Data Visualization

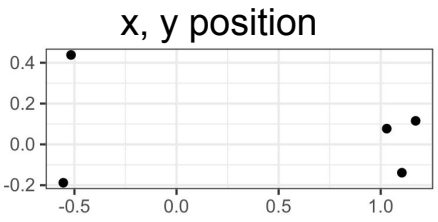
IFT6758
Fall 2019

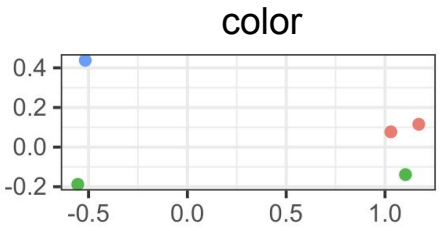
Readings:
Data Types, Graphical Marks, and Visual Encoding Channels
Data Transformation

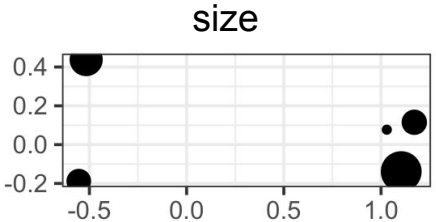
Visual Encodings

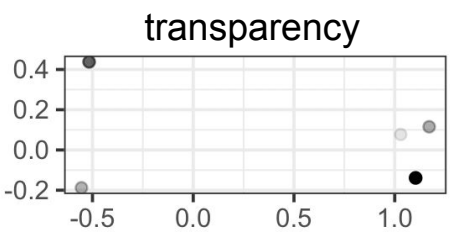
Visualization represents data using graphical marks

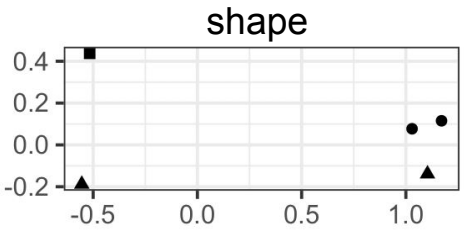
- Different attributes of the marks encode data variables
- Marks allow us to make comparisons across observations and variables
- Our brains are much better at reasoning about this than the raw tables

