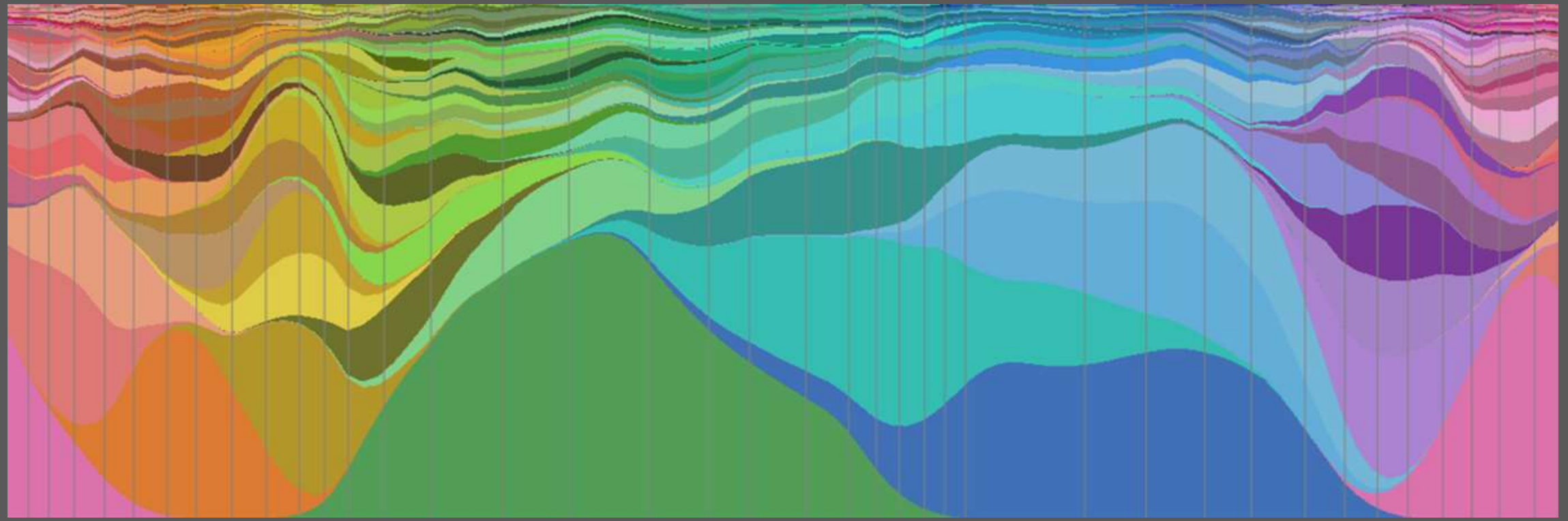
LDSCI5209 - Information Presentation and Visualisation

Week 1: Introductions



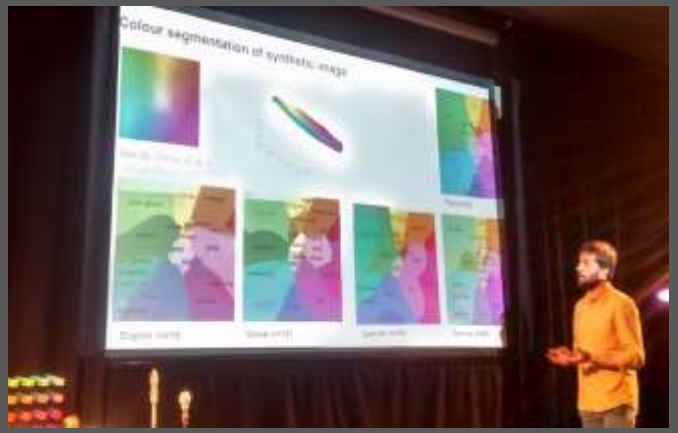
Dimitris Mylonas

Northeastern University London

Plan for today

- Introductions
- Course overview
- Importance of data visualisation
- Evolution of visualisation

Who are you?



Colournamer: https://colornaming.net
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Aims for the LDSCI5209 course

- Design and evaluate effective data visualisations
- Apply principles of human perception, cognition and interactivity
- Develop good programming skills for both static and interactive visualisations
- Enhance analytical and communication skills

Teaching plan

- 12 x 1.5 hours of lectures
- 12 x 1.5 hours of hands-on lab sessions
- 12 x 1 hours of optional office hours

Useful resources

- Canvas & Syllabus:
- Textbook:

  Visualization Analysis and Design by Tamara Munzner (2014)
- Yet, there is no single textbook on visualisation and we will use multiple sources.

Formative assessment

- Submit solved Exercise Sheets for each lab session
- When? Every Monday 23:59
- Marks, if any, do NOT contribute to the overall final grade

Summative assessment

- AE1 Set Exercises: From Colours to Words
- AE2 Written Assignment: Explorable Visual Data Stories

Grade scale

1st Class	Upper Second Class	Lower Second Class	Third Class	Fail
100	68	58	48	35
90	65	55	45	20
85	62	52	42	5
80				0
75				
72				

