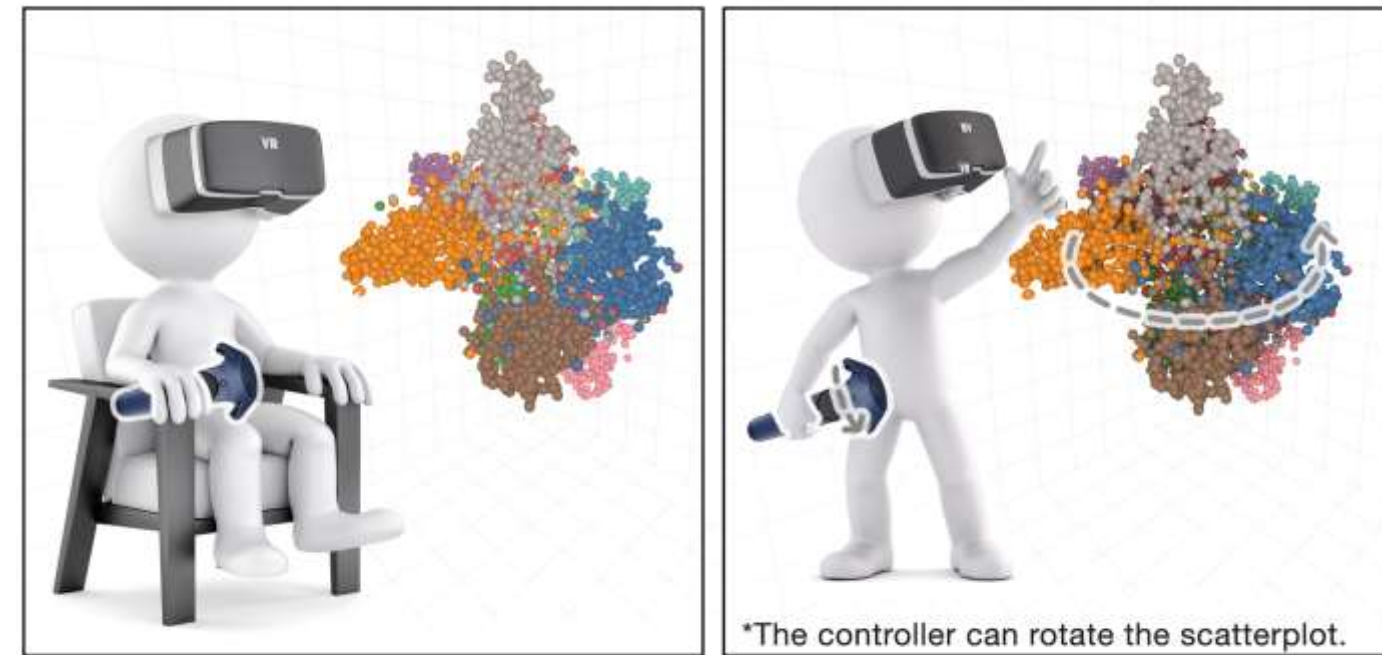
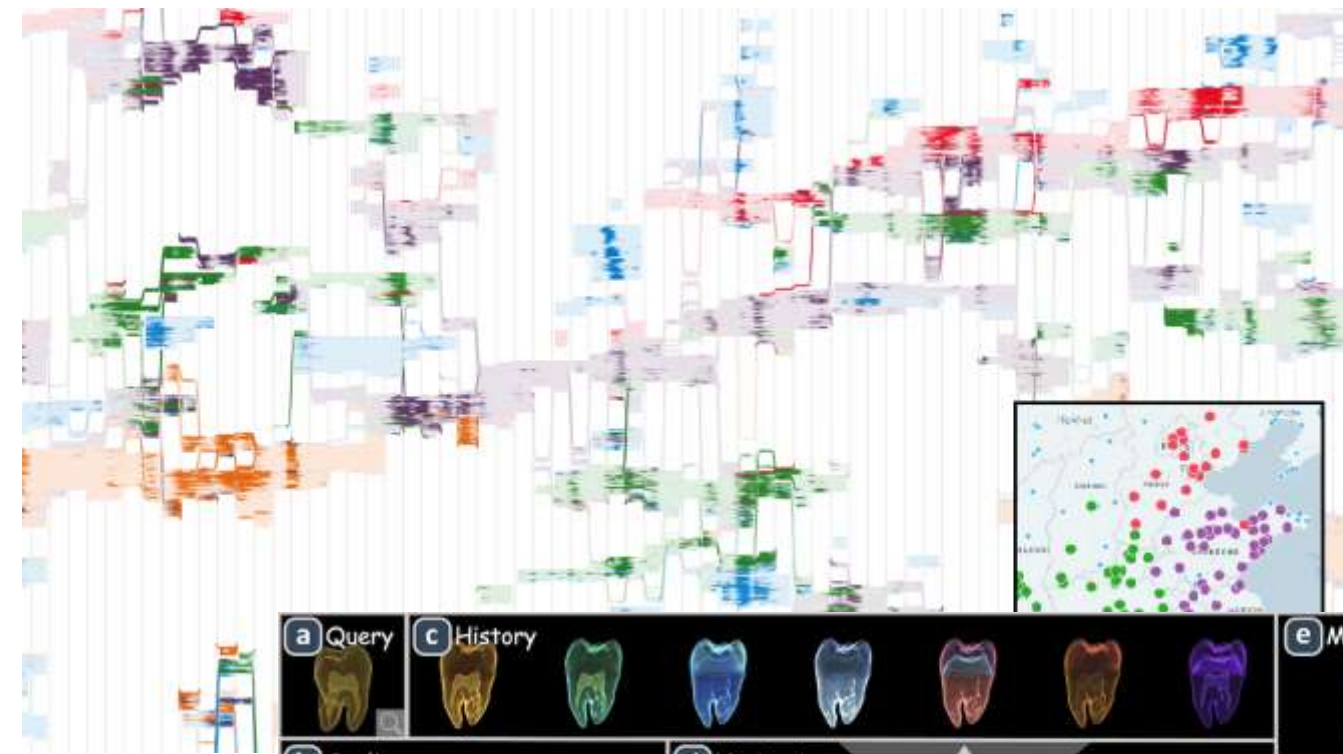
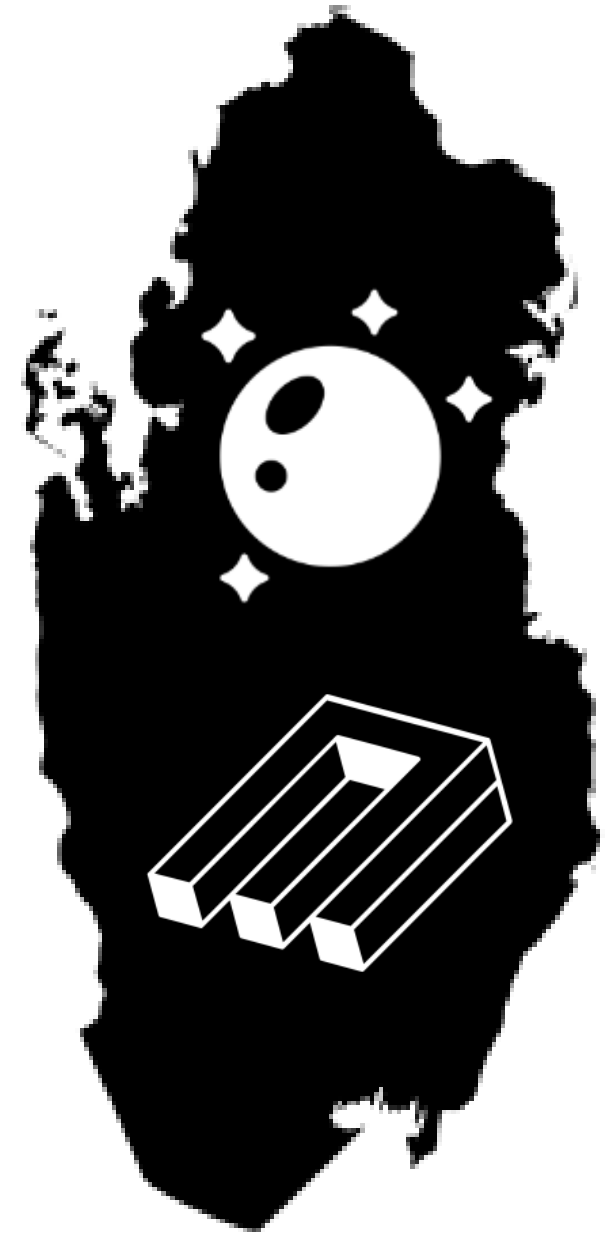