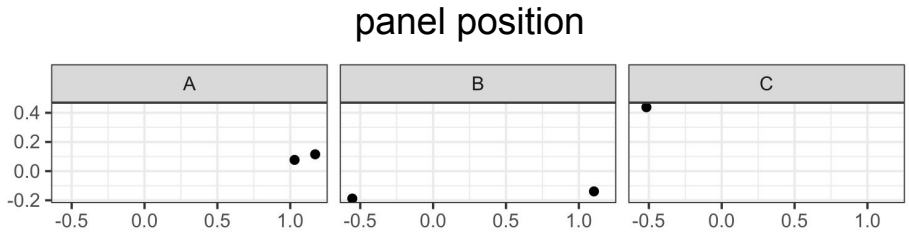












Visual Encodings

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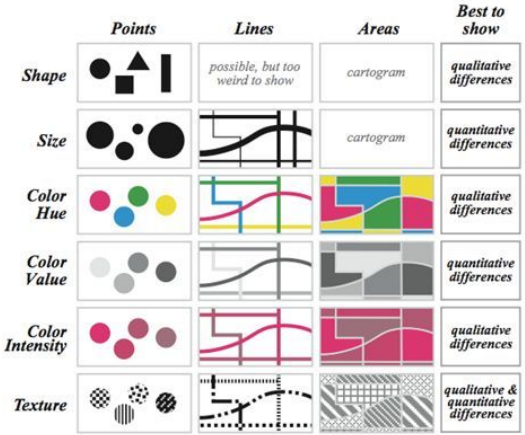
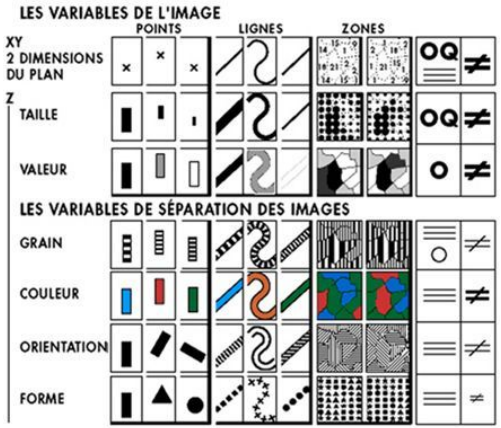
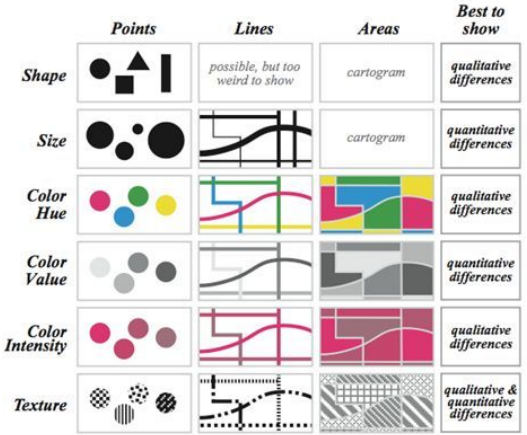


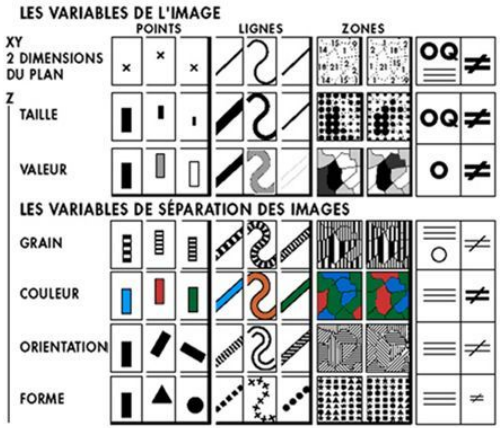


Bertin, Jacques. Semiology of Graphics: Diagrams, Networks, Maps. Madison, WI: University of Wisconsin Press, 1983.

Visual Encodings

- Some encodings are better suited to some variable types
  - Size is better for continuous, not appropriate for categorical
- Some encodings are easier to perceive than others
  - Color >> Shape





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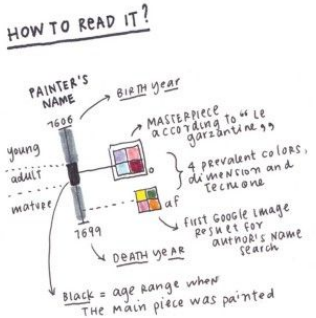
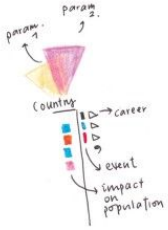
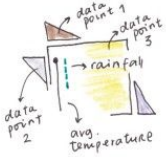
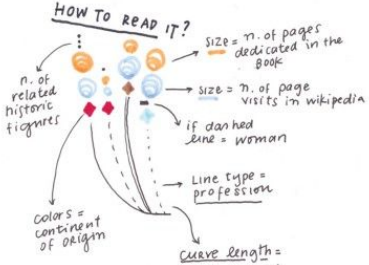
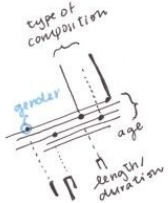
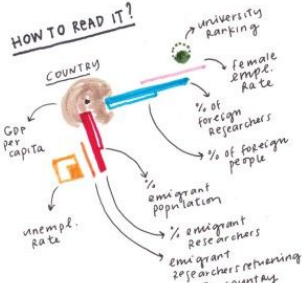

HOW TO READ IT?
PAINTER'S NAME
BIRTH year
7606
young
adult
mature
7699
MASTERPIECE according to "LE GARZANTINE"
4 prevalent colors, dimension and tecnique
af
First Google Image Result for author's NAME search
DEATH year
Black = age range when the main piece was painted