Attendance

- Use SEAtS app on your mobiles to register your attendance

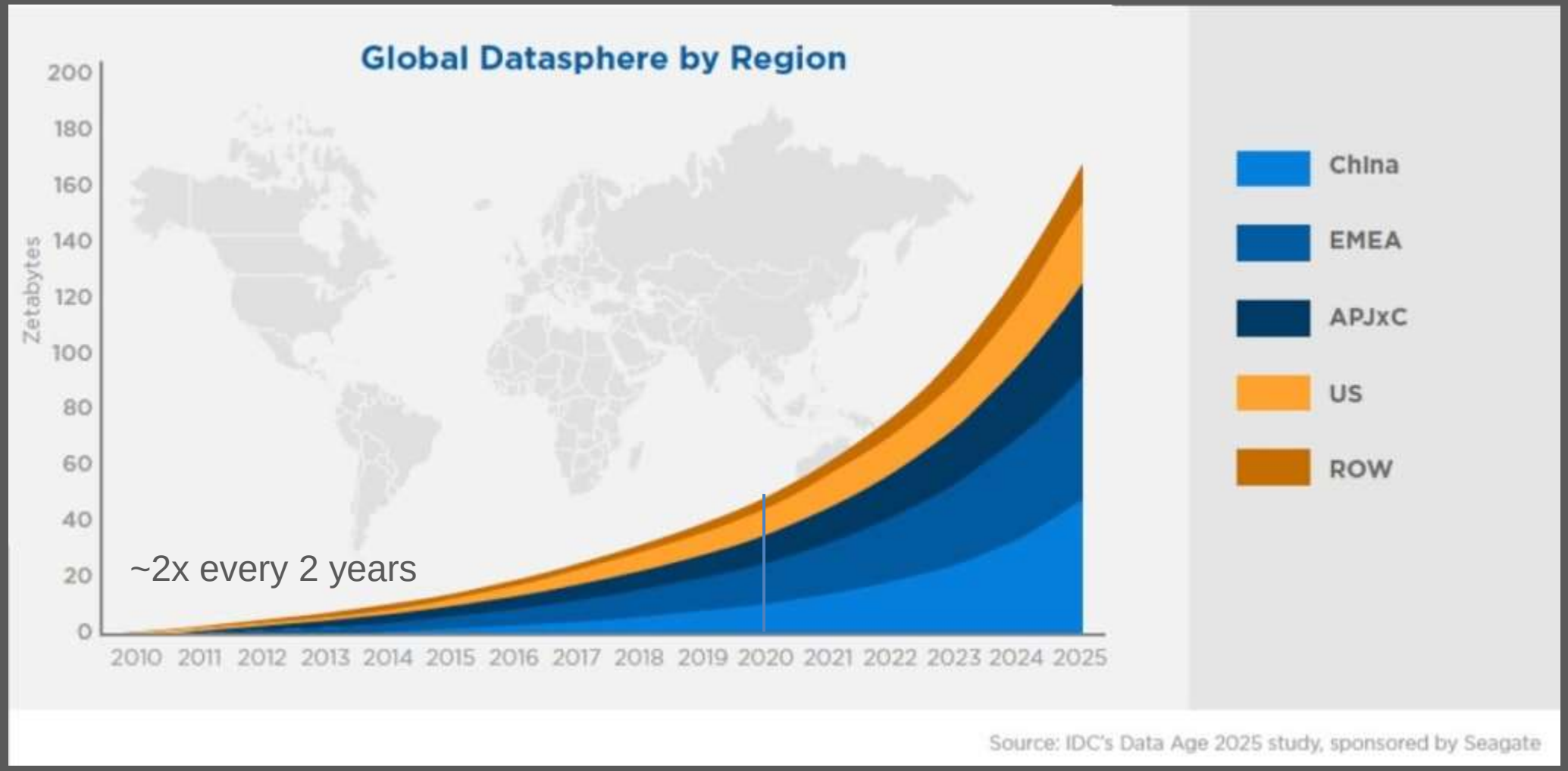
The importance of data visualisation

Making the invisible visible

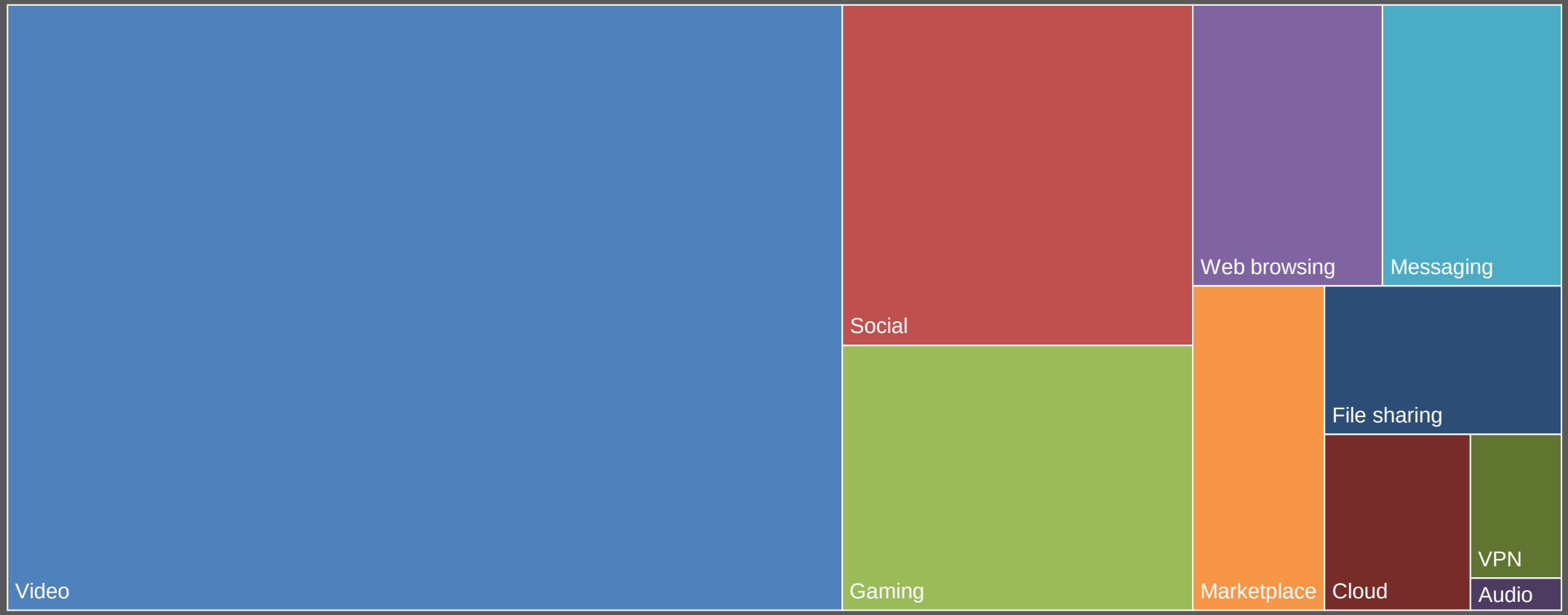
What is data visualisation?

- Data visualisation is the visual representation of information and data to enhance human cognition.
- It is used to **augment human capabilities**, not to replace human decision-making with computational methods.
- Data visualisation is an interdisciplinary field that combines art, design, psychology, statistics, **data science** and human computer interaction (HCI).

How much data do we produce?



What kind of data do we produce?



