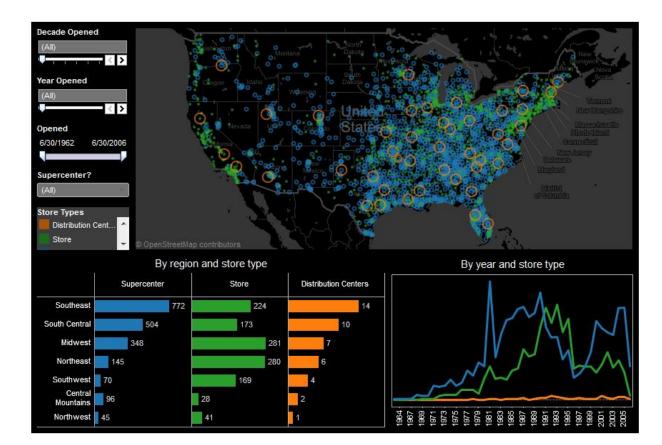
- Communication & explanation are in focus
- To present a story/message/fact
- Clearly defined message
- Clear focus less is more
- Limited interaction to support message
- \rightarrow Author-driven visualisation



Hans Rosling; Gapminder https://www.gapminder.org/ https://www.youtube.com/watch?v=hVimVzgtD6w

visualisation for sensemaking

- Exploration & discovery are in focus
- To discover something new
- Open-ended goals
- Multiple views on the data
- Interactivity is important
- \rightarrow Reader-driven visualisation



The Growth of WalMart through 2006 https://www.freakalytics.com/tdwi-11-9/

forms of visualisation

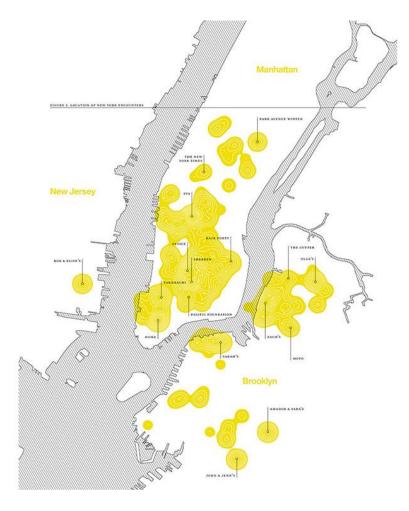
Throughout 2009, friend

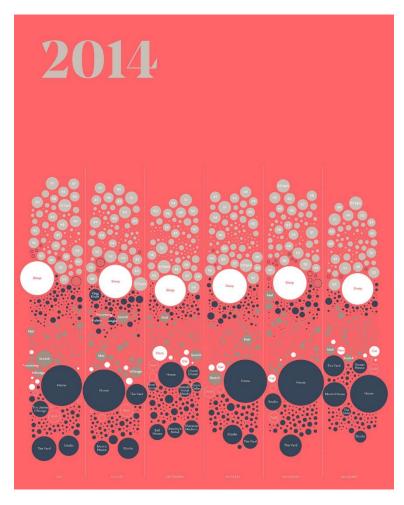
n his activities whene hey met. All data on the followir

participants to a variety of

Distribution Date and location of encounters.







http://feltron.com/FAR09.html

Non-interactive computer-generated visualizations



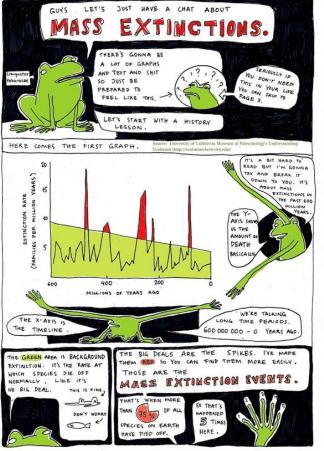
https://coronavirus.jhu.edu/map.html

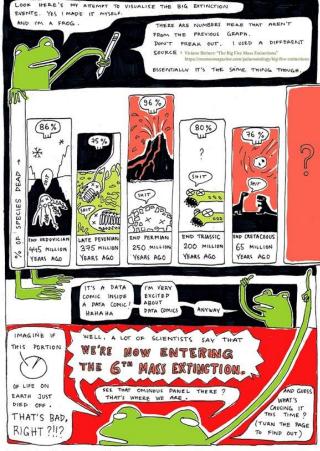
http://v.isits.in/

Interactive data visualizations



Dear Data. https://www.dear-data.com/





Data Comics. https://datacomics.github.io/

None-interactive data visualisations, sketched by hand



http://dataphys.org/list/how-much-sugar-do-you-consume/



Atelier Brückner http://dataphys.org/list/walkable-age-pyramid



Stefanie Prosavec and Miriam Quick http://dataphys.org/list/touching-air-necklace-shows-air-pollution

Data physicalization

visualisation to facilitate research processes

trading consequences

Environmental History

Colin M. Coates, Jim Clifford, Andrew Watson Universities of York and Saskatchewan, Canada

- Text Mining & Ontology Development Bea Alex, Claire Grover, Ewan Klein University of Edinburgh
- Information Visualization

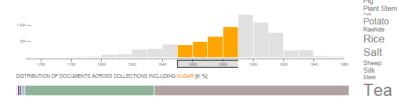
Uta Hinrichs, Aaron Quigley University of St Andrews

 Database Development Jason Reid, Ian Fieldhouse, Nicola Osborne EDINA



FINTER A COMMODITY OF INTERE





COMMODITIES RELATED TO SUGAR Barley

Beef Butter

Capsicum

Cattle

Coal

DOCUMENTS INCLUDING SUGAR [top 100]

1879: Report from the Select Committee on Sugar Industries; toge proceedings of the committee, minutes of evidence, and appendix.; Hou Parilamentary Papers

1879: Report from the Select Committee on Sugar Industries; toge proceedings of the committee, minutes of evidence, and appendix.; How Parliamentary Papers

1852: Report from the Select Committee on Sugar Duties; together proceedings of the committee, minutes of evidence, appendix, and inde Commons Parliamentary Papers

1862: Report from the Select Committee on Sugar Duties; together i proceedings of the committee, minutes of evidence, appendix, and inde Commons Parliamentary Papers