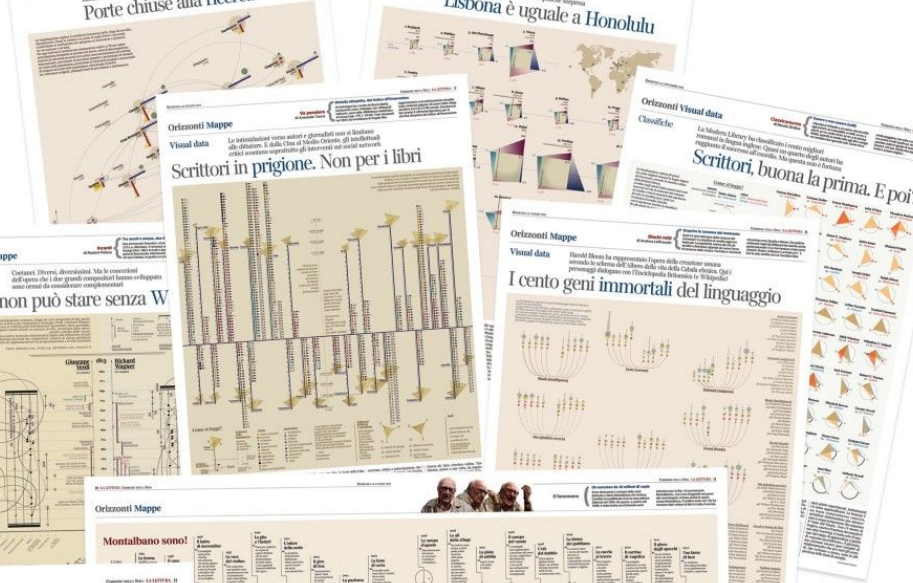

param 1
param 2
Country
career
event
impact on population

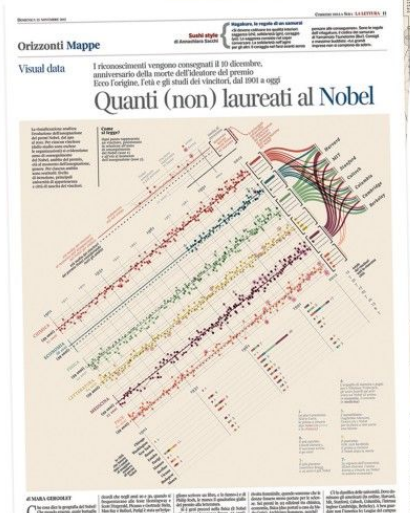

data point 1
data point 3
rainfall
data point 2
avg. temperature

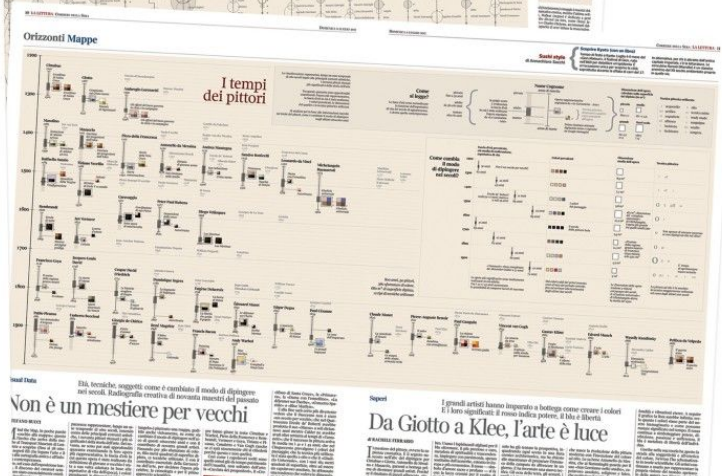

HOW TO READ IT?
n. of related historic figures
SIZE = n. of pages dedicated in the BOOK
size = n. of page visits in wikipedia
if dashed line = woman
Line type = profession
Colors = continent of origin
Curve length = Birth period