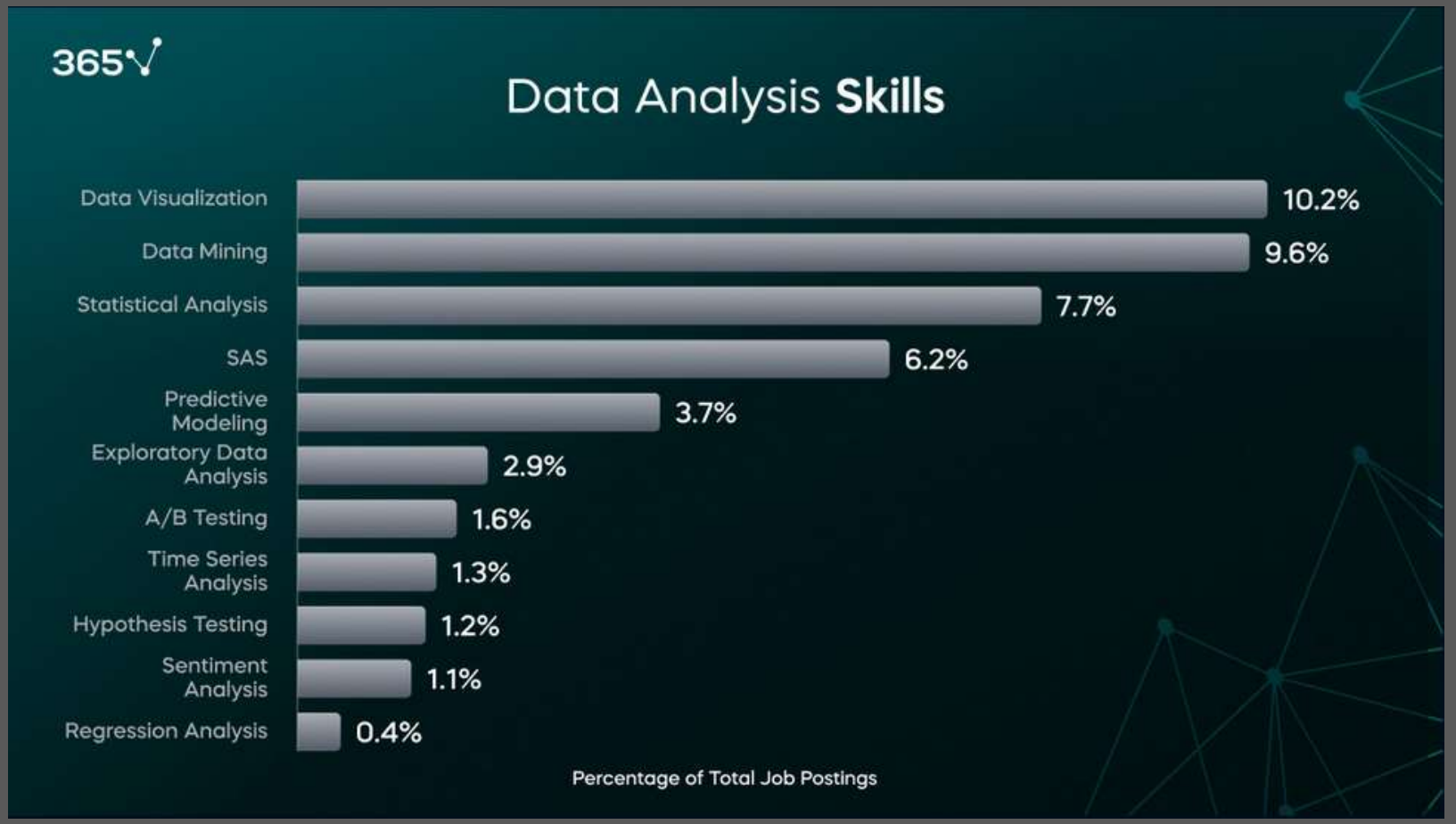
Source: https://whatsthebigdata.com/data-generated-every-day/

The ability to take data—to be able to understand it, to process it, to extract value from it, to visualise it, to communicate it—that's going to be a hugely important skill in the next decades, ...because now we really do have essentially free and ubiquitous data. So the complimentary scarce factor is the ability to understand that data and extract value from it.

Hal Varian, Google's Chief Economist

The McKinsey Quarterly, Jan 2009

Popularity of skills in data science



Why visualise data?

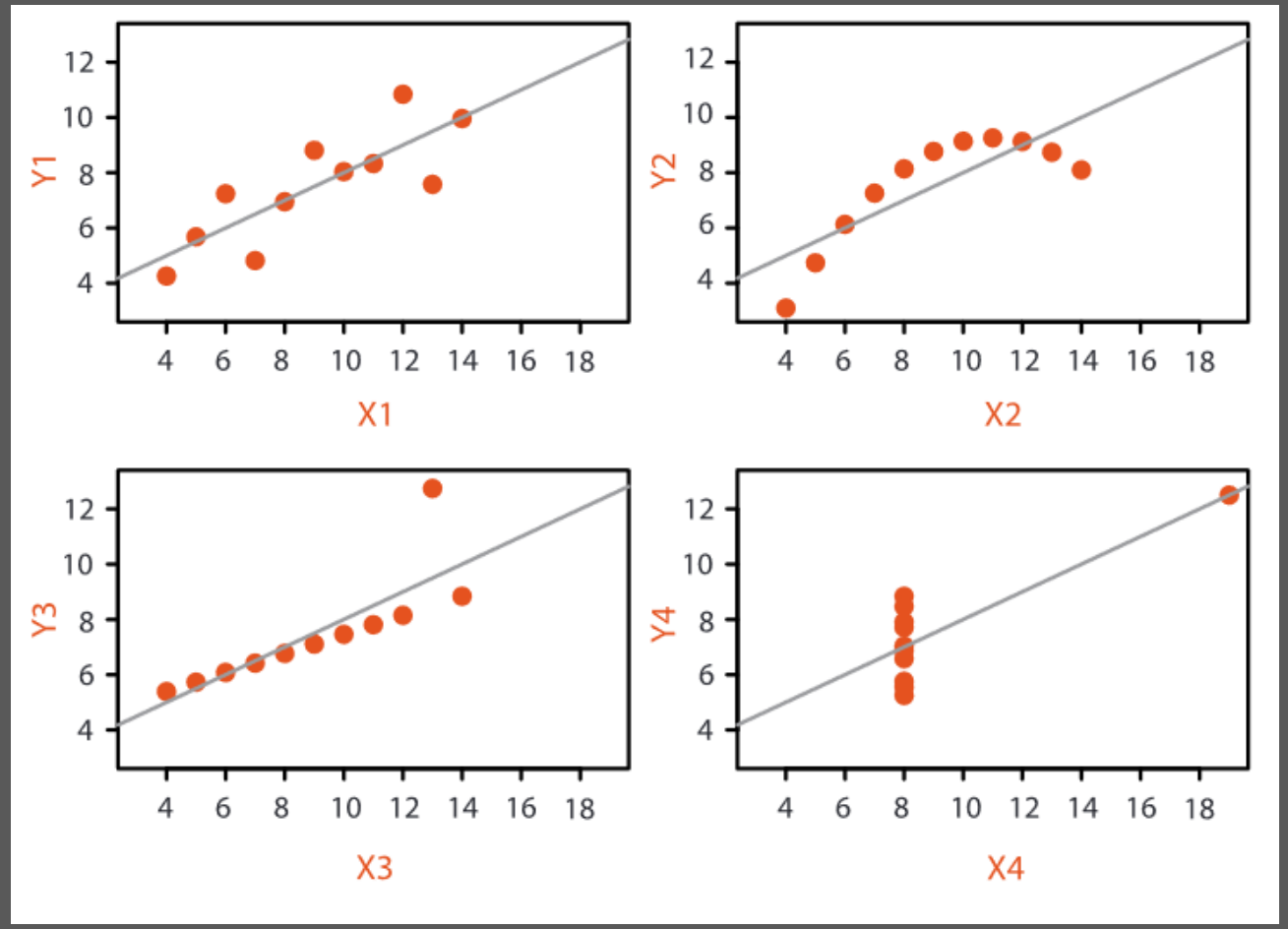
- Help cognition
- Expand memory
- Find patterns
- Generate and answer questions
- Make decisions
- Communicate
- Inspire