1879: Report from the Select Committee on Sugar Industries; toget proceedings of the committee, minutes of evidence, and appendix.; Ho Parliamentary Papers

1884: Sugar bounties. Return to an order of the Honourable the Hou dated 12 August 1884.-for, return 'of all correspondence since the date between the trade and the Foreign Office, between the trade and the Bo between the Foreign Office and foreign governments, on the subject of sugar." House of Commons Pariamentary Papers

1879: Report from the Select Committee on Sugar Industries; togethy proceedings of the committee, minutes of evidence, and appendix.; Hou Parliamentary Papers

III 1373: Sugar duties (memorials from the trade), Copy or sugar reflect Treasure, date 02 February 1072; sugar reflects: memorial, alade 6 M of West India merchants, sugar brokers, wholesale groosers, groosers, a parts of the county, April, May or June 1372; sugar reflects memorial, 1872; reply thereto; sugar refiners: memorial, 23 June 1872; reply there of wholesale dealers, addressed to the Treasury, February 1873; Hour Patiliamettiany Papers

III1879: Report from the Select Committee on Sugar Industries; togeth proceedings of the committee, minutes of evidence, and appendix.; How Parliamentary Papers

1880: Report from the Select Committee on Sugar Industries; togeth proceedings of the committee, minutes of evidence, and appendix.; How Parliamentary Papers

1850: General Index to the bills, reports, accounts, and other papers of the House of Commons: 1845-1850.; House of Commons Parliament

III1875: Commercial. No. 20 (1875). (Sugar conferences.) Corresponde the sugar convention of 1864, and the conferences held at Brussels in N of Commons Parliamentary Papers

III1862: Report from the Select Committee on Sugar Dutles; together v proceedings of the committee, minutes of evidence, appendix, and inde Commons Parliamentary Papers

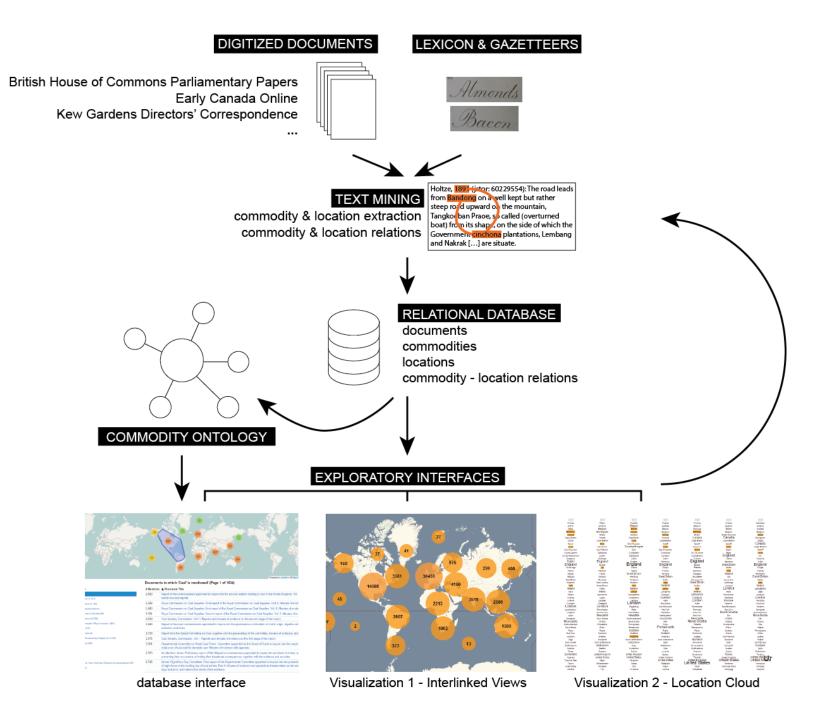
■1881: Report from the Select Committee on Raliways; together with the committee, minutes of evidence, and appendix. Part I.; House of Comparilamentary Papers

#1875: Commercial. No. 20 (1875). (Sugar conferences.) Correspond the sugar convention of 1864, and the conferences held at Brussels in I of Commons Parilamentary Papers

III 1843: Sugar bountles. Return to an order of the Honourable the Hous dated 12 August 1854--for-terum for all correspondence eine the date between the trade and the Foreign Office, between the trade and the Bo between the Foreign Office and foreign governments, on the subject of e sugar. House of Commons Parliamentary Papers

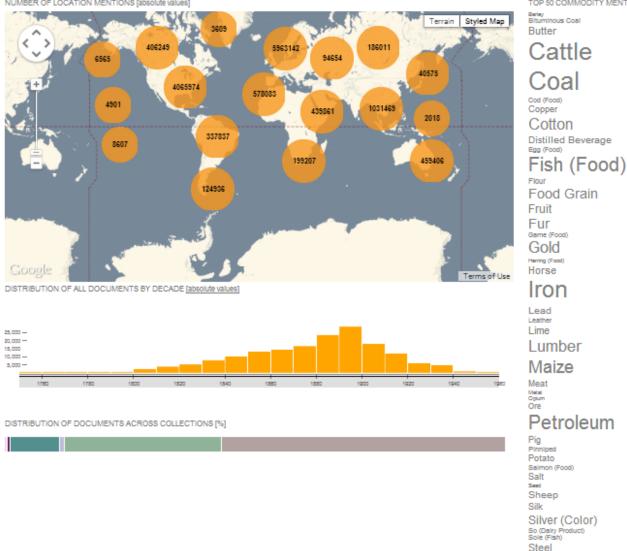
1888: Commercial. No. 15 (1888). Further correspondence respecting conference on the sugar question: 1888. [in continuation of "commercial 2000 Nutries of Commercial International Descention of the sugar question of t

https://academic.oup.com/dsh/article/30/suppl_1/i50/364557



ENTER A COMMODITY OF INTEREST

commodity search



TOP 50 COMMODITY MENTIONS

Sugar

Tobacco

Tea Tin

1908: Annual series of trade reports, serial no. 3917 to 4175 (Trade, Navigation, Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parilamentary Papers

DOCUMENTS [top 100]