# VIS 2023

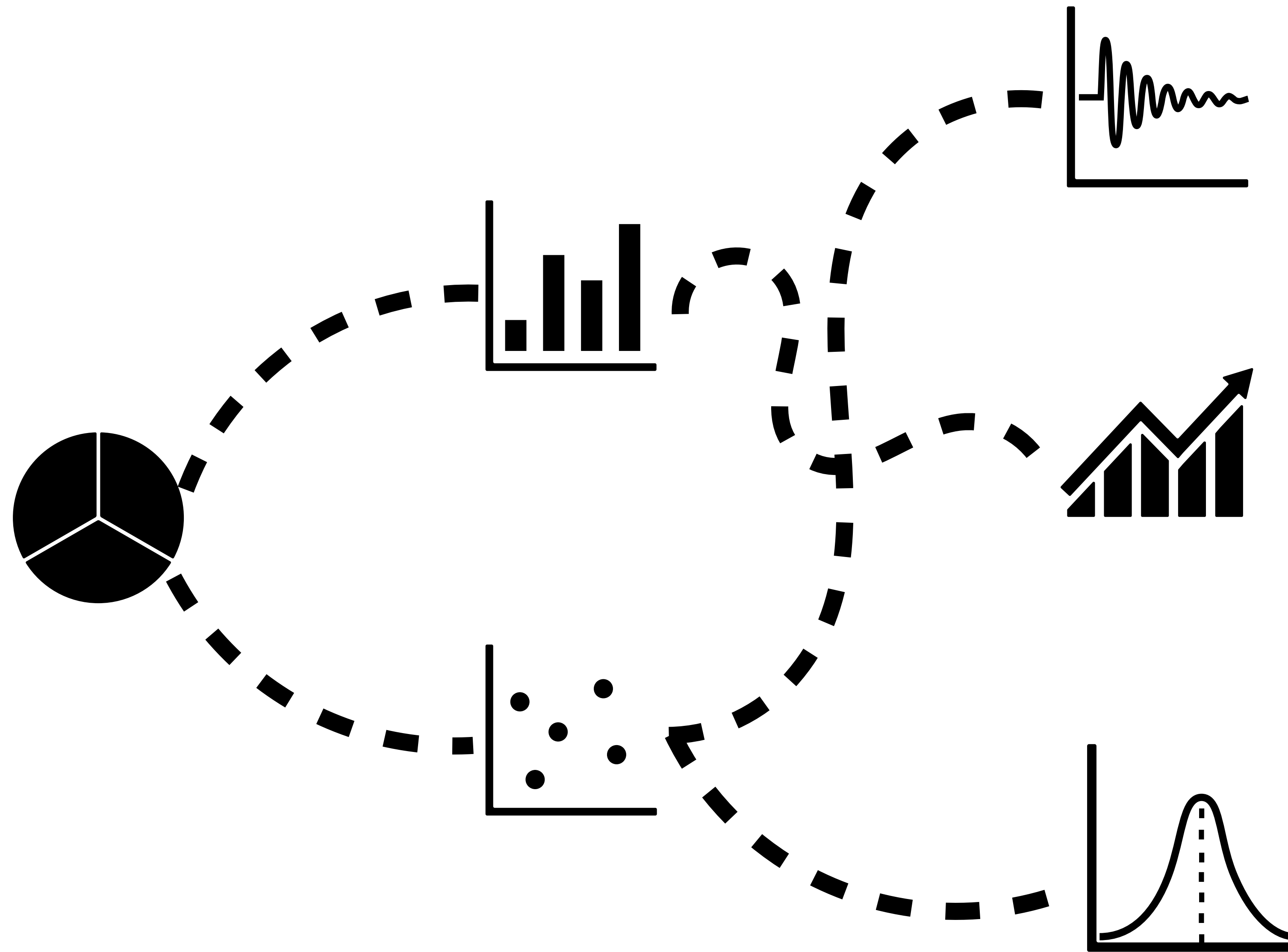
Melbourne, Australia, 22-27 October

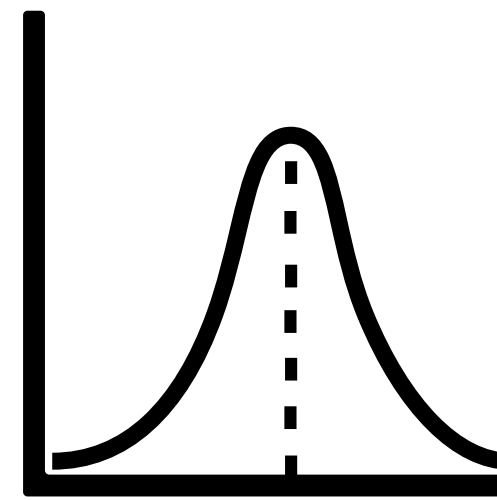
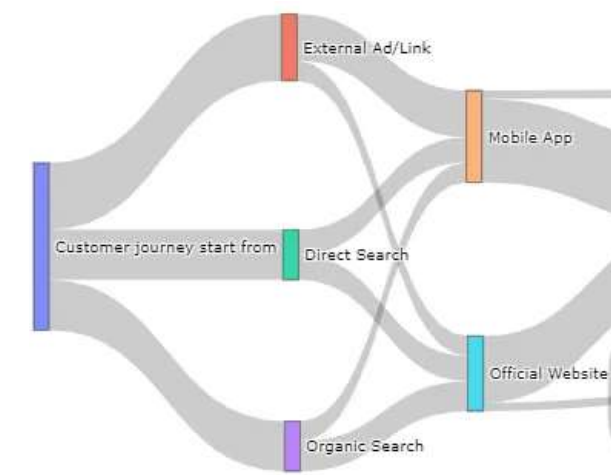
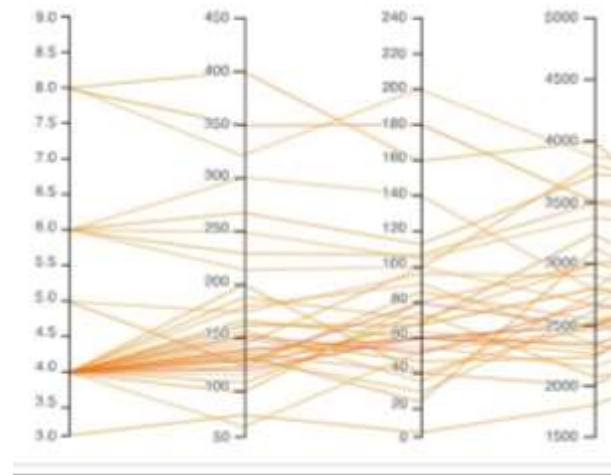
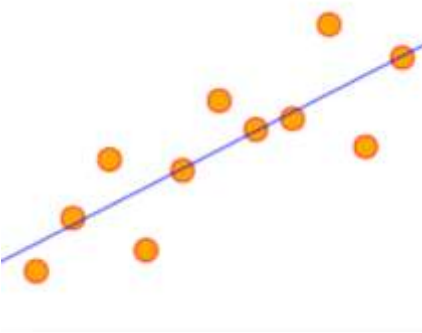
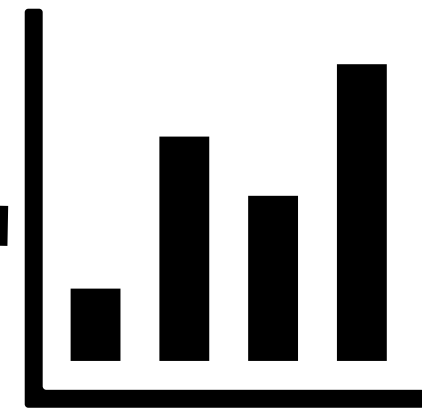
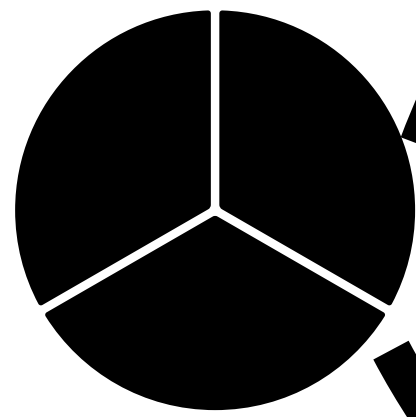




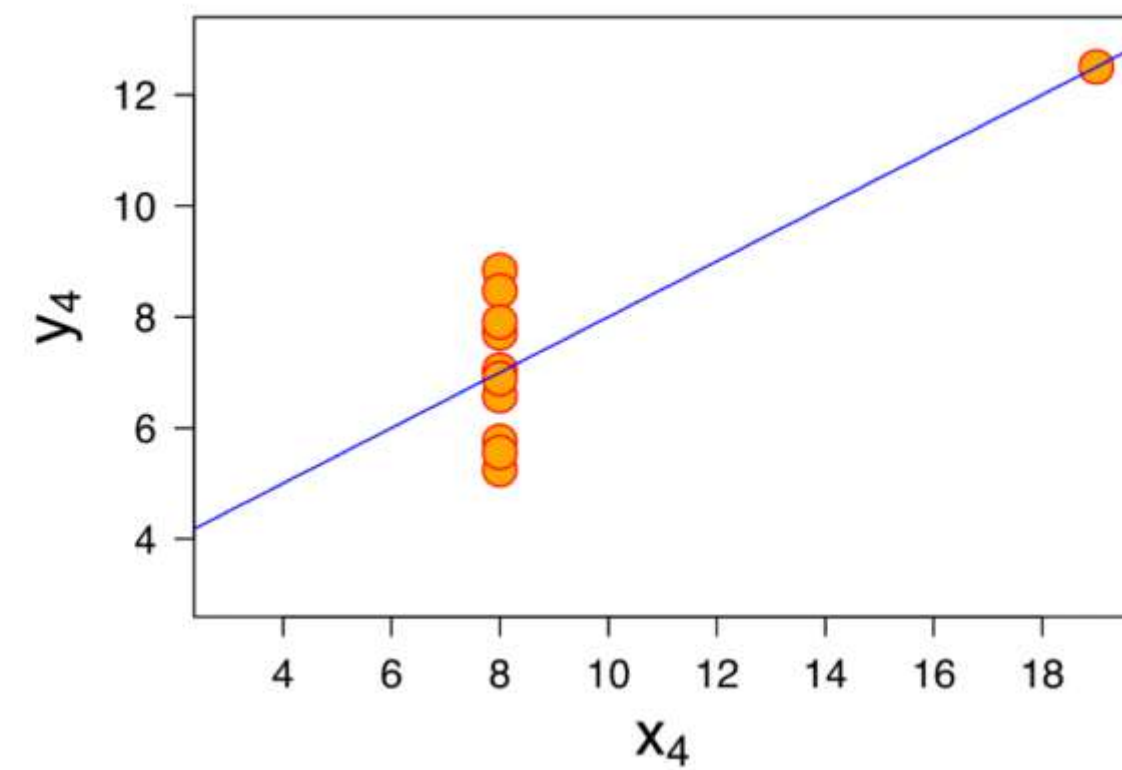
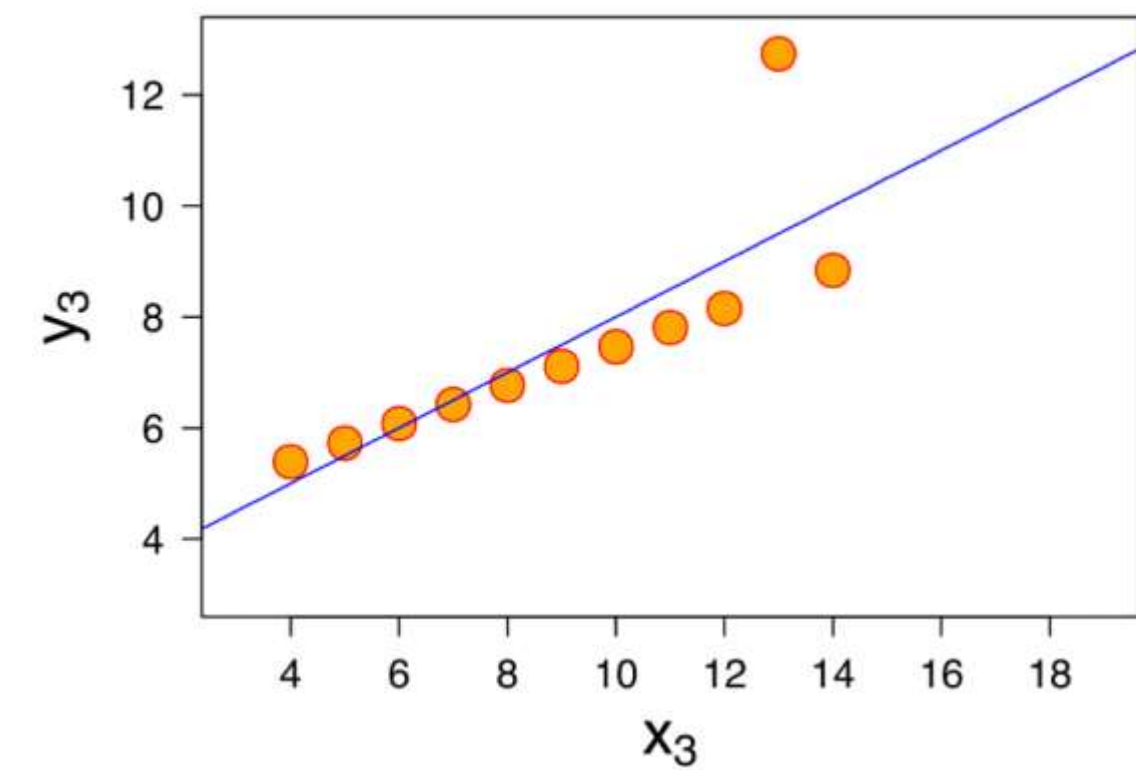
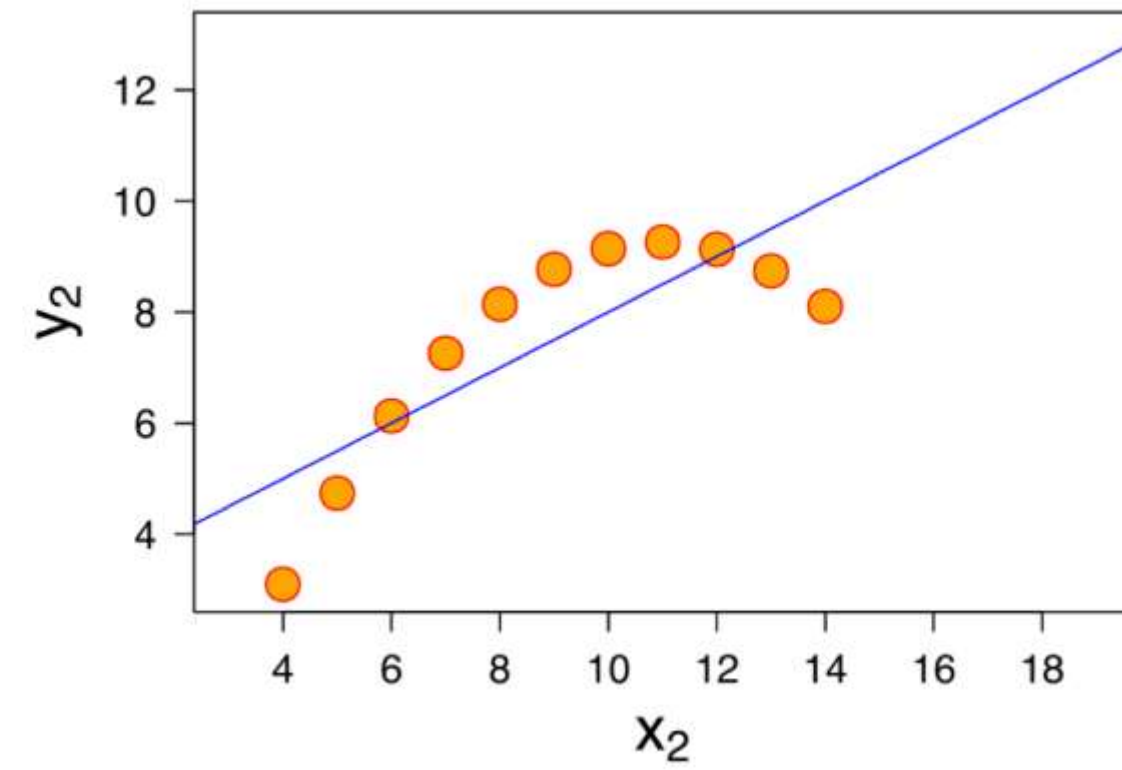
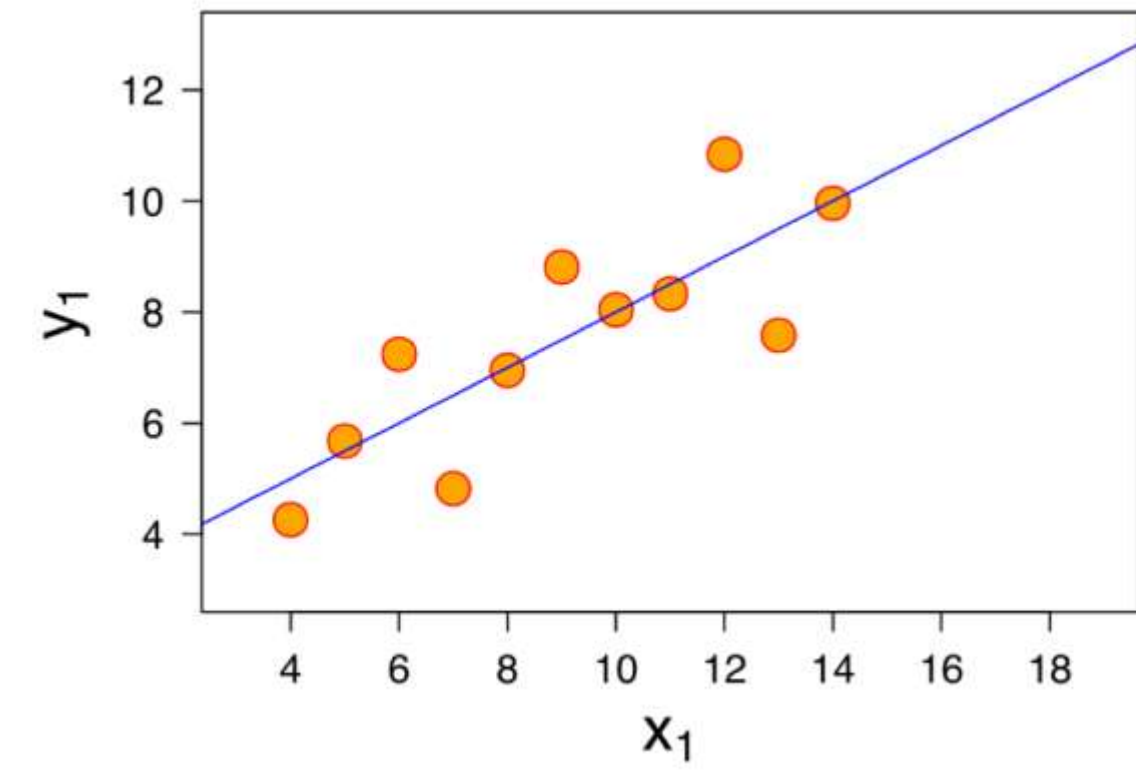
# Seeking Pearls, Avoiding Mirages: Charting a Course through Data Complexity using Interactive Visualization