Cognitive limitations

https://youtu.be/_bnnmWYI0lM?feature=shared

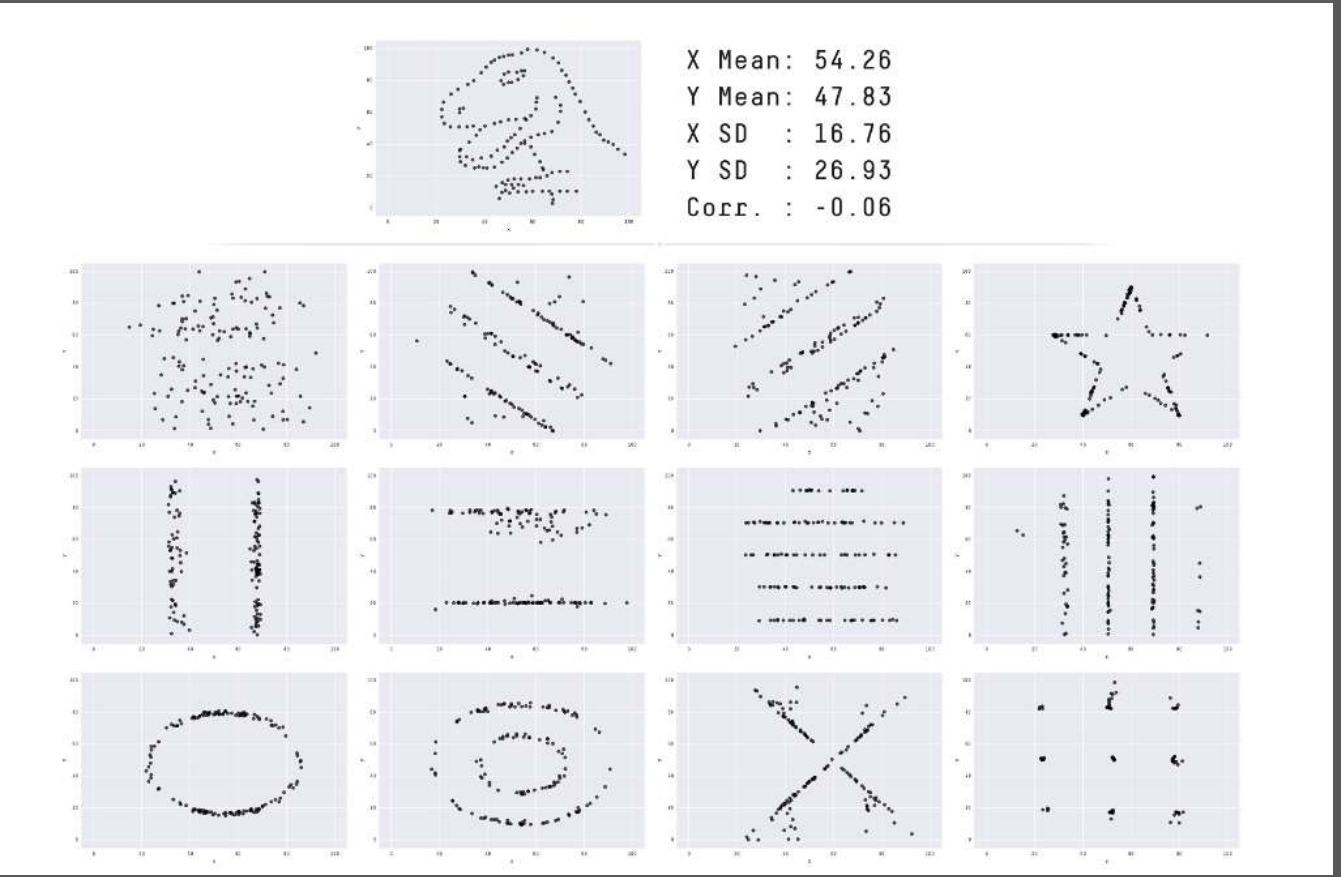
Why visualisation complements statistics

	X1	Y1	X2	Y2	X3	Y3	X4	Y4
	10	8.04	10	9.14	10	7.46	8	6.58
	8	6.95	8	8.14	8	6.77	8	5.76
	13	7.58	13	8.74	13	12.74	8	7.71
	9	8.81	9	8.77	9	7.11	8	8.84
	11	8.33	11	9.26	11	7.81	8	8.47
	14	9.96	14	8.1	14	8.84	8	7.04
	6	7.24	6	6.13	6	6.08	8	5.25
	4	4.26	4	3.1	4	5.39	19	12.5
	12	10.84	12	9.11	12	8.15	8	5.56
	7	4.82	7	7.26	7	6.42	8	7.91
	5	5.68	5	4.74	5	5.73	8	6.89
Mean	**9.00**	**7.50**	**9.00**	**7.50**	**9.00**	**7.50**	**9.00**	**7.50**
StD	**3.16**	**1.94**	**3.16**	**1.94**	**3.16**	**1.94**	**3.16**	**1.94**
Corr	**0.82**		**0.82**		**0.82**		**0.82**	



Anscombe, 1973

… same stats, different visualisations



Matejka and Fitzmaurice (CHI 2017)

Learning about stats and visualisation

https://www.ted.com/talks/hans_rosling_the_best_stats_you_ve_ever_seen?subtitle=en

The evolution of data visualisation

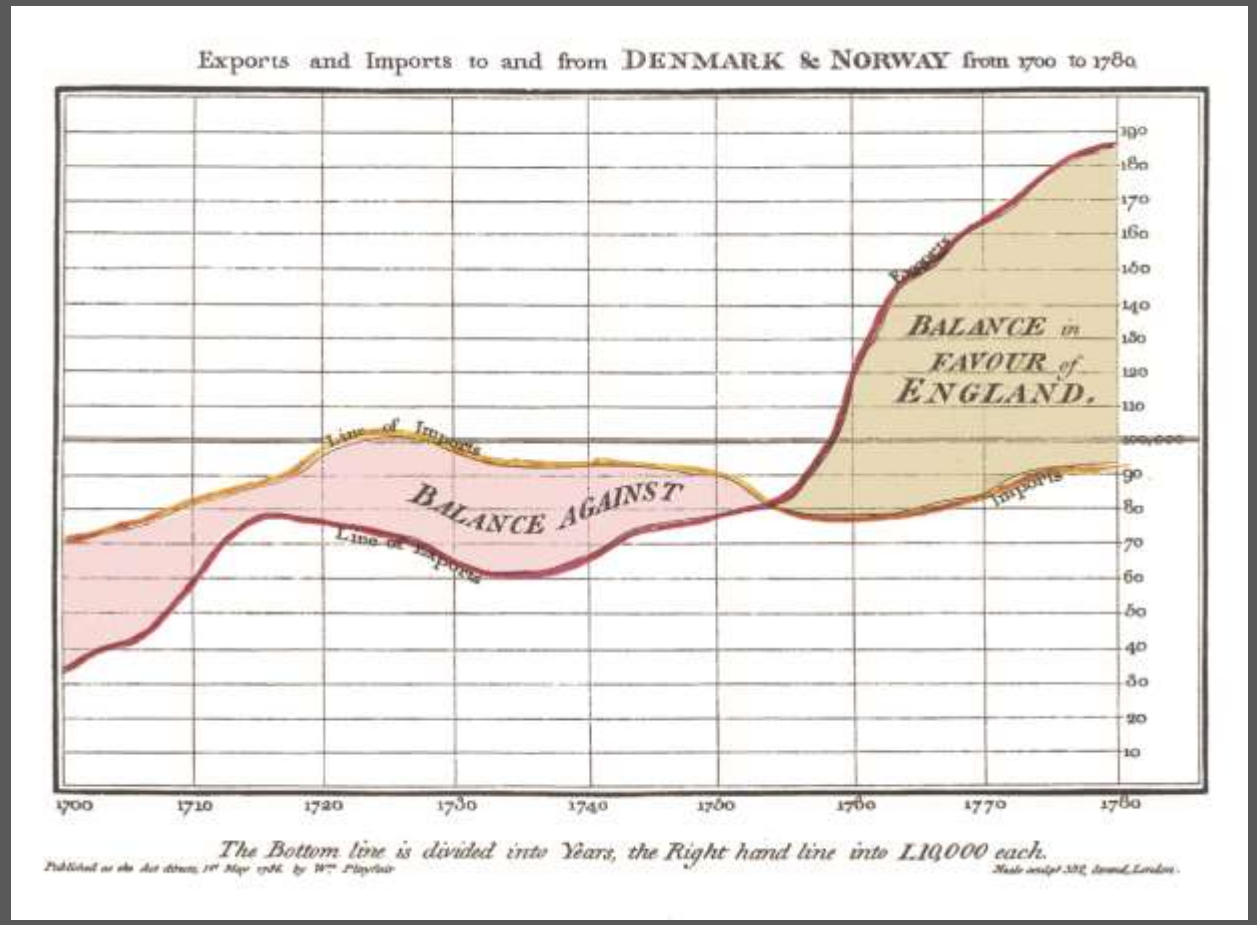
From early maps to interactive dashboards