1910: Annual series of trade reports: serial nos. 4388 to 4602, for session 1910 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1911: Annual series of trade reports: serial nos. 4603 to 4826, for session 1911 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1909: Annual series of trade reports, serial no. 4176 to 4387 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1913: Annual series of trade reports: serial nos. 4827 to 5041, for session 1912-13 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1906: Annual series of trade reports, serial no. 3475 to 3738 (Trade, Navigation, Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1914: Annual series of trade reports: serial no. 5184 to 5389, for session 1914 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1907: Annual series of trade reports, serial no. 3739 to 3916 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1905: Annual series of trade reports, serial no. 3256 to 3474 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parilamentary Papers

1902: Annual series of trade reports, serial no. 2696 to 2922 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1916: Annual series of trade reports: serial nos. 5390 to 5554, for session 1914-16 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1904: Annual series of trade reports, serial no. 3066 to 3255 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1894: Reports from H.M. Diplomatic and Consular Officers Abroad on Trade and Finance [Full version]; House of Commons Parilamentary Papers

1897: Reports from H.M. Diplomatic and Consular Officers Abroad on Trade and Finance [Full version]: House of Commons Parilamentary Papers

1898: Reports from H.M. Diplomatic and Consular Officers Abroad on Trade and Finance [Full version]: House of Commons Parilamentary Papers

1913: Annual series of trade reports: serial nos. 5042 to 5183, for session 1913 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House

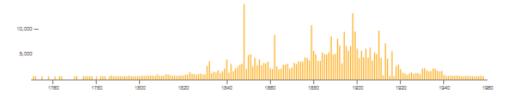


NUMBER OF LOCATION MENTIONS [absolute values]



ENTER A COMMODITY OF INTEREST commodity search

DISTRIBUTION OF COMMODITY MENTIONS ACROSS YEARS:SUGAR [absolute values]

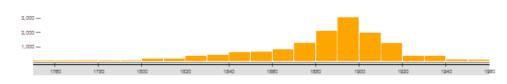


SUGAR





DISTRIBUTION OF ALL DOCUMENTS BY DECADE [absolute values]



DISTRIBUTION OF DOCUMENTS ACROSS COLLECTIONS INCLUDING SUGAR [In %]

COMMODITIES RELATED TO SUGAR DO

Acole

Beef

Barley

Butter

Capsicum

Cattle

Cheese

Coal

Lime

Meat

Pig

Lumber

Maize

Molasses

Plant Stem

Potato

Rawhide

Rice

Salt

Petroleum

Cod (Food)

Cocoa Bean

DOCUMENTS INCLUDING SUGAR [top 100]

1862: Report from the Select Committee on Sugar Duties; together with the proceedings of the committee, minutes of evidence, appendix, and Index.; House of Commons Parliamentary Papers

1879: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix; House of Commons Parilamentary Papers

1848: Eighth report from the Select Committee on Sugar and Coffee Planting; together with an appendix.; House of Commons Parilamentary Papers

1851: Second report from the Select Committee on Customs; together with the proceedings of the committee, minutes of evidence, appendix and index.; House of Commons Parilamentary Papers

ImitaBs: West India Royal commission. Report of the West India Royal commission. Appendix C., Vol. I., containing part I., minutes of proceedings, reports of evidence, and copies of certain documents received in London.; House of Commons Paritamentary Papers

1848: First report from the Select Committee on Sugar and Coffee Planting; together with the minutes of evidence, and appendix.; House of Commons Parilamentary Papers

Distilled Beverage Gulana, Barbados, Trinldad, and Tobago; House of Commons Parilamentary Papers

III1898: West India Royal commission. Report of the West India Royal commission. Appendix C., vol. III., containing parts VI. to XIII. Proceedings, evidence, and documents relating to the Windward Islands, the Leeward Islands, and Jamaica.; House of Commons Parilamentary Papers

III1840: Report from the Select Committee on East India Produce; together with the minutes of evidence, an appendix, and index; House of Commons Parilamentary Papers

III1848: Third report from the Select Committee on Sugar and Coffee Planting; together with the minutes of evidence, and appendix.; House of Commons Parilamentary Papers

III1899: Beer Materials Committee. Report of the Departmental Committee on Beer Materials.; House of Commons Parilamentary Papers

IIII1832: Report from Select Committee on the Commercial State of the West India Colonies; together with the minutes of evidence, and an appendix and Index.; House of Commons Pariliamentary Papers

III1888: Commercial. No. 3 (1888). International conference on the sugar question. Minutes of proceedings and papers laid before the conference.; House of Commons Parilamentary Papers

1848: Seventh report from the Select Committee on Sugar and Coffee Planting; together with the minutes of evidence, and appendix; House of Commons Parilamentary Papers

III 1880: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix.; House of Commons Pariliamentary Papers

III1848: Fifth report from the Select Committee on Sugar and Coffee Planting; together with the minutes of evidence, and appendix.; House of Commons Parilamentary Papers

III1842: Report from the Select Committee on West India Colonies; together with the minutes of evidence, appendix, and Index.; House of Commons Pariliamentary Papers

III1919: East India (Industrial Commission, 1916 18). Minutes of evidence taken before the Indian Industrial Commission, 1916-18. Vol. I.-Delhi, United Provinces, and Bihar and Orissa.; House of Commons Parilamentary Papers

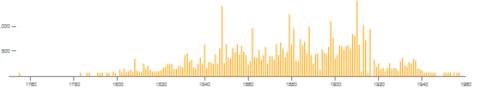
III1910: Canada and the West Indies. Royal Commission on Trade Relations between Canada and the West Indies. Part III. Minutes of evidence taken in the West Indies; and appendices.; House of Commons Parilamentary Papers

III1884: Sugar bountles. Return to an order of the Honourable the House of Commons, dated 12 August 1884:--for, return "of all correspondence since the date of the last return between the trade ENTER A COMMODITY OF INTEREST commodity search

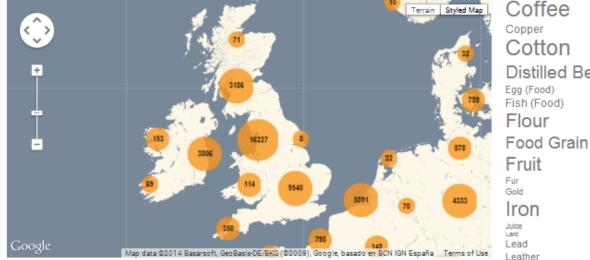




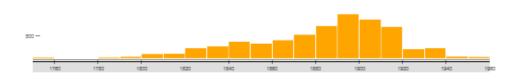




LOCATION MENTIONS ASSOCIATED WITH SUGAR [absolute values]