Prof. Lane Harrison | Worcester Polytechnic Institute | Director, VIEW Lab





# Visualization helps reveal hidden patterns in your data:



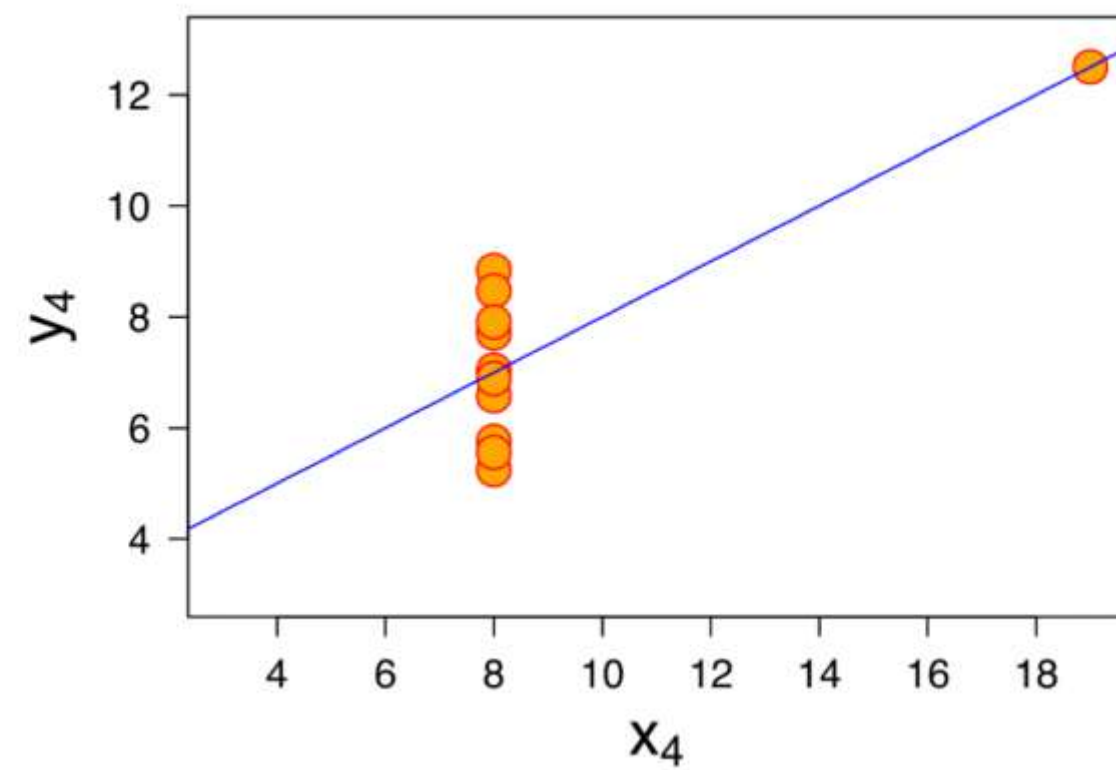
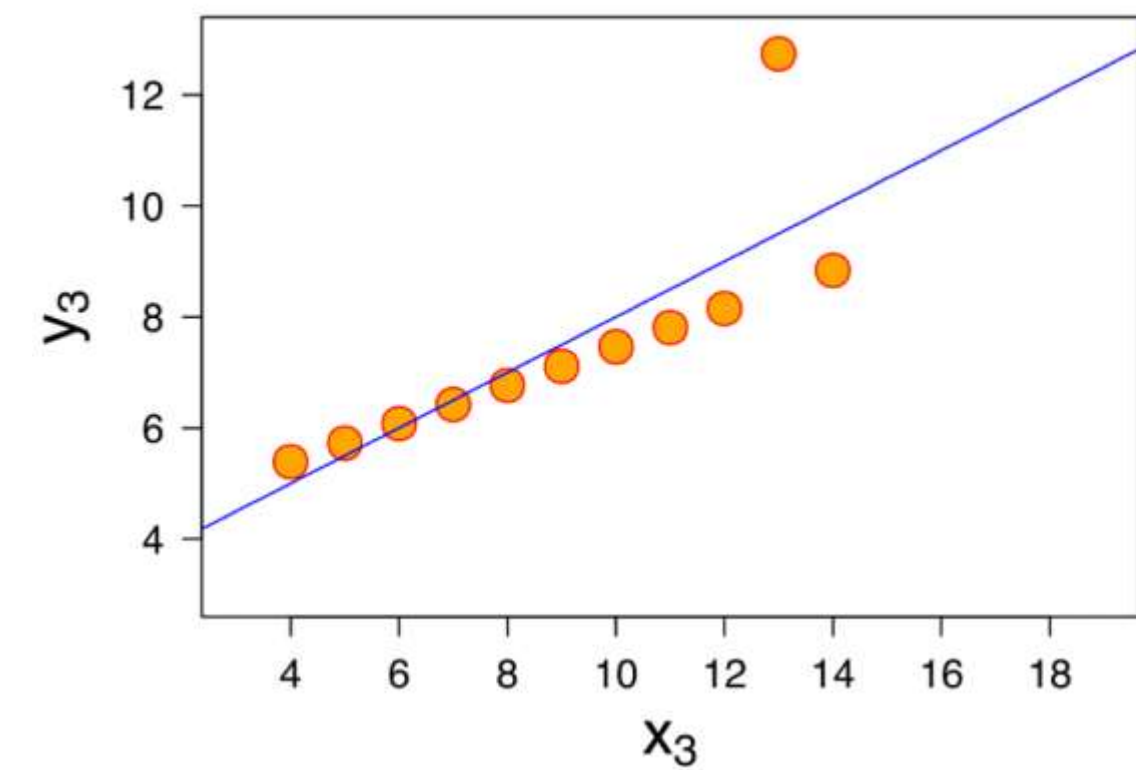
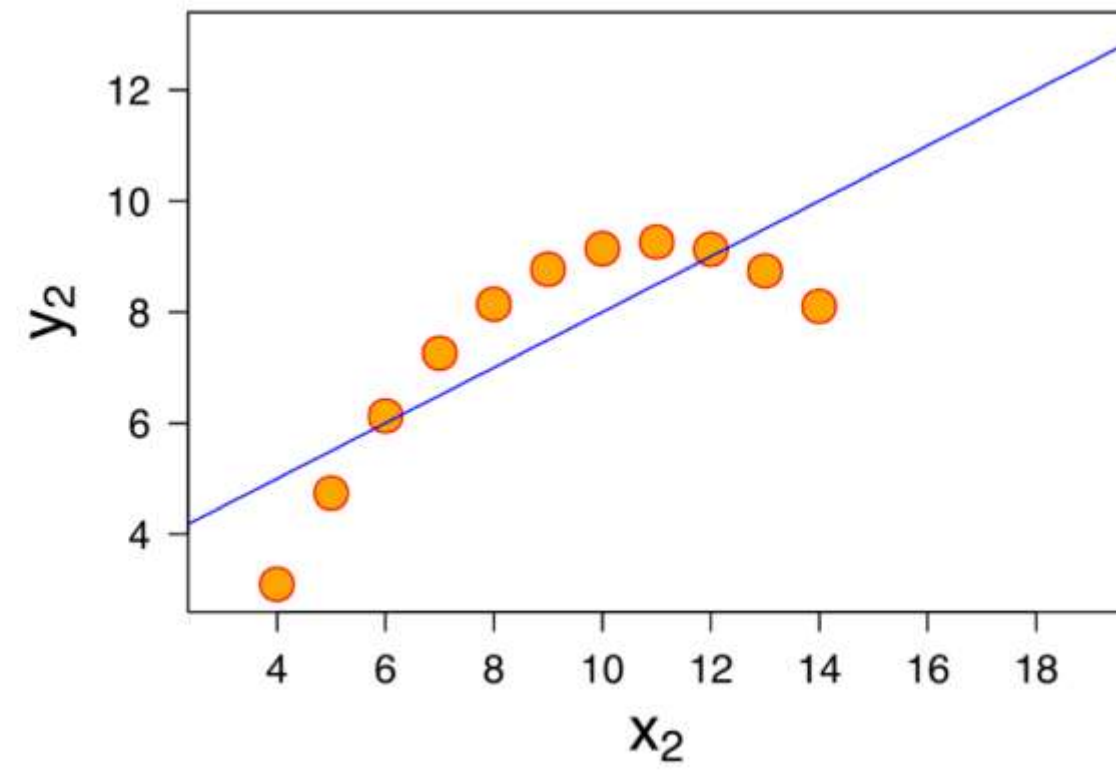
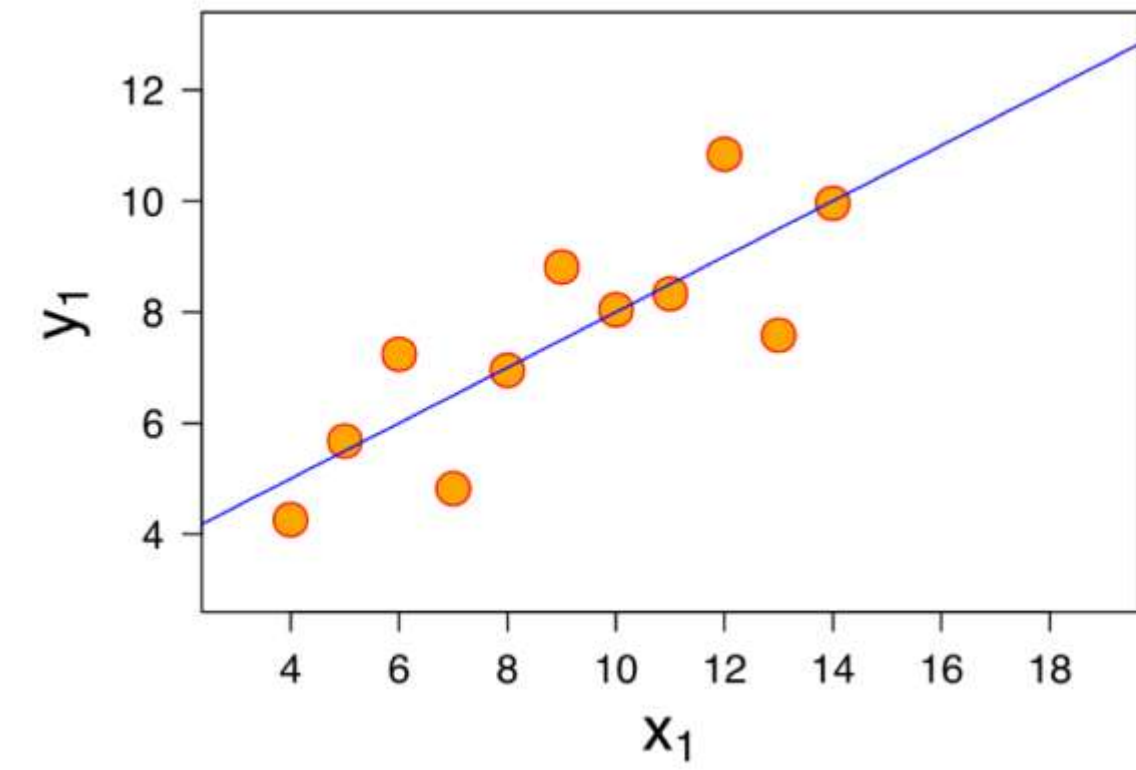
Mean-X: 9.0  
Variance-X: 11.0