type of competition
gender
age
length/ duration

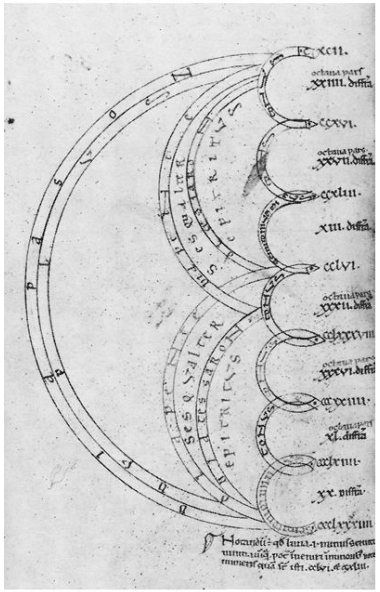

HOW TO READ IT?
COUNTRY
university ranking
female empl. Rate
% of foreign researchers
% of foreign people
GDP per capita
% emigrant population
unempl. Rate
% emigrant researchers
emigrant researchers returning


Orizzonti Mappe
Visual data
Scrittori in prigione. Non per i libri
Orizzonti Visual data
Scrittori, buona la prima. E poi
I cento geni immortali del linguaggio
Verdi non può stare senza W
Montalbano sono!

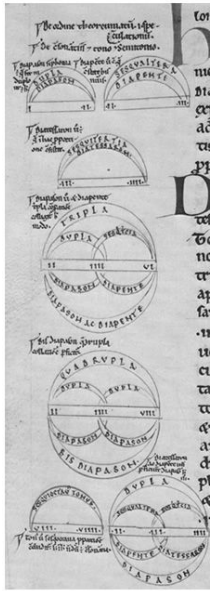

Orizzonti Mappe
Visual data
Quanti (non) laureati al Nobel


Orizzonti Mappe
I tempi dei pittori
Non è un mestiere per vecchi
Da Giotto a Klee, l'arte è luce

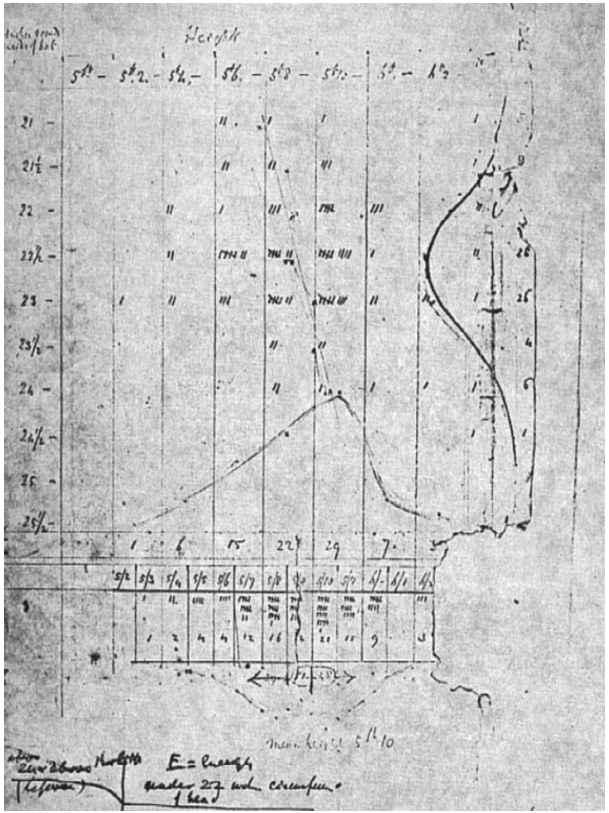
Don’t think that this is obvious!