DISTRIBUTION OF ALL DOCUMENTS BY DECADE [absolute values]



DISTRIBUTION OF DOCUMENTS ACROSS COLLECTIONS INCLUDING SUGAR [In %]

COMMODITIES RELATED TO SUGAR

Accie Barley Beef Butter Capsicum Cattle Cheese Coal

Cocoa Bean Cod (Food) Coffee Copper

Cotton

Lime

Meat

Pig

Lumber

Maize

Molasses

Plant Stem

Potato

Rawhide

Rice

Salt

Petroleum

DOCUMENTS INCLUDING SUGAR [top 100]

1879: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix.; House of Commons Parillamentary Papers

1910: Canada and the West Indies. Roval Commission on Trade Relations between Canada and the West Indies. Part IV. Minutes of evidence taken in London; and appendices.; House of Commons Parliamentary Papers

1862: Report from the Select Committee on Sugar Duties; together with the proceedings of the committee, minutes of evidence, appendix, and index.; House of Commons Parilamentary Papers

1879: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix.; House of Commons Parilamentary Papers

1848: Eighth report from the Select Committee on Sugar and Coffee Planting; together with an appendix.; House of Commons Parliamentary Papers

1879: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix.; House of Commons Parilamentary Papers

1840: Report from the Select Committee on East India Produce: together with the minutes of evidence, an appendix, and index.; House of Commons Parilamentary Papers

Distilled Beverage House of Commons: 1815-1801 - House of Commons: Barliamentary Desert House of Commons: 1845-1850.: House of Commons Parliamentary Papers

> #1875: Commercial. No. 20 (1875). (Sugar conferences.) Correspondence respecting the sugar convention of 1864, and the conferences held at Brussels In May 1875.; House of Commons Parliamentary Papers

> #1862: Report from the Select Committee on Sugar Dutles; together with the proceedings of the committee, minutes of evidence, appendix, and index.; House of Commons Pariliamentary Papers

■1909: Annual series of trade reports, serial no. 4176 to 4387 (Trade, Navigation, Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

#1881: Report from the Select Committee on Railways; together with the proceedings of the committee, minutes of evidence, and appendix. Part I.; House of Commons Parilamentary Papers

■1884: Sugar bountles. Return to an order of the Honourable the House of Commons, dated 12 August 1884:--for, return "of all correspondence since the date of the last return between the trade and the Foreign Office, between the trade and the Board of Trade, and between the Foreign Office and foreign governments, on the subject of export bountles on sugar."; House of Commons Parliamentary Papers

#1875: Commercial. No. 20 (1875). (Sugar conferences.) Correspondence respecting the sugar convention of 1864, and the conferences held at Brussels in May 1875.; House of Commons Parliamentary Papers

III1934: Trade and navigation. Return (in part) to an order of the honourable the House of Commons, dated 30 January, 1934:--for, accounts relating to trade and navigation of the United Kingdom for each month during the year 1934.; House of Commons Parilamentary Papers

■1937: Trade and navigation. Return (in part) to an order of the honourable the House of Commons dated 20 January, 1937:-- for accounts relating to trade and navigation of the United Kingdom for each month during the year 1937; House of Commons Parilamentary Papers

#1888: Commercial. No. 15 (1888). Further correspondence respecting the international conference on the sugar question: 1888. [in continuation of "commercial No. 2 (1888)," C. 5259.]; House of Commons Parliamentary Papers

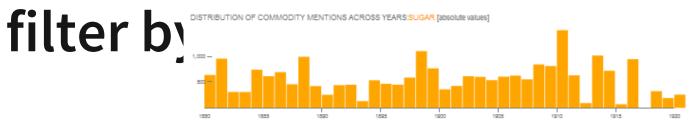
#1834: Catalogue of parilamentary reports, and a breviate of their contents: arranged under heads according to the subjects. 1696-1834.; House of Commons Parilamentary Papers

■1916: Annual series of trade reports: serial nos. 5390 to 5554, for session 1914-16 (Trade. Navination, Shinning: Annual and miscellaneous series (foreign countries)) (Full version): House



ENTER A COMMODITY OF INTEREST commodity search

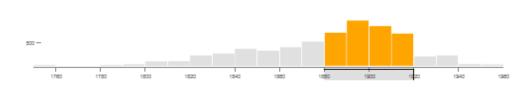




LOCATION MENTIONS ASSOCIATED WITH SUGAR [absolute values]



Map data @2014 Basarsoft, GeoBasis-DE/BKG (@2009), Google, basado en BCN IGN España Terms of Use DISTRIBUTION OF ALL DOCUMENTS BY DECADE [absolute values]





COMMODITIES RELATED TO SUGAR

Annie Barley Zeef Butter

Cattle

Cheese

Coal Cocoa Bean Cod (Food) Coffee Copper Cotton

Distilled Beverage Egg (Food) Fish (Food) Flour Food Grain Fruit Gold

Iron Juice Lard

> Leather Lime Lumber Maize Meat Molasses

Petroleum Pig

Plant Stem Potato Rawhide Rice

Salt Sheep

DOCUMENTS INCLUDING SUGAR [top 100]

1910: Canada and the West Indies. Roval Commission on Trade Relations between Canada and the West Indies. Part IV. Minutes of evidence taken in London; and appendices.; House of Commons Parliamentary Papers

1881: Report from the Select Committee on Railways; together with the proceedings of the committee, minutes of evidence, and appendix. Part I.; House of Commons Parliamentary Papers

1909: Annual series of trade reports, serial no. 4176 to 4387 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

1884: Sugar bountles. Return to an order of the Honourable the House of Commons, dated 12 August 1884;--for, return "of all correspondence since the date of the last return between the trade and the Foreign Office, between the trade and the Board of Trade, and between the Foreign Office and foreign governments, on the subject of export bounties on sugar."; House of Commons Parliamentary Papers