Mean-Y: 7.5  
Variance-Y: 4.125

Correlation: 0.816

Anscombe's Quartet, 1972

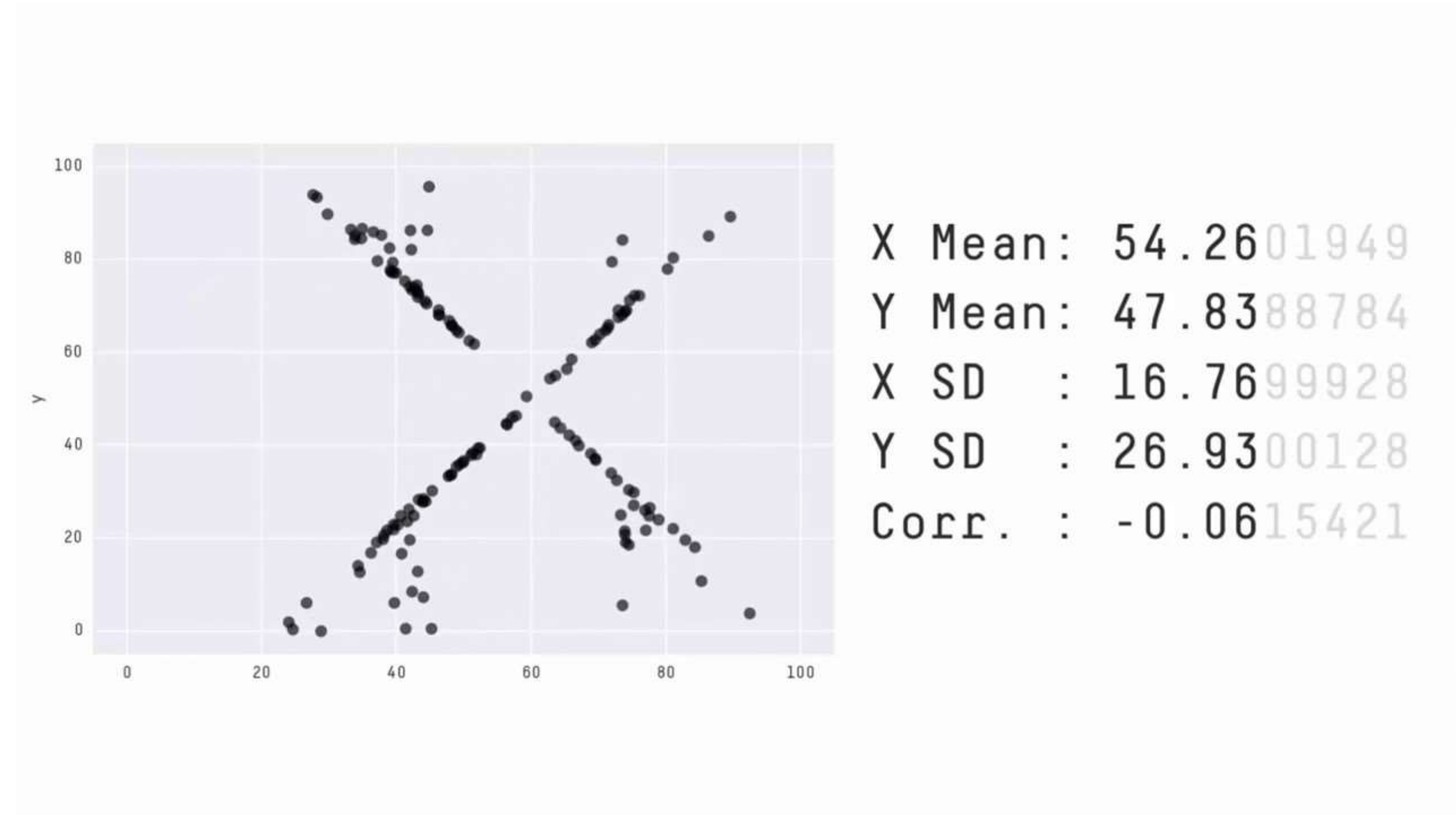
# Visualization helps reveal hidden patterns in your data:



Mean-X: 9.0  
Variance-X: 11.0

Mean-Y: 7.5  
Variance-Y: 4.125

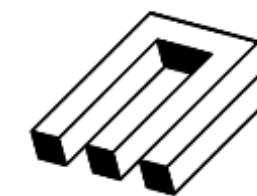
Correlation: 0.816



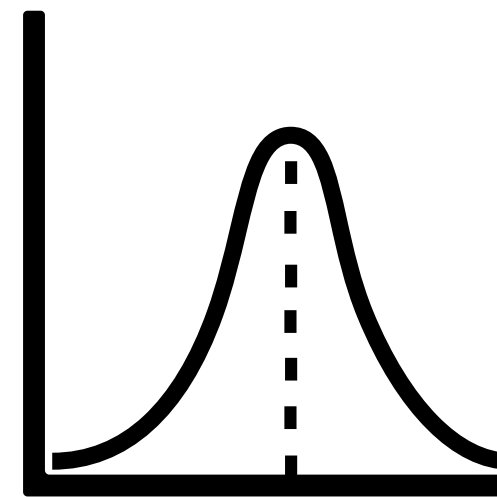
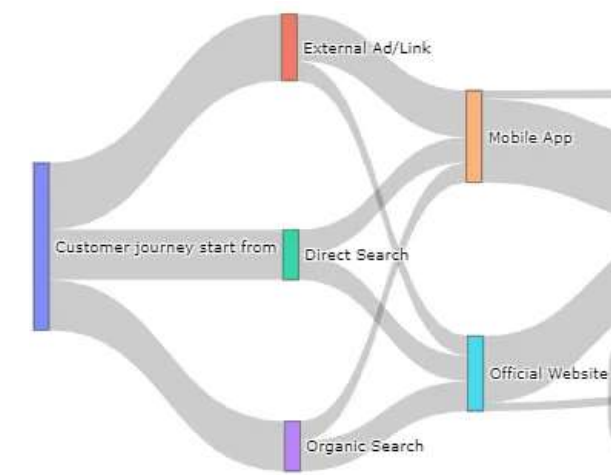
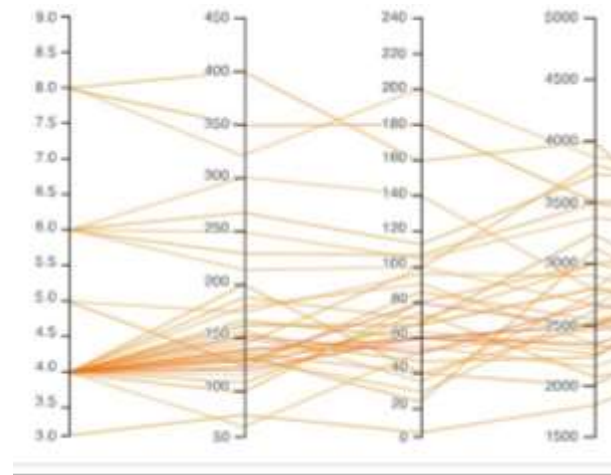
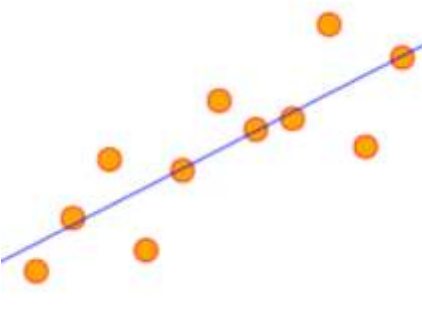
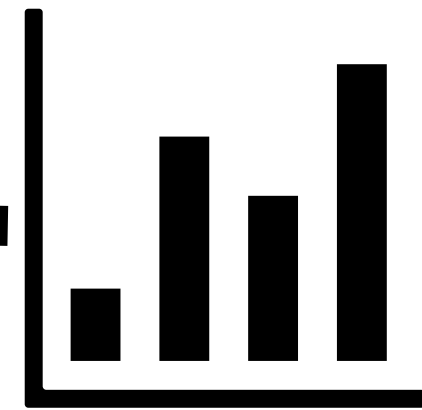
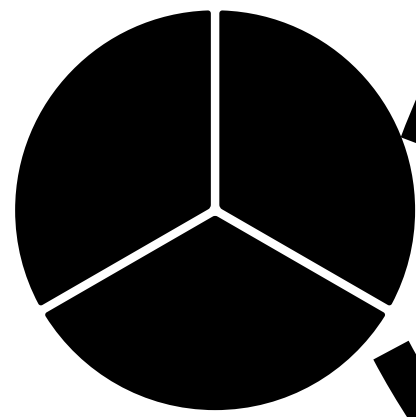
To get to this stage:



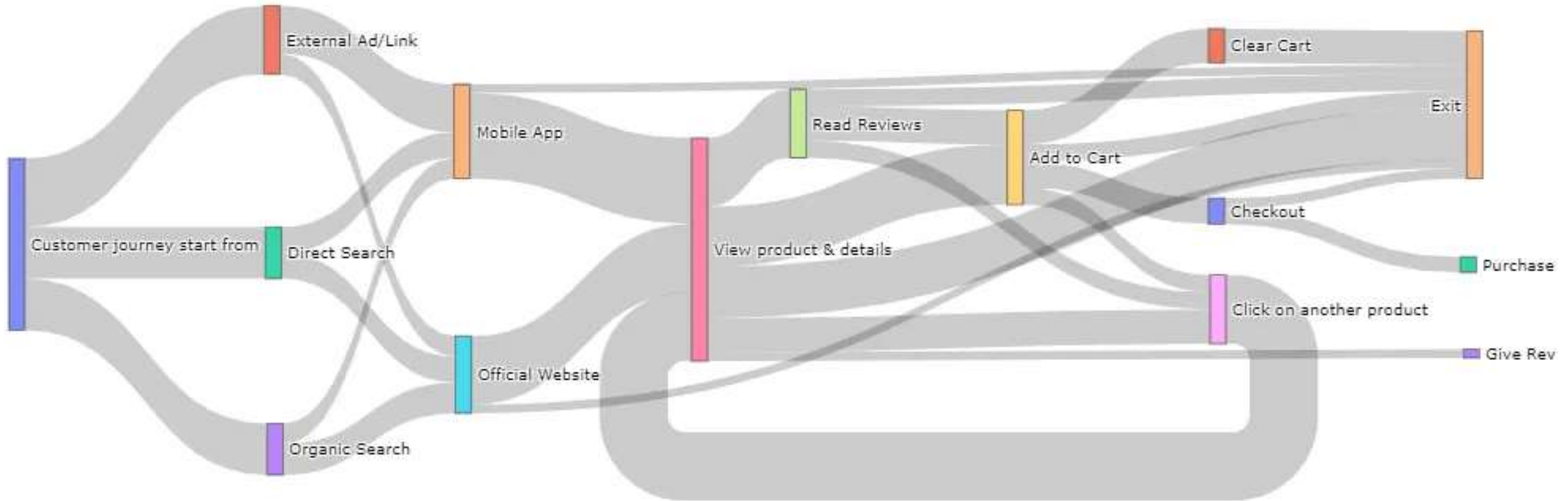
Make plotting a habit; make it enjoyable!



Beware of limited tools/libraries on the market

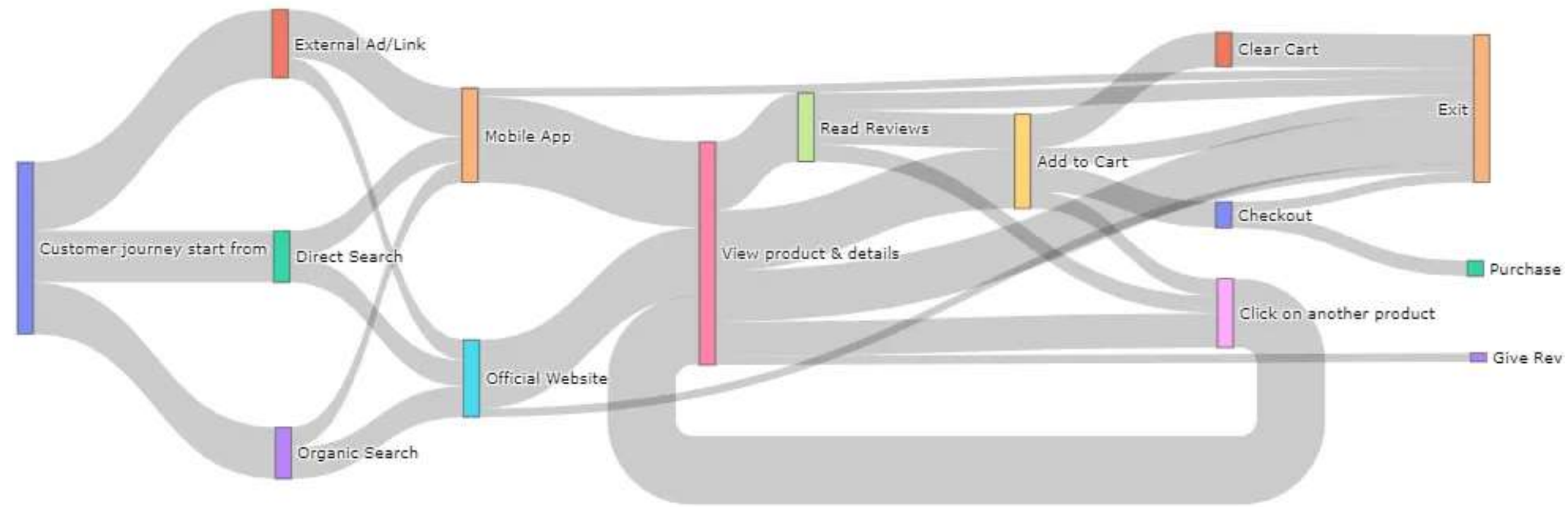


# Visualization helps scale your analysis capabilities:



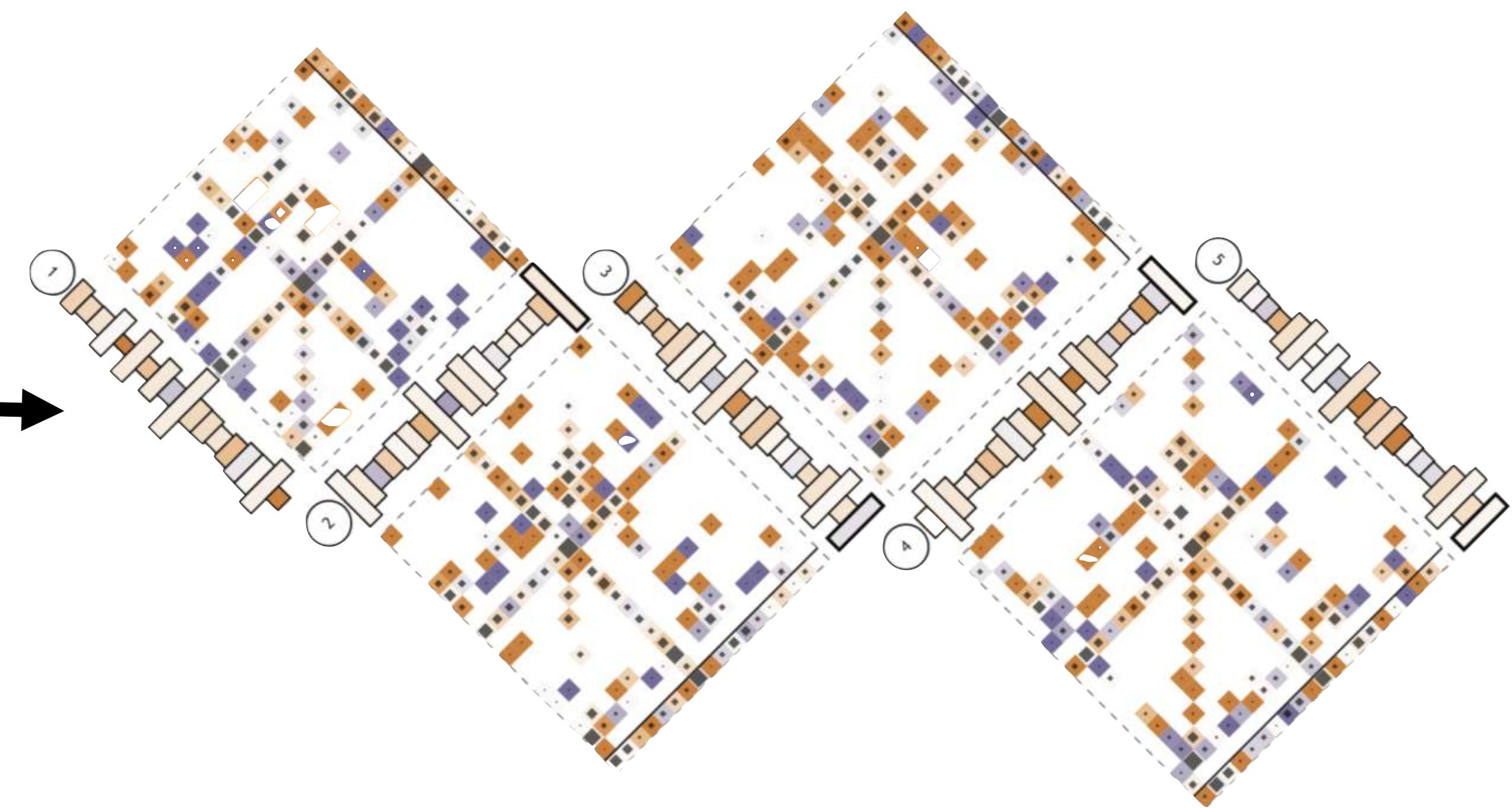
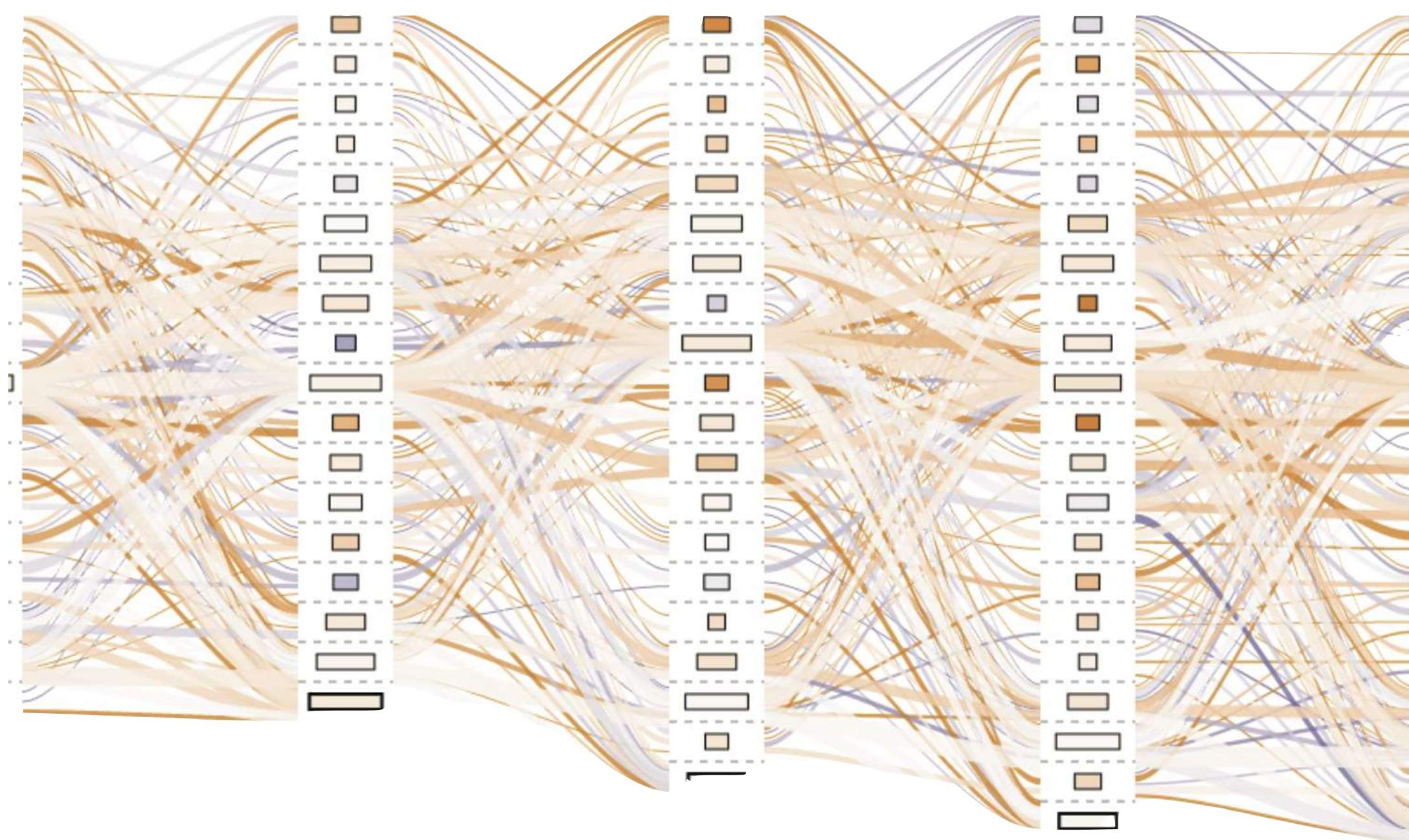