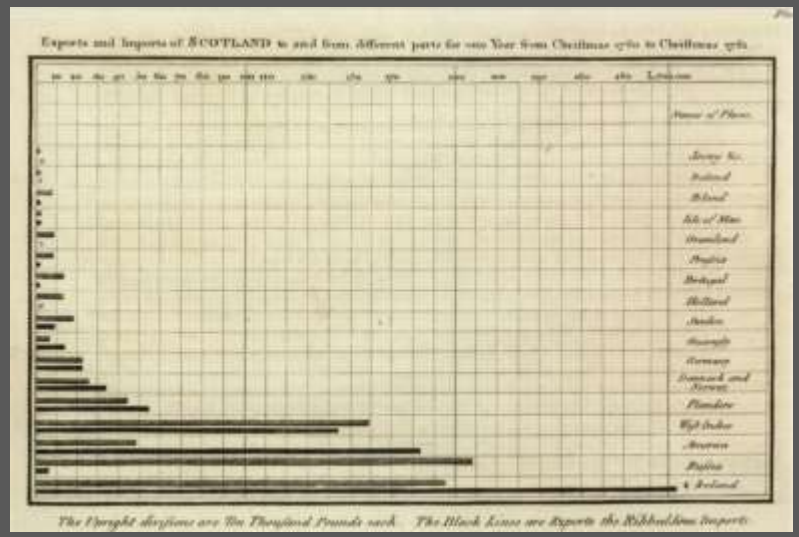
Early visualisations (Pre-1700s)

Ptolemy's Geography (circa 150)

Mercator’s World map (1569)

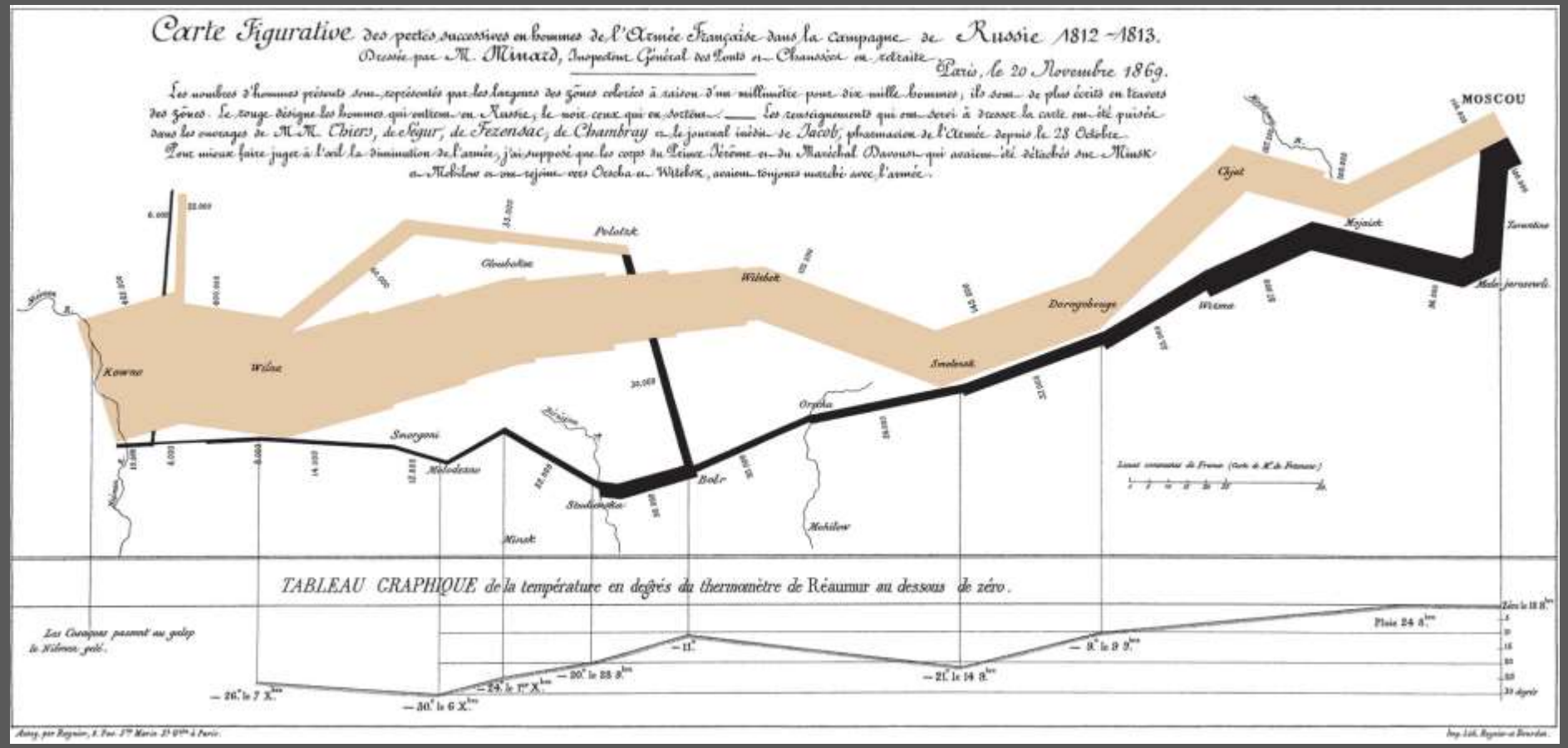
The rise of statistical graphics (1800s)





