Visualization basics for data exploration and communication

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Virtual Summer School *Data Literacy in Health*, August 26 2021

ZB MED Information Centre for Life Sciences
Technology Arts Sciences TH Köln

Slides and Code (Jupyter Notebooks) can be found here:

https://github.com/foerstner-lab/2021-08-26-Visualisation_basics_for_data_exploration_and_communication

https://bit.ly/2XODDoM

Plan for this session

09:00 - 10:00	Introduction & Live Coding
10:00 - 11:00	Working on your data
11:00 - 12:00	Discussion, Questions & Answers

After this session you should have a basic understanding of selected concepts of data visualization that are independent of the tool that you use.

1. Introduction & Live Coding
2. Working on your data
3. Discussion, Questions & Answers
4. Reading recommendations

1 Introduction & Live Coding

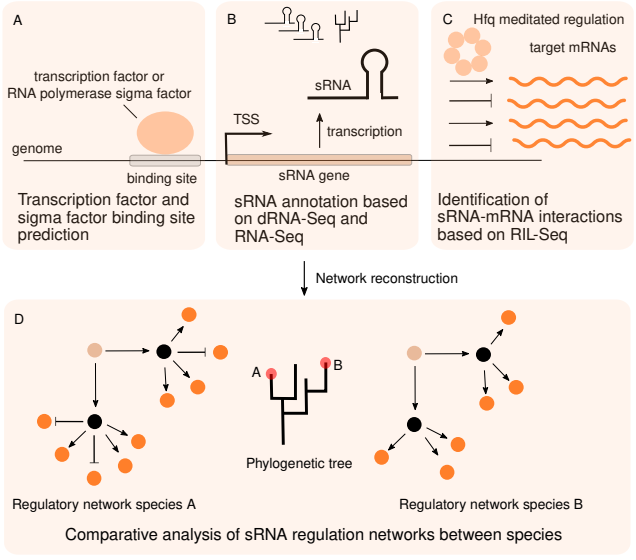
2 Working on your data

3 Discussion, Questions & Answers

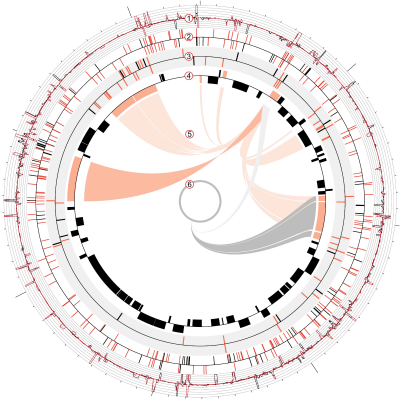
4 Reading recommendations

Visualisation are powerful tools to
understand data and communicate ideas.

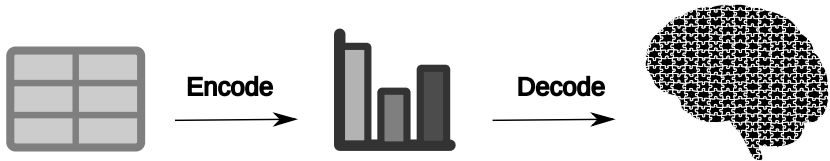
Visualising ideas, plans or concepts



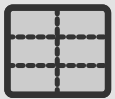
Visualising research results



Berger, *et al.*, 2016, *Sci. Rep.*, https://doi.org/10.1038/srep35307


Encode
Decode
Data
Mental Model

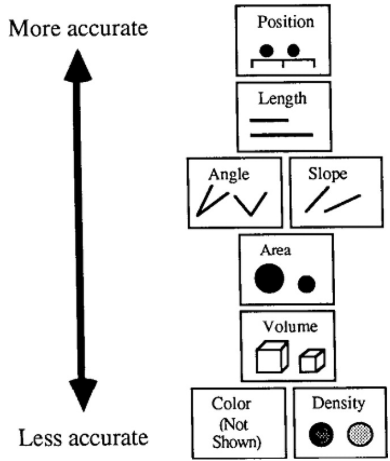
Entities and their features



Features can be

- categorical / qualitative
  - Nominal (e.g. cell line, cancer type, eye color, gender)
  - Ordinal (e.g. very bad, bad, good, very good)
- numerical / quantitative
  - Discrete (e.g. gene length in nucleotides, number cells)
  - Continuous (e.g. cell length, concentration, relative expression)


CRAFTSMAN
NICKEL PLATED



Mackinlay, 1986, *ACM Transactions on Graphics*, https://doi.org/10.1145/22949.22950

Live Coding

What are your questions?

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4 Reading recommendations

Visualize your data

- Which types of feature are in you data set?
- Which features would you like to visualize?
- How do you want to encode features and combine their visualization?

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4 Reading recommendations

Reading recommendations

- The *Points of View* Series in *Nature Methods*
- *Fundamentals of Data Visualization*, Claus Wilke, 2019, O'Reilly Media, ISBN-13: 978-1492031086
- *Visualization Analysis and Design*, Tamara Munzner, 2014, Taylor & Francis, ISBN-13: 978-1466508910