Musical Intervals (ca. 12th-century)



Musical Ratios (ca. 12th-century)



The Shape of Song (2

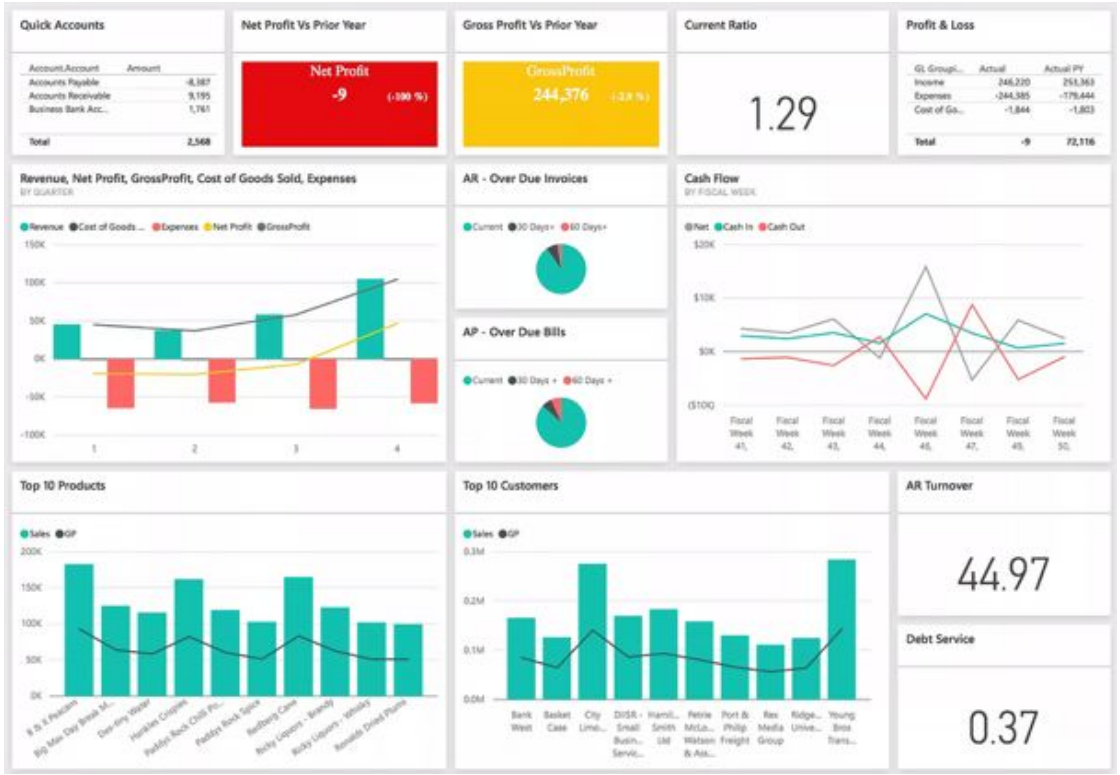
Example: The Gapminder data

(go to gapminder.ipynb)

Distributional Summaries

- Sometimes, there are too many points to usefully plot at once
- In this case, it’s useful to compute distribution summaries and display those
  - Histograms: Count within bin ranges
  - Boxplots and violinplots: Display quartiles
  - Contours: Show regions of equal density

What makes a good visualization?



What makes a good visualization?