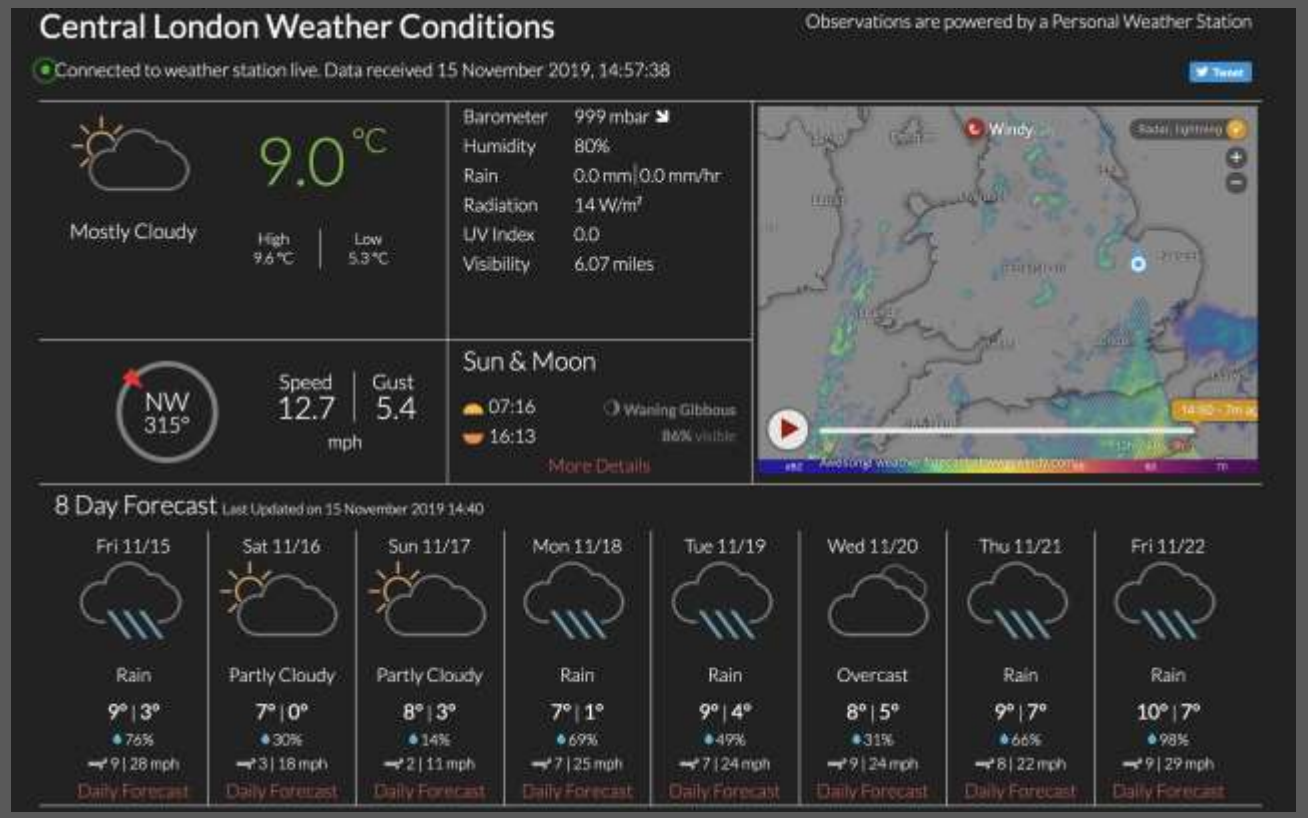
William Playfair (1759 –1823)

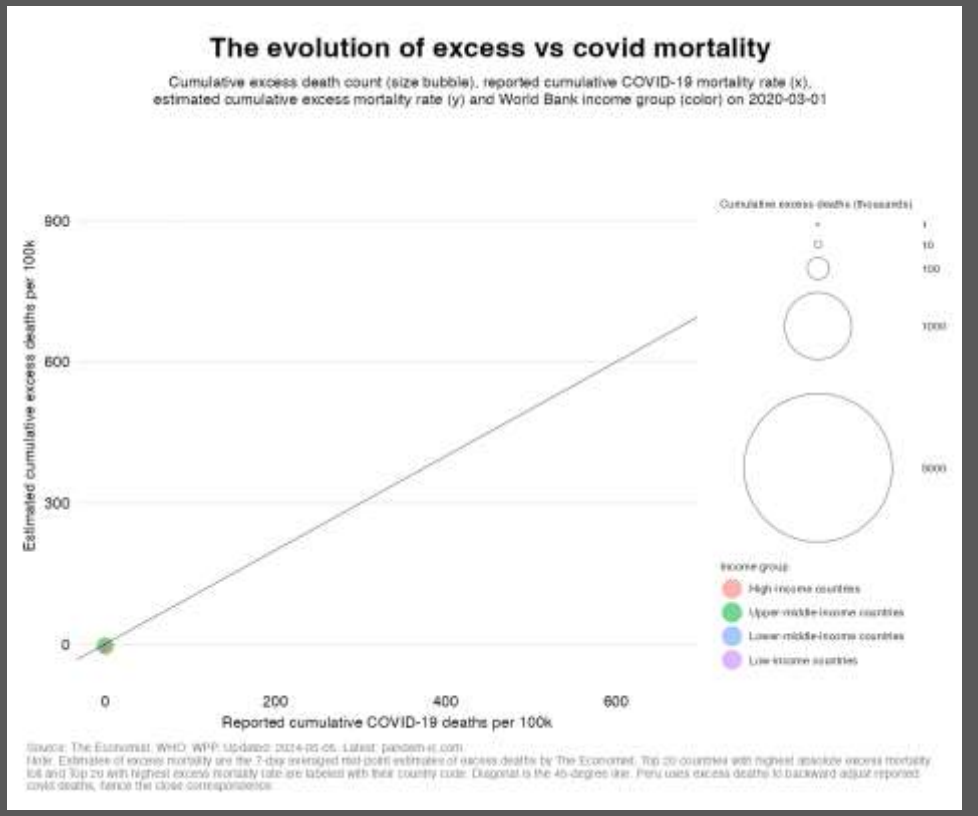
Modern data visualisation (1900s)