# Visualization helps scale your analysis capabilities:

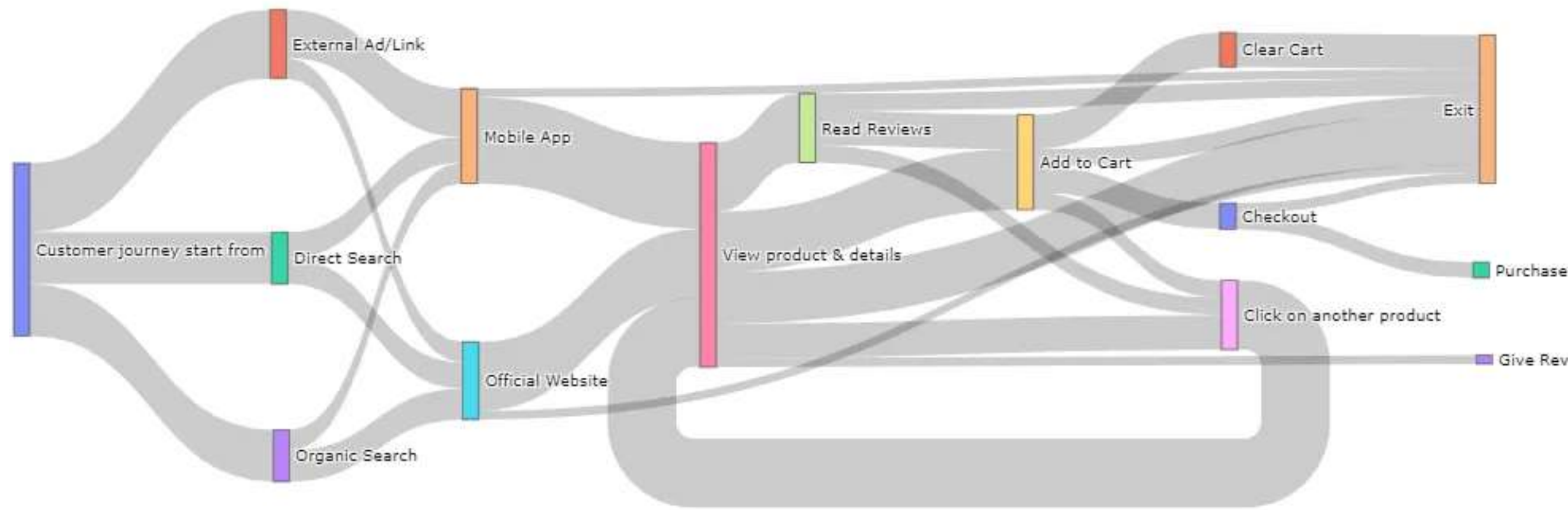


Sankeys are wonderful, but they struggle to scale.

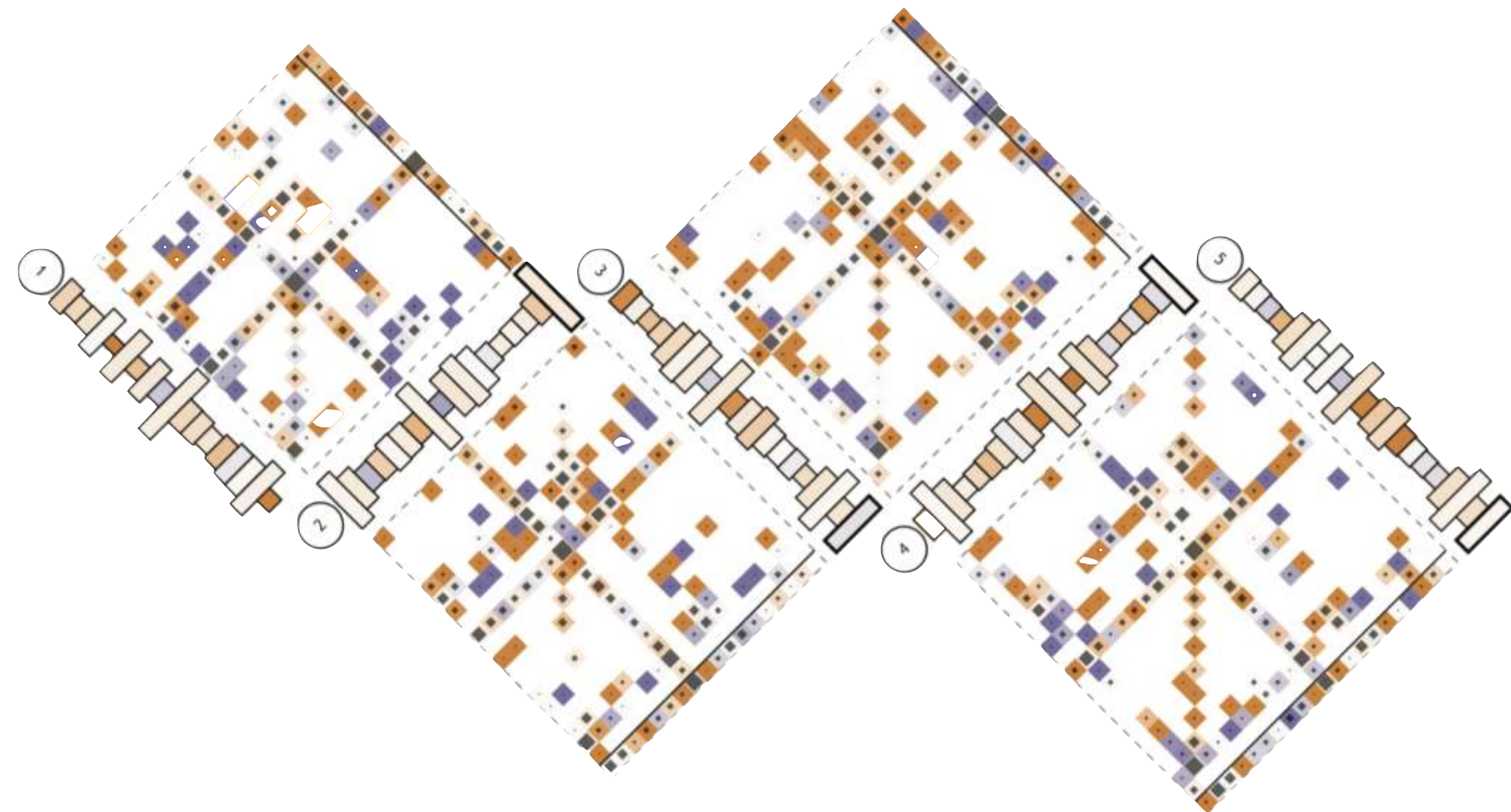
# Visualization helps scale your analysis capabilities:



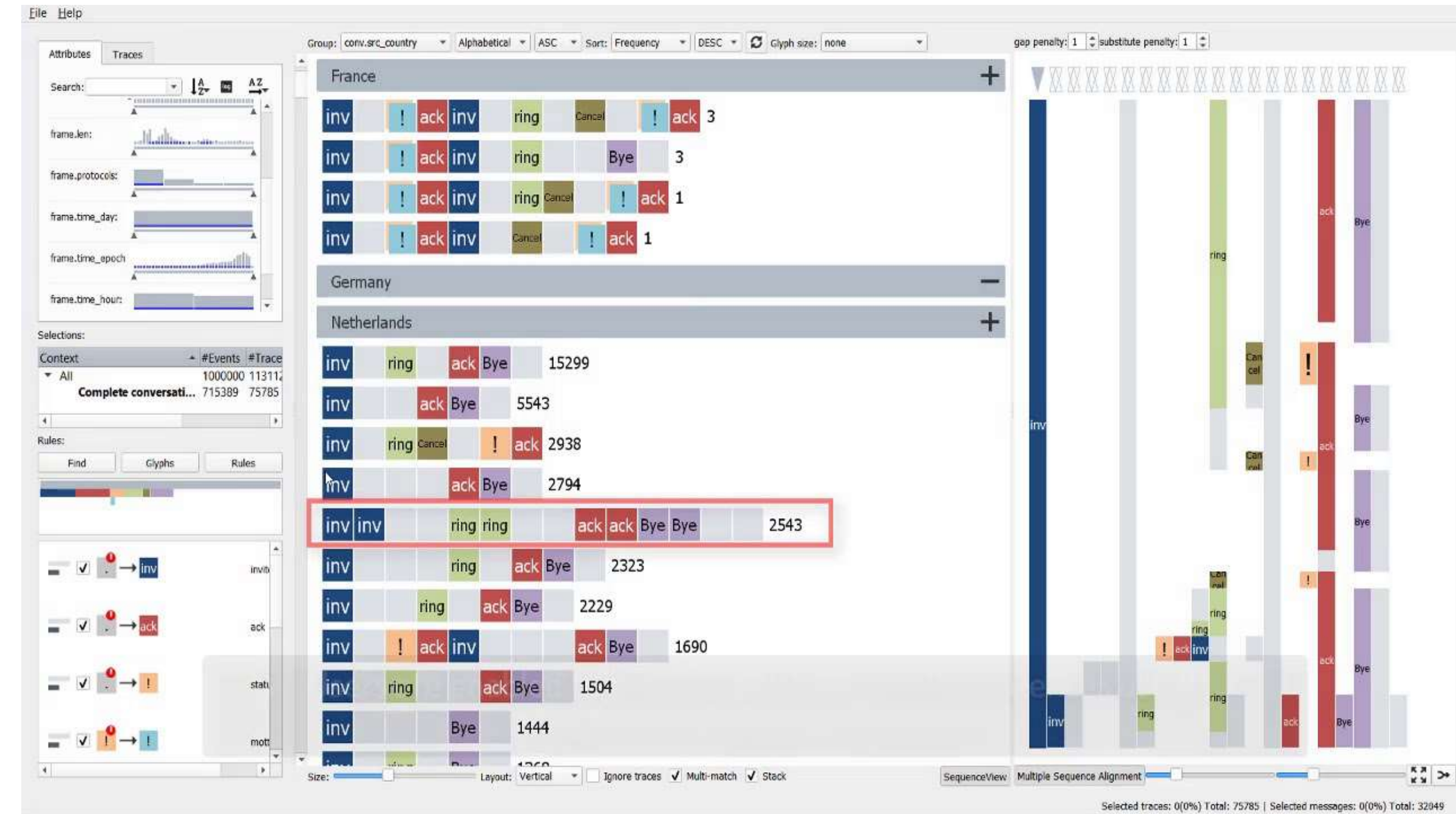
# Visualization helps scale your analysis capabilities:



Sankeys are wonderful, but they struggle to scale.

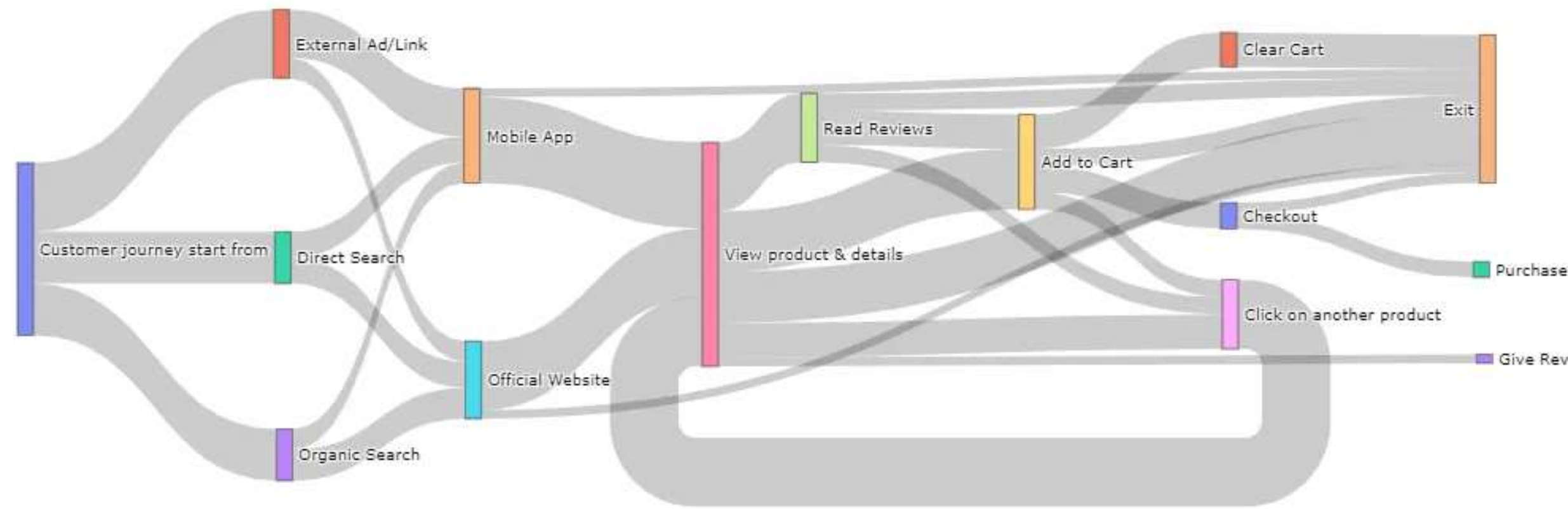


Zhao et al., 2015

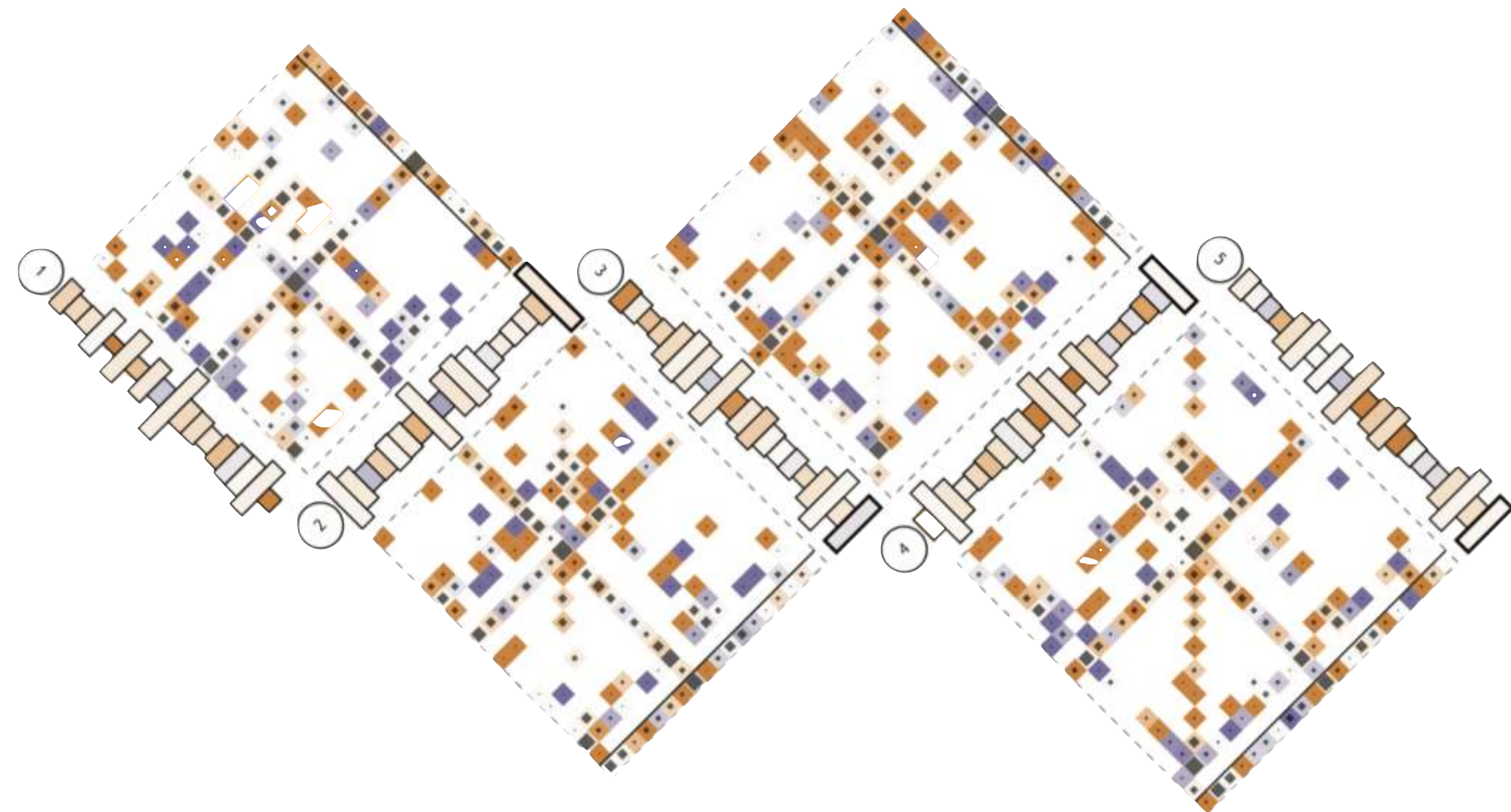


Cappers et al., 2018

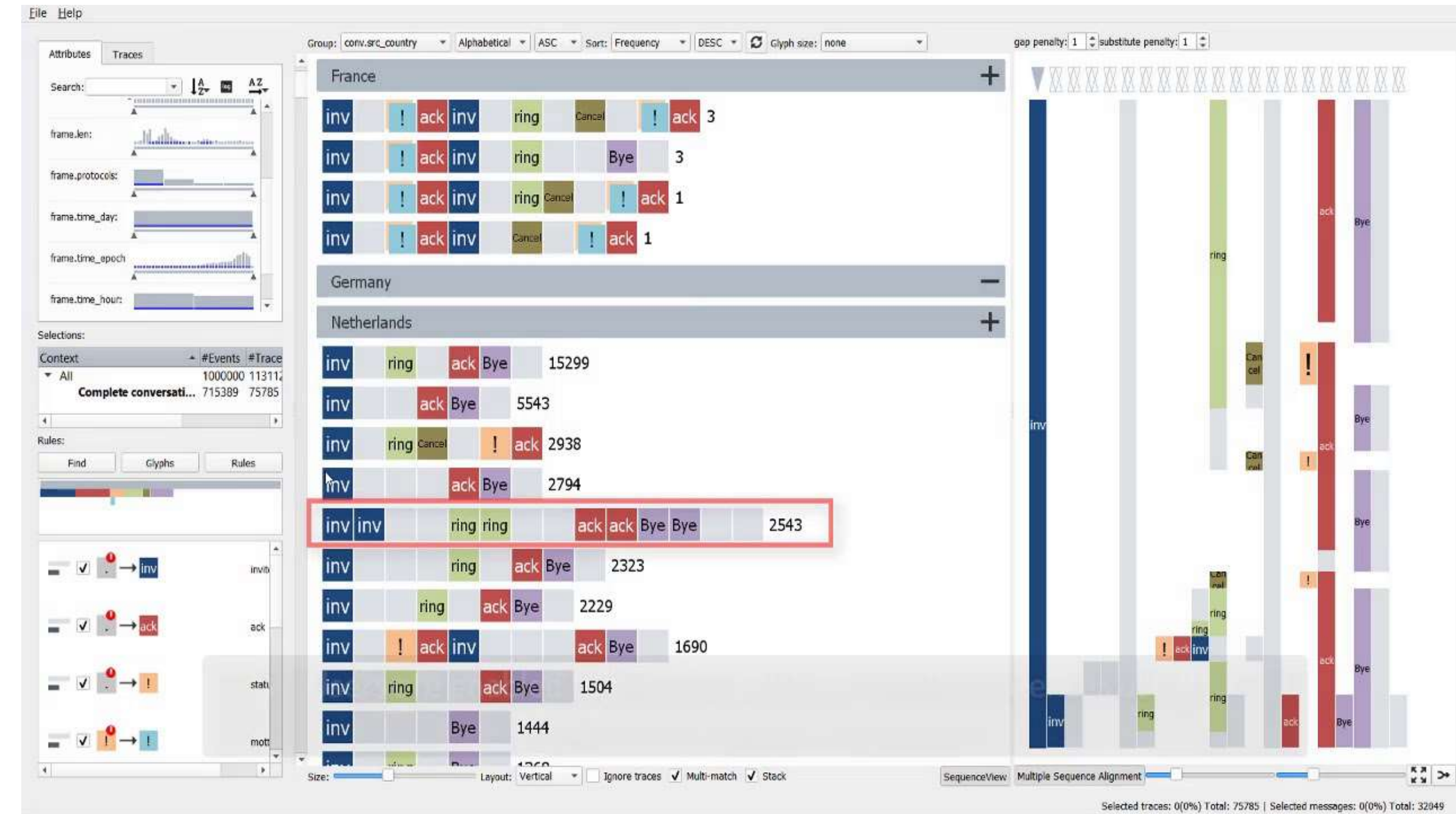
# Visualization helps scale your analysis capabilities:



Sankeys are wonderful, but they struggle to scale.