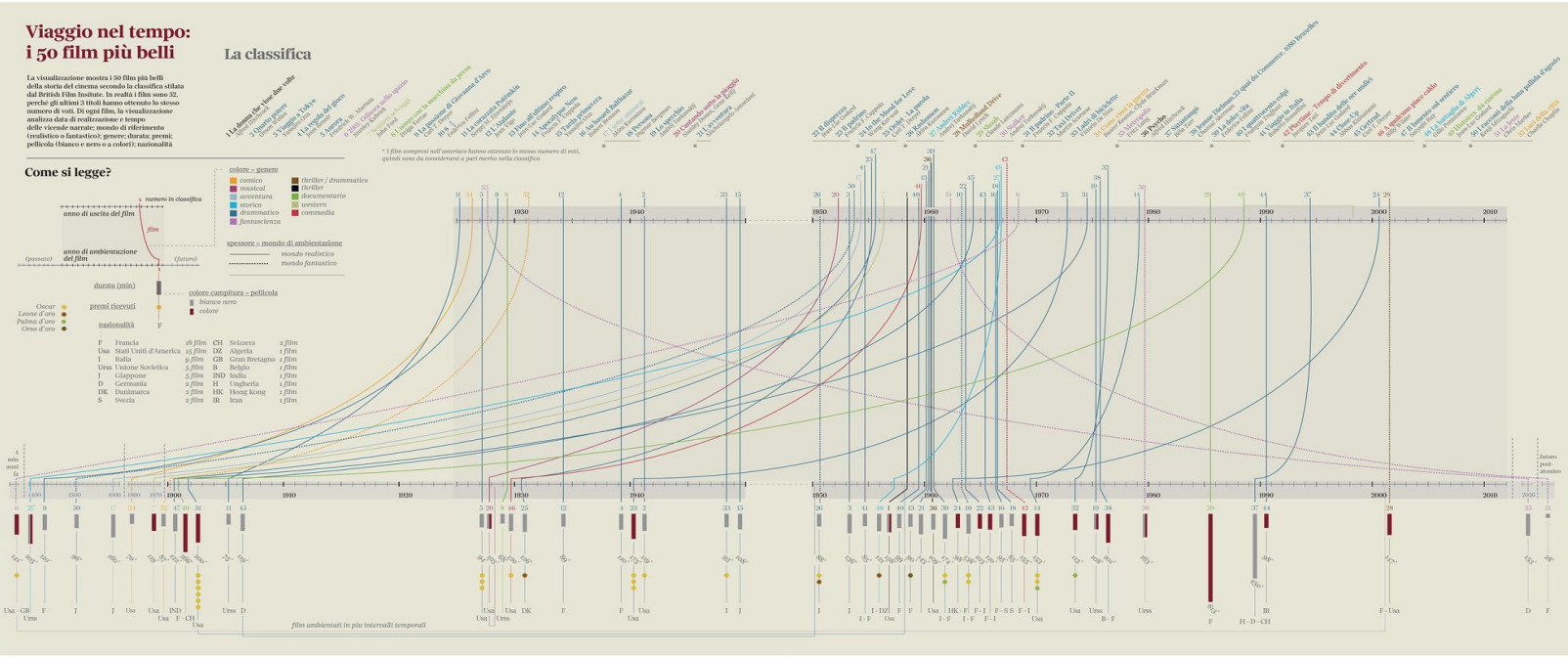
Orizzonti Mappe

Viaggio nel tempo: i 50 film più belli

La classifica

La visualizzazione mostra i 50 film più belli della storia del cinema secondo la classifica stilata dal British Film Institute. In realtà i film sono 52, perché gli ultimi 3 titoli hanno ottenuto lo stesso numero di voti. Di ogni film, la visualizzazione analizza data di realizzazione e tempo delle vicende narrate; mondo di riferimento (realistico o fantastico); genere; durata; premi; pellicola (bianco e nero o a colori); nazionalità

Come si legge?



Inchiostro di Cina

di Marco Del Corona

Il re della moda ha il cuore tenero

Ha un milione di follower su weibo, il Twitter cinese. Han Huohuo commenta moda, fotografa moda e vive di moda. È corteggiato dalle griffe che puntano sulla Cina ed è considerato figura influentissima per orientare il gusto. Vola di sfilata in sfilata, ne tengono conto gli strateghi del marketing. Ma a 28 anni scrive da adolescente: «So quanto nel cuore aspetti un affetto giungere all'improvviso...».

La graduatoria

Ogni 10 anni un sondaggio mondiale tra gli esperti decreta il titolo | *Il posto delle fragole* e *Il settimo sigillo*.

Le scelte

Il critico del «Corriere della Sera», che ha partecipato all'elezione, | genialità di stile e ricchezza di stimoli. Mi

What makes a good plot?

- Seems like a large gap between encodings and beautiful visualizations
- A good visualization,
  - Allows insight: Starts with an interesting question, and answers it
  - Prioritizes data: Maximizes the data-to-ink ratio
  - Is aesthetically beautiful (though this has been controversial)
- There are literally manifestos about this
  - http://www.visualcomplexity.com/vc/blog/?p=644
  - http://giorgialupi.com/data-humanism-my-manifesto-for-a-new-data-wold