1888: Commercial. No. 15 (1888). Further correspondence respecting the International conference on the sugar question: 1888. [in continuation of "commercial No. 2 (1888)," C. 5259.]; House of Commons Parliamentary Papers

1916: Annual series of trade reports: serial nos. 5390 to 5554, for session 1914-16 (Trade. Navigation, Shipping: Annual and miscellaneous series (foreign countries)) (Full version); House of Commons Parliamentary Papers

1880: Report from the Select Committee on Sugar Industries; together with the proceedings of the committee, minutes of evidence, and appendix.; House of Commons Parillamentary Papers

1910: Annual series of trade reports: serial nos. 4388 to 4602, for session 1910 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

■1905: Annual series of trade reports, serial no. 3256 to 3474 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

■1914: Annual series of trade reports: serial no. 5184 to 5389, for session 1914 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

#1885: Trade and navigation. Return (in part) to an order of the Honourable the House of Commons, dated 19 February 1885,---for, accounts relating to trade and navigation of the United Kingdom, for each month during the year 1885.; House of Commons Parilamentary Papers

#1887: Condition of the working classes. Tabulation of the statements made by men living in certain selected districts of London in March 1887 .: House of Commons Parilamentary Papers

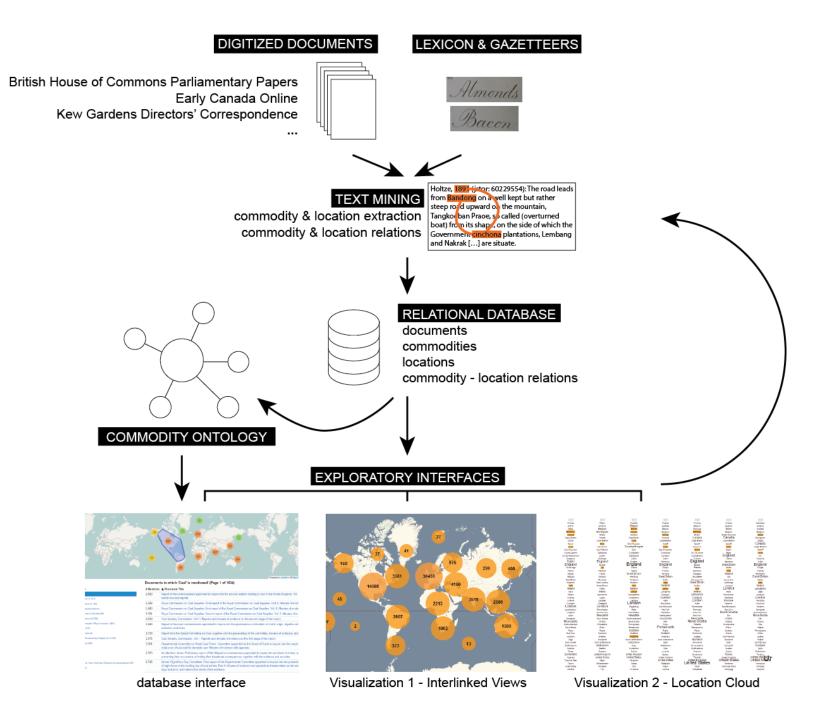
#1884: Sugar bountles. Return to an order of the Honourable the House of Commons, dated 12 August 1884;--for, return "of all correspondence since the date of the last return between the trade and the Foreign Office, between the trade and the Board of Trade, and between the Foreign Office and foreign governments, on the subject of export bounties on sugar."; House of Commons Parliamentary Papers

#1885: Trade and navigation. Return (in part) to an order of the Honourable the House of Commons, dated 19 February 1885;---for, accounts relating to trade and navigation of the United Kingdom, for each month during the year 1885.; House of Commons Parilamentary Papers

■1908: Annual series of trade reports, serial no. 3917 to 4175 (Trade. Navigation. Shipping: Annual and miscellaneous series (foreign countries)) [Full version]; House of Commons Parliamentary Papers

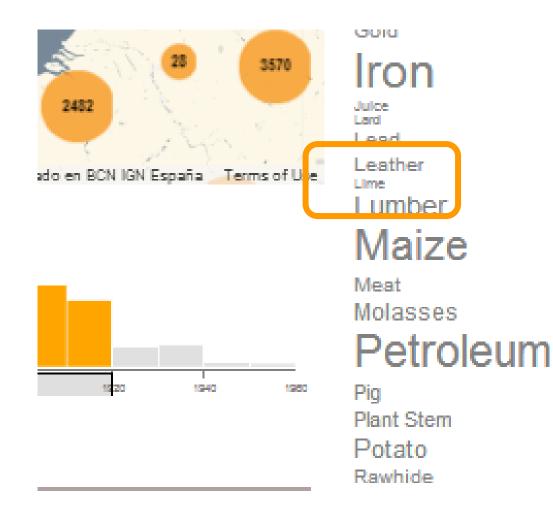
■1884: Sugar bounties. Return to an order of the Honourable the House of Commons, dated 12 August 1884;--for, return "of all correspondence since the date of the last return between the trade and the Foreign Office, between the trade and the Board of Trade, and between the Foreign Office and foreign governments, on the subject of export bounties on sugar."; House of Commons





visualisation informs text mining

• Lime among the top 50 commodities???