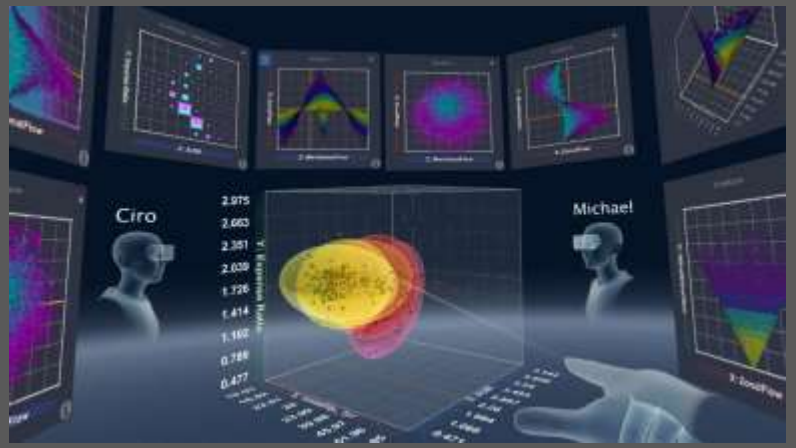
Minard's Flow Map (1869)

Interactive real time visualisations (2000s)



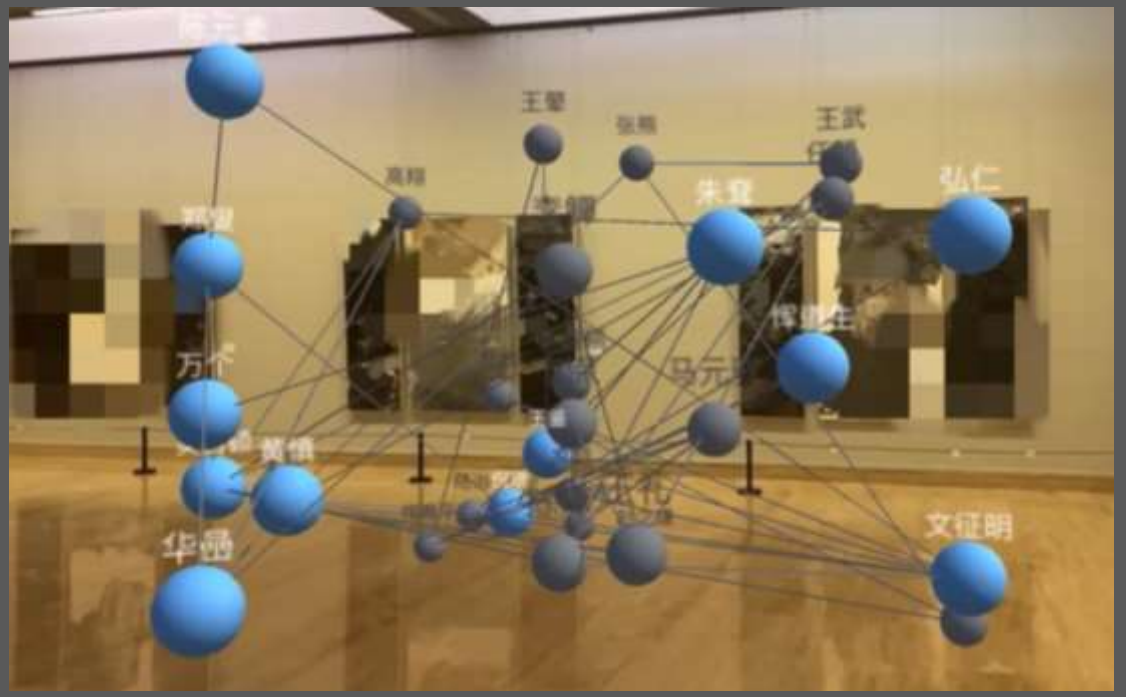


The future of data visualisation?



Vitualitics

AR Graph Visualisation (Li & Wang, 2022)