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■1887: Co certain sele

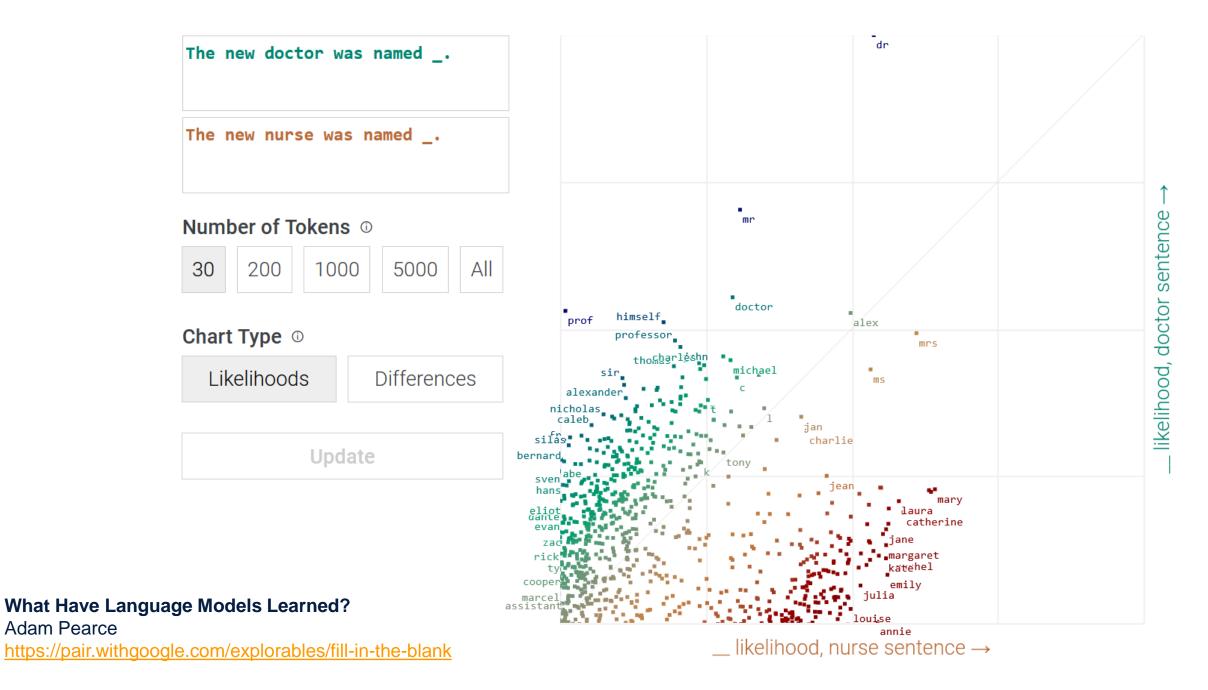
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III 1908: An Annual and Parliamenta

insights from initial visualisation inform new visualisation approaches

enter a commodity of interest sugar raw data: sugar enter a location of interest location search	minimum number of 200 400	•••••	400 1600 1800	location mentions by continue							ABOUT Designed
top 50 location mentions by decade											
1800	1810	1820	1830	1840	1850	1850	1870	1880	1890	1900	1910
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Philadelphia	Portamouth	New South Wales	Quebec	New South Wales	Marila	Paris	New York	Ontario	Philippine Islands	New York	New York
Plymouth	Portugal	Newfoundend	Rostock	Nova Scotla	Mauritius	Penang	New York	Ottawa	Portugal	Norway	Persia
Port Glasgow	Rutain San	North America	Rotterdam Russia	Pernambuco Porto Rico	Mysore	Plymouth	Paris	Paris	Cuebec	Persis	Portugei Russia
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United States	Surrey	Trinidad	Trieste	St. George	Spain	Sgain	Toronio	Toronto	Trinidad	Switzerland	Sutzerand
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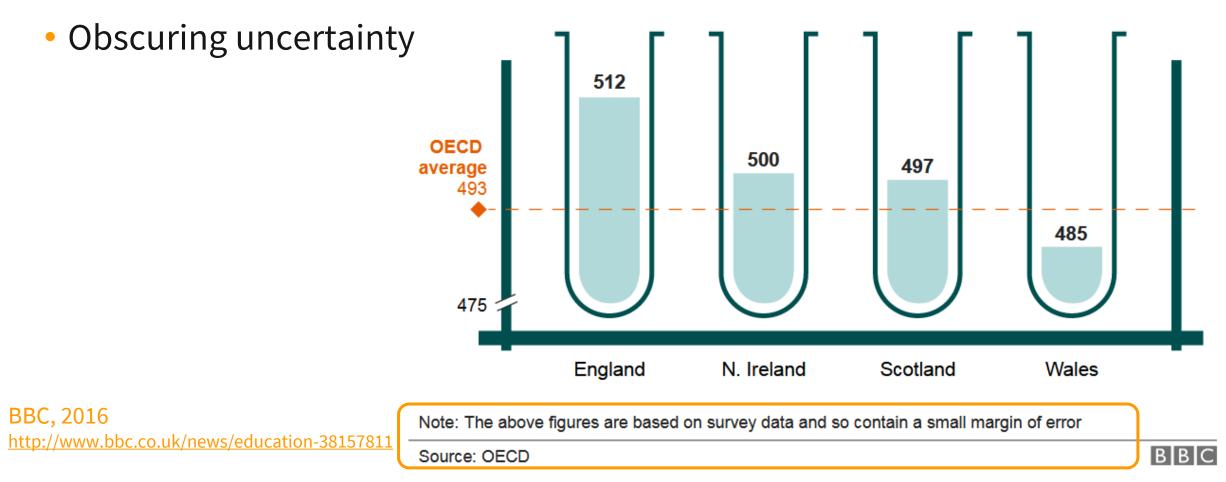
critical perspectives on visualization

Manipulating scales



http://www.vislies.org/2016/gallery/

England best at science, with only Wales below OECD average Pisa science scores, by UK nation





Map tweeted by Trump in October 2019 https://edition.cnn.com/2019/10/01/politics/trump-impeach-this-map-fact-check/index.html

misleading through specific mapping choices

SHARE OF THE POPULAR VOTE IN THE 2016 PRESIDENTIAL ELECTION

Donald Trump Hillary Clinton Other candidates 46.1% 62,984,825 votes
48.2% 65,853,516 votes
5.7%

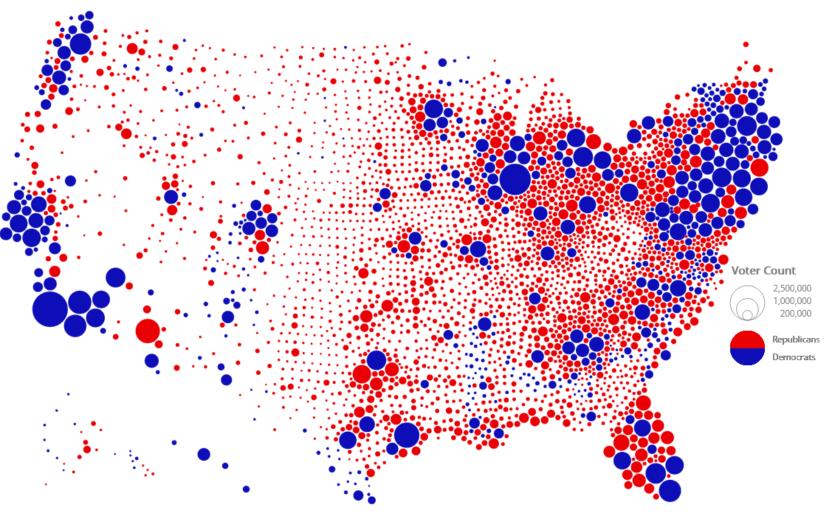
Visualization by Alberto Cairo https://www.youtube.com/watch?v=DhGW99CFbAM



misleading through specific mapping choices

PERCENTAGE OF ELIGIBLE VOTERS Didn't vote 40.0% Voted for Donald Trump 27.7% Voted for Hillary Clinton 28.9% Voted for other candidates 3.4% Visualization by Alberto Cairo 3.4%

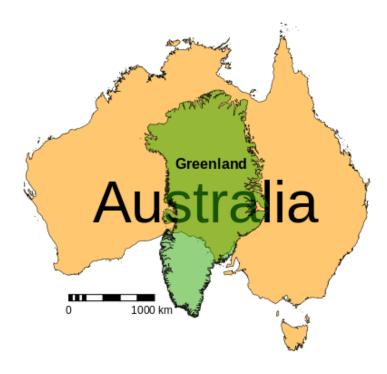


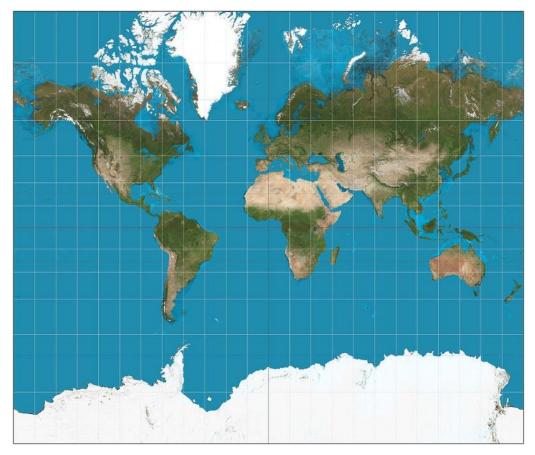


https://try-to-impeach-this.jetpack.ai/

maps are political

- Mercator projection is problematic
- Countries far away from the equator are heavily distorted



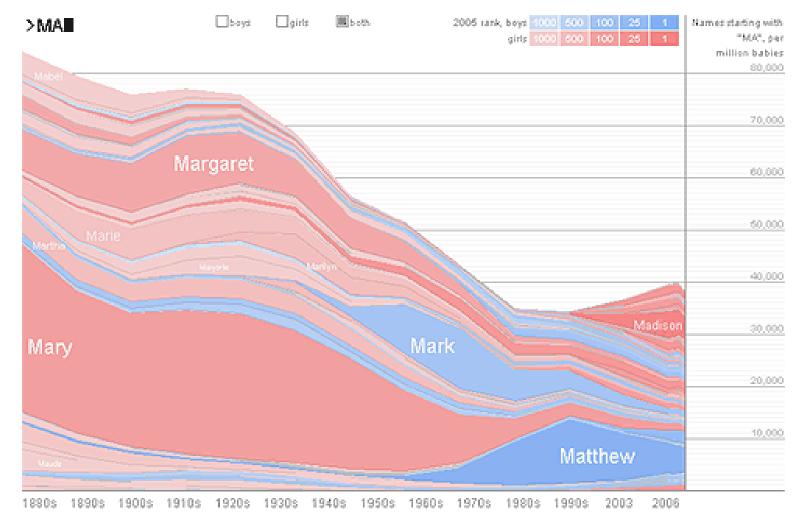


https://en.wikipedia.org/wiki/Mercator_projection 72

ethical & political considerations

- What values or assumptions does the visualisation promote?
- What perspectives are rendered invisible or muted?
- Do the potential benefits of a visualisation outweigh the possible harm it might cause?

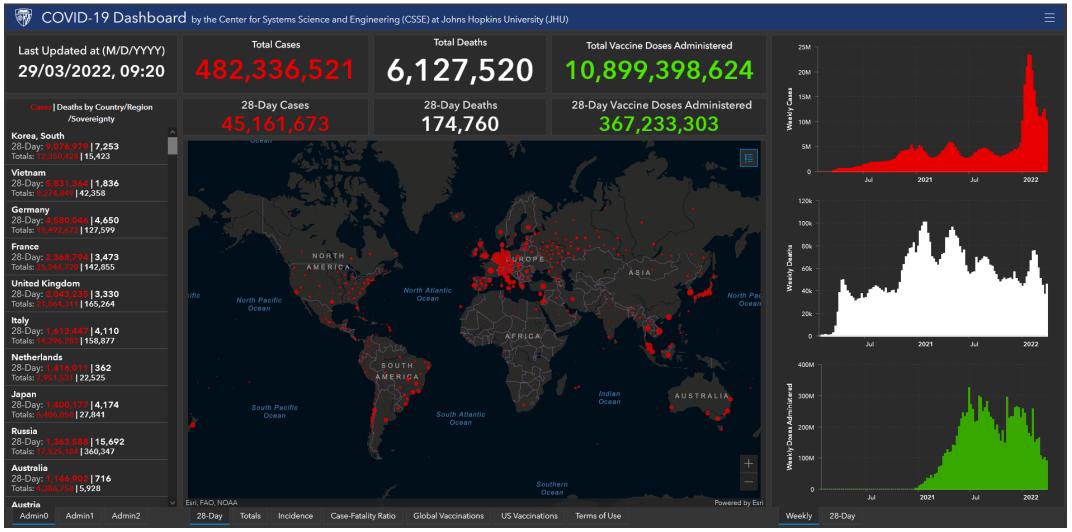
Name voyager (2005)



http://www.bewitched.com/namevoyager.html

Covid-19 Dashboard

Center for Systems Science and Engineering at Johns Hopkins University



https://gisanddata.maps.arcgis.com/apps/dashboards/bda7594740fd40299423467b48e9ecf6