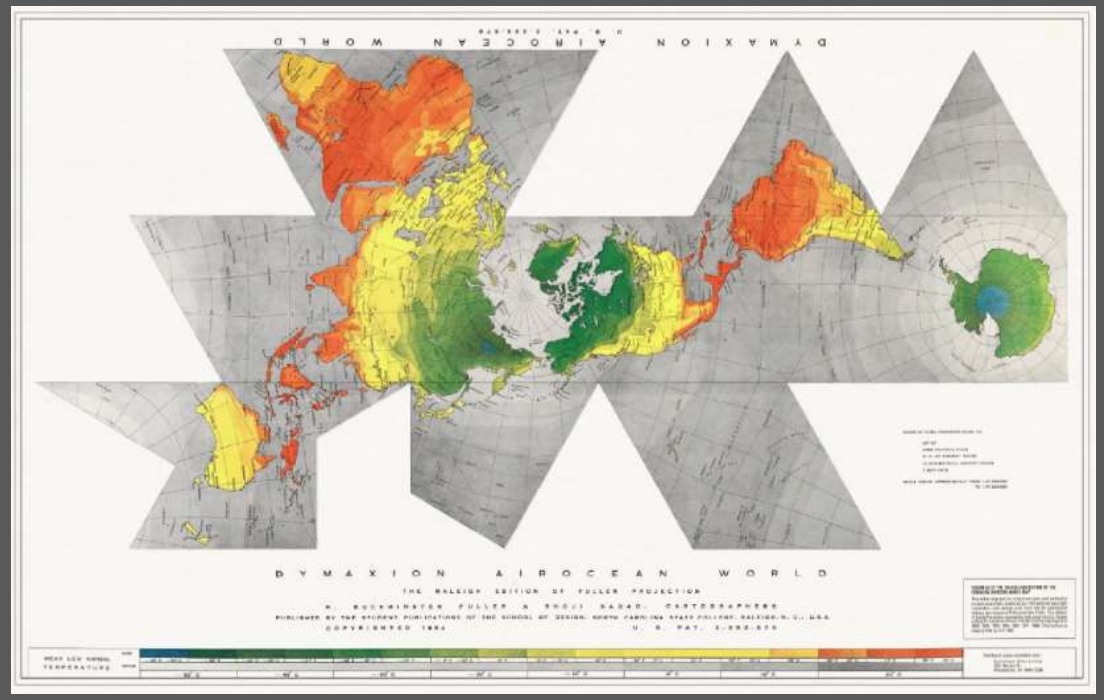


Interactive activity

Exploring strengths and limitations of data visualisations

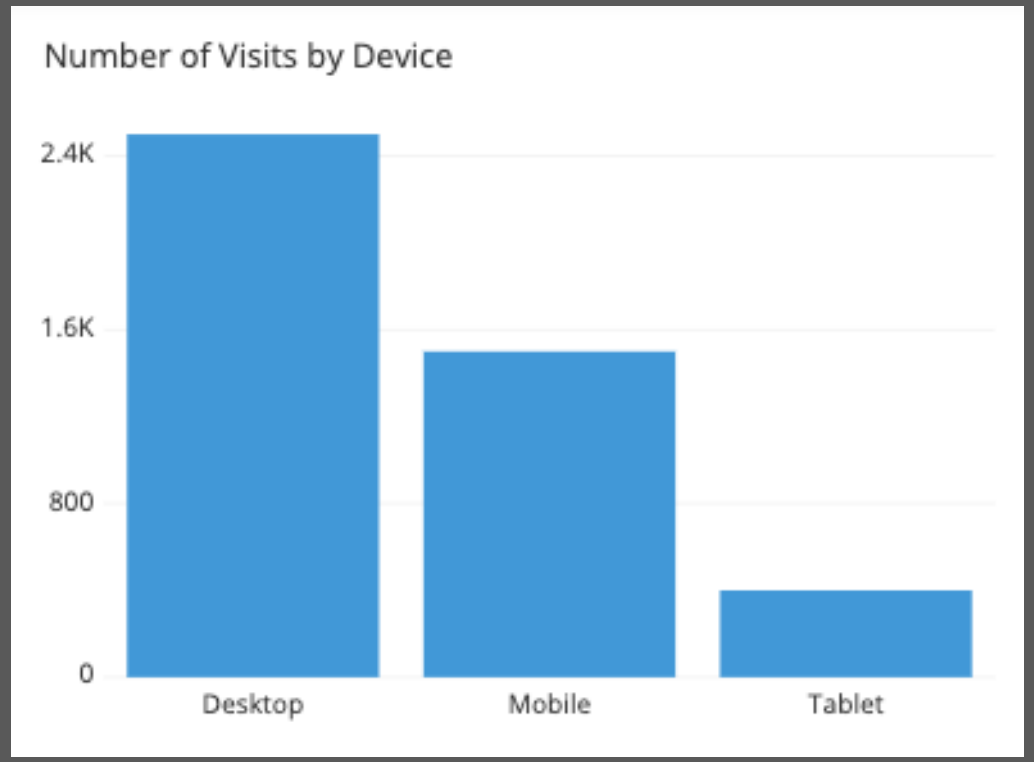
Physical vs. Dymaxion world maps

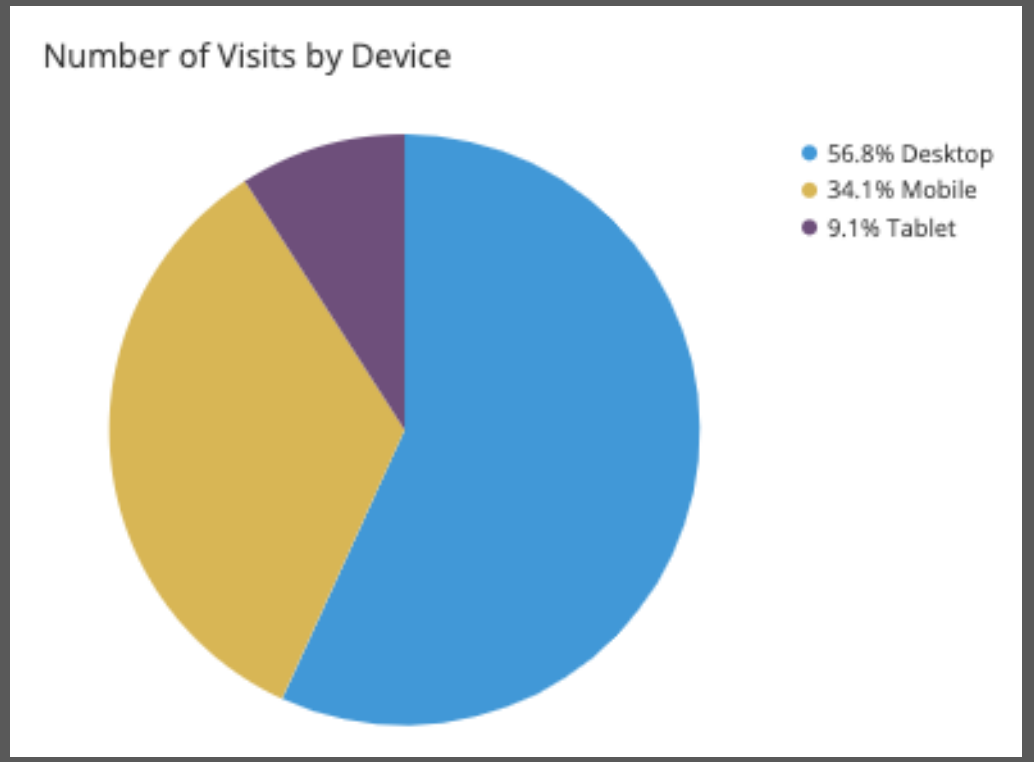
Physical Map



Dymaxion Map (1954)

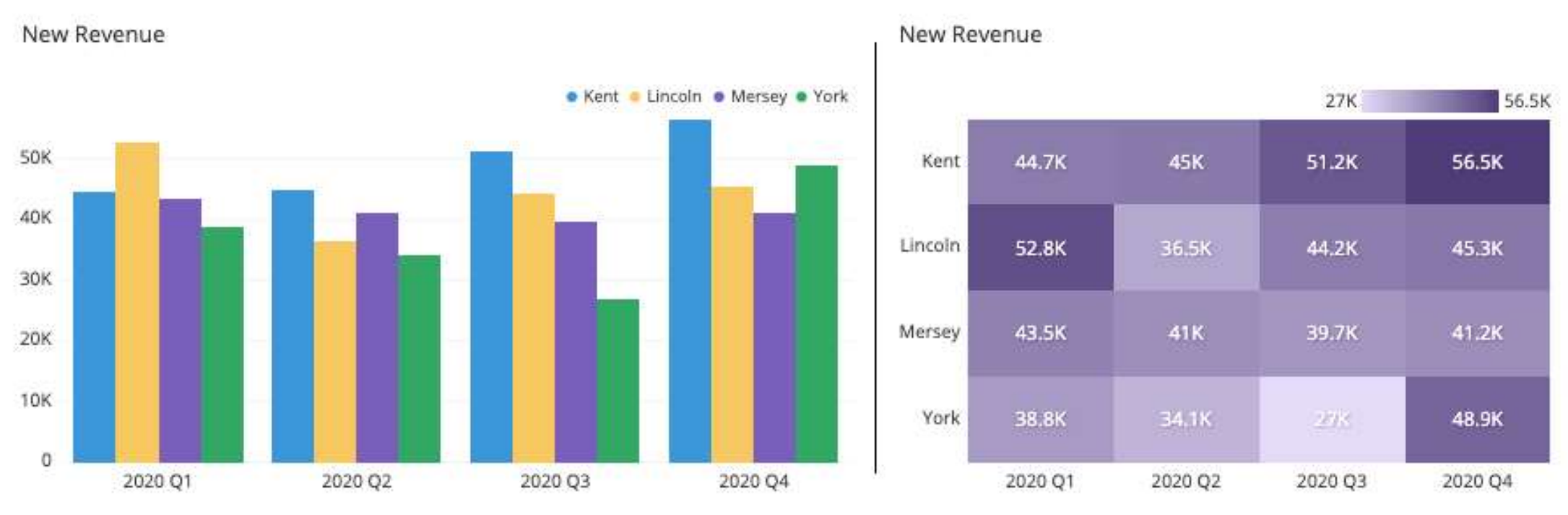
Bars vs. Pie charts





Source: https://www.atlassian.com/data/charts/how-to-choose-pie-chart-vs-bar-chart

Bar charts vs. heatmaps



Source: https://www.atlassian.com/data/charts/heatmap-complete-guide

Questions?