Corona Moments

Center for Systems Science and Engineering at Johns Hopkins University

Click the bubbles to read people's moments.		≡ change view
Select countries or hashtags to filter.	▶ REPORT	٨.
World (78)	[anonymous], Early November 2020, Germany Half a year into #wfh I bought an ethernet	•
#academiclife #conferences #covid #homeoffice #homeschooling #lockdown	cable which is representative of me finally setting up a proper workspace at home after having thought for a while: "does it still make sense to invest in equipment now?"	250
(#marriage) (#responsibility) (#socialdistancing) (#sourdough)	previous <u>next</u>	200
ADD YOUR MOMENT	Half a year into #wfh I bought an ethernet cable which is	
HIDE ALL	representative of me finally setting up a proper workspace at home after having thought for a while:	V ¹⁵⁰
	"does it still make sense to invest in equipment now?"	
		50
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		worldwide

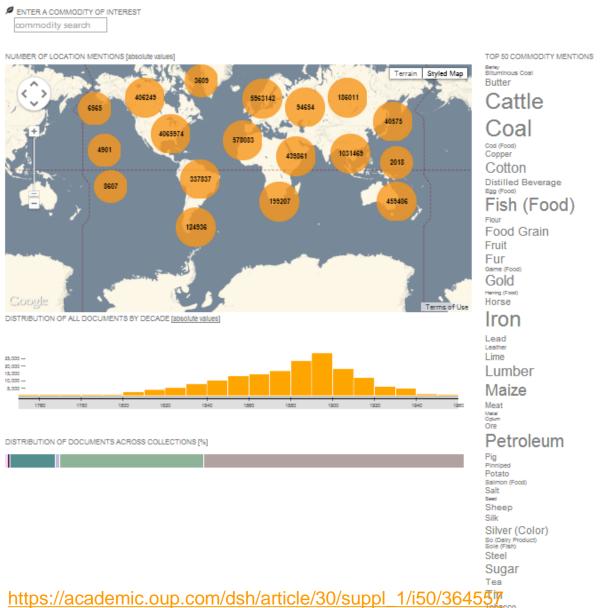
https://uclab.fh-potsdam.de/coronamoments/#/embedded-stories#progressTarget

Trading Consequences

- Points of critique
 - Disclosure of sources and intentions
 - Data provenance
 - → Make the invisible visible

→ Visualisation is about showing & telling

Alberto Cairo



additional pointers

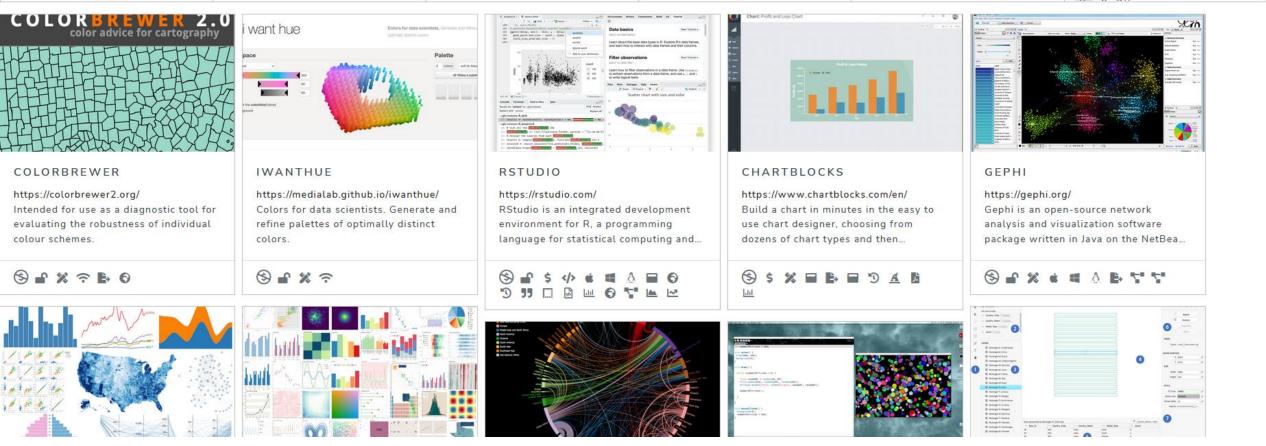
visualization tools

- Libraries
 - Python
 - <u>https://towardsdatascience.com/top-6-python-libraries-for-visualization-which-one-to-use-fe43381cd658</u>
 - JavaScript
 - D3.js <u>https://d3js.org/</u>
 - R packages
 - https://towardsdatascience.com/the-7-r-packages-you-should-be-using-for-data-visualisation-e29010cefe51
- Off-the-shelf tools
 - Tableau Desktop
 - Student license: https://www.tableau.com/en-gb/academic/students
 - Raw Graphs <u>https://rawgraphs.io/</u>

VISBROWSER	ADD A TOOL	ABOUT	
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Search

AVAILABILITY	PROGRAMMING SKILLS	PLATFORM	FEATURES	TYPE OF DATA	VISUALIZATION	
34 🛞 Free 28 🗬 Open source	23 🗶 None 11 🖪 Javascript	17 🔹 Apple 20 📲 Windows	23 🖬 Web-publishing	33 🖬 Numeric	11 Networks	
18 \$ Paid	6 🌩 Python 🔰 🛓 Java	12 & Linux 22 穼 Web	26 📑 File exports	25 Geographic	25 O Maps	
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					10 11 011	



https://vistools.net/

further reading

- Alberto Cairo. **The Truthful Art**. <u>http://www.thefunctionalart.com/</u>
- Tamara Munzner. Visualization Analysis & Design. <u>https://www.cs.ubc.ca/~tmm/vadbook/</u>

- Giorgia Lupi. Data Humanism, The Revolution will be Visualized <u>http://giorgialupi.com/data-humanism-my-manifesto-for-a-new-data-wol</u>
- Michael Correll. Ethical Dimensions of Visualization Research. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, 2019. <u>https://arxiv.org/pdf/1811.07271.pdf</u>