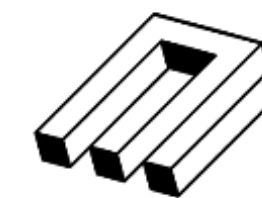
Zhao et al., 2015



To get to this stage:



Special projects (R&D), licensing, collaboration



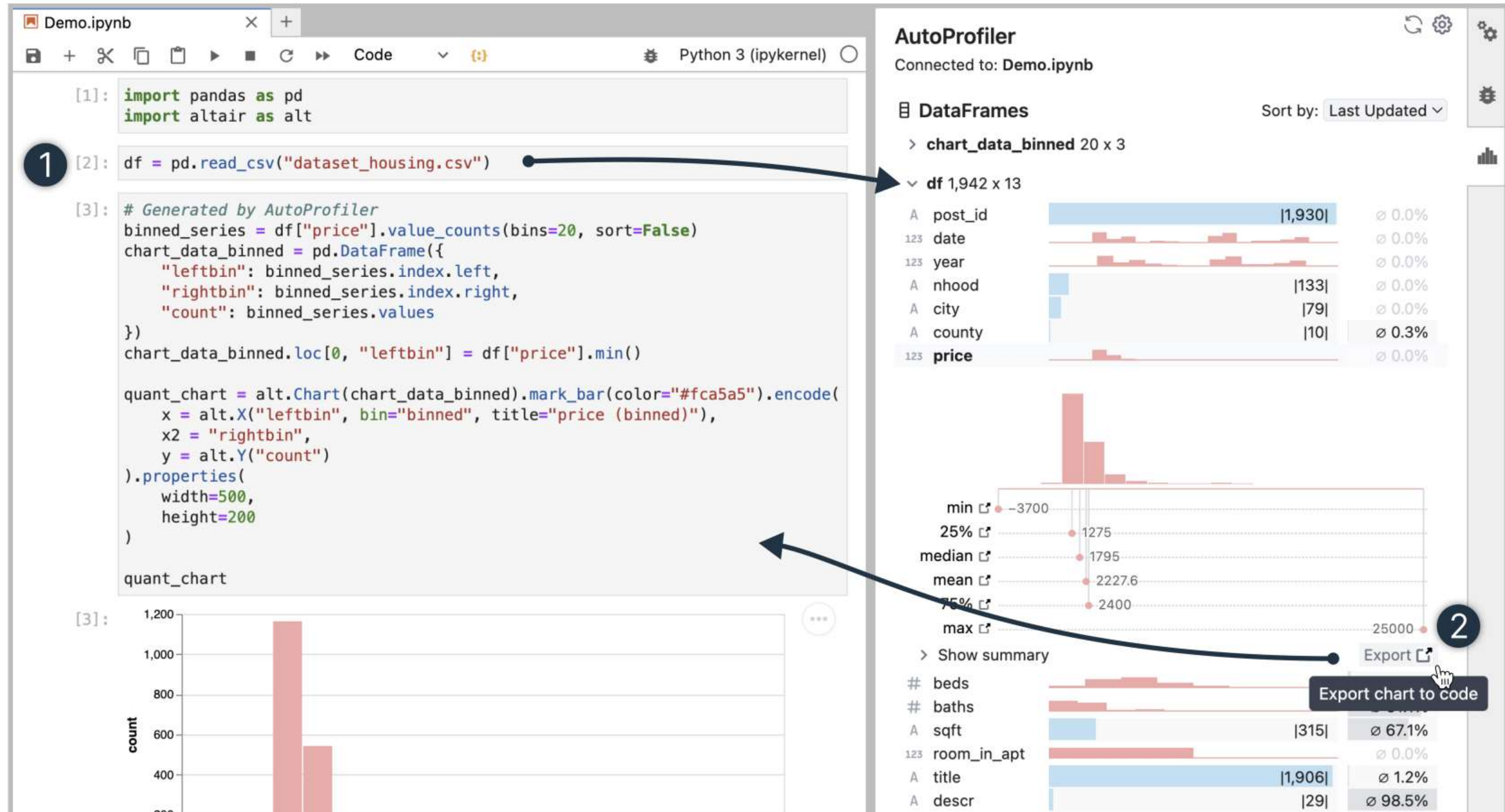
Make sure it fits your needs!

Cappers et al., 2018

# Dead or Alive: Continuous Data Profiling for Interactive Data Science



Will Epperson , Vaishnavi Gorantla , Dominik Moritz , Adam Perer 



The screenshot displays a Jupyter Notebook environment with a code cell and the AutoProfiler sidebar. The code cell contains the following Python code:

```
[1]: import pandas as pd
import altair as alt

1 [2]: df = pd.read_csv("dataset_housing.csv")

[3]: # Generated by AutoProfiler
binned_series = df["price"].value_counts(bins=20, sort=False)
chart_data_binned = pd.DataFrame({
    "leftbin": binned_series.index.left,
    "rightbin": binned_series.index.right,
    "count": binned_series.values
})
chart_data_binned.loc[0, "leftbin"] = df["price"].min()

quant_chart = alt.Chart(chart_data_binned).mark_bar(color="#fca5a5").encode(
    x = alt.X("leftbin", bin="binned", title="price (binned)"),
    x2 = "rightbin",
    y = alt.Y("count")
).properties(
    width=500,
    height=200
)

quant_chart

[3]:
```

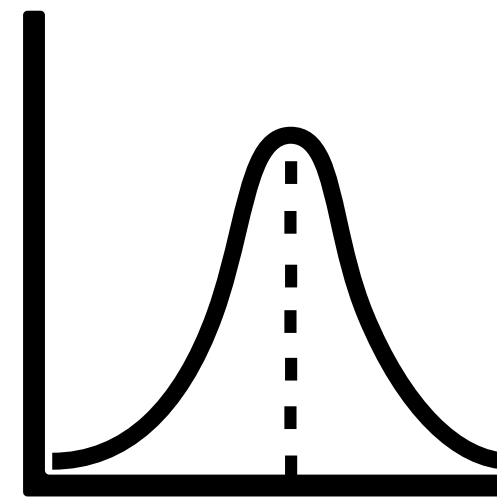
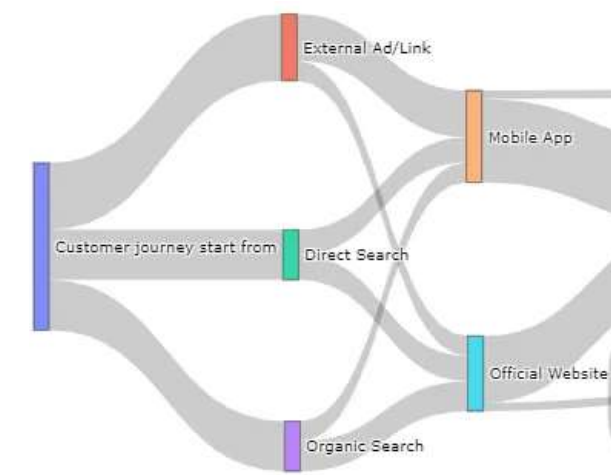
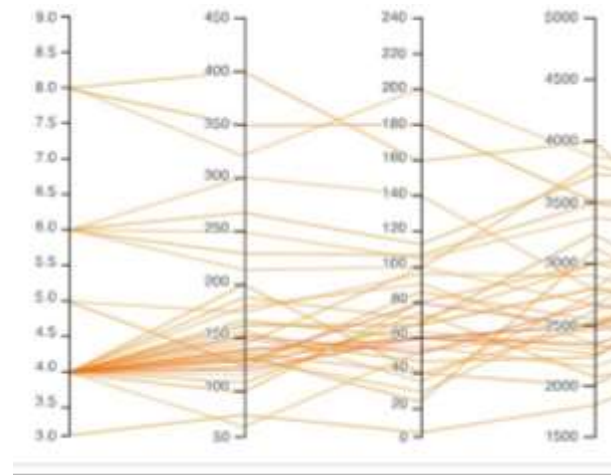
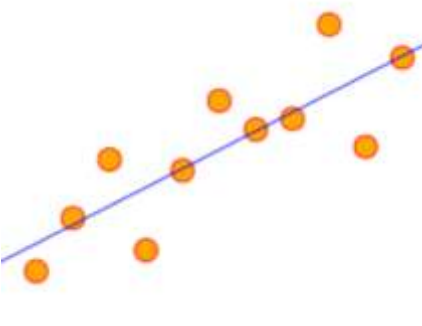
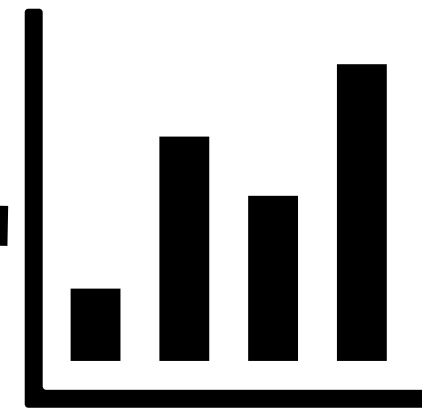
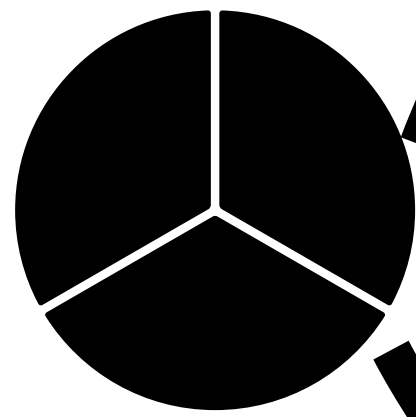
The AutoProfiler sidebar shows a list of DataFrames, including 'chart\_data\_binned' (20 x 3) and 'df' (1,942 x 13). The 'df' DataFrame is expanded to show a summary of its columns:

Column	Count	Percentage
post_id	1,930	0.0%
date		0.0%
year		0.0%
nhood	133	0.0%
city	79	0.0%
county	10	0.3%
price		0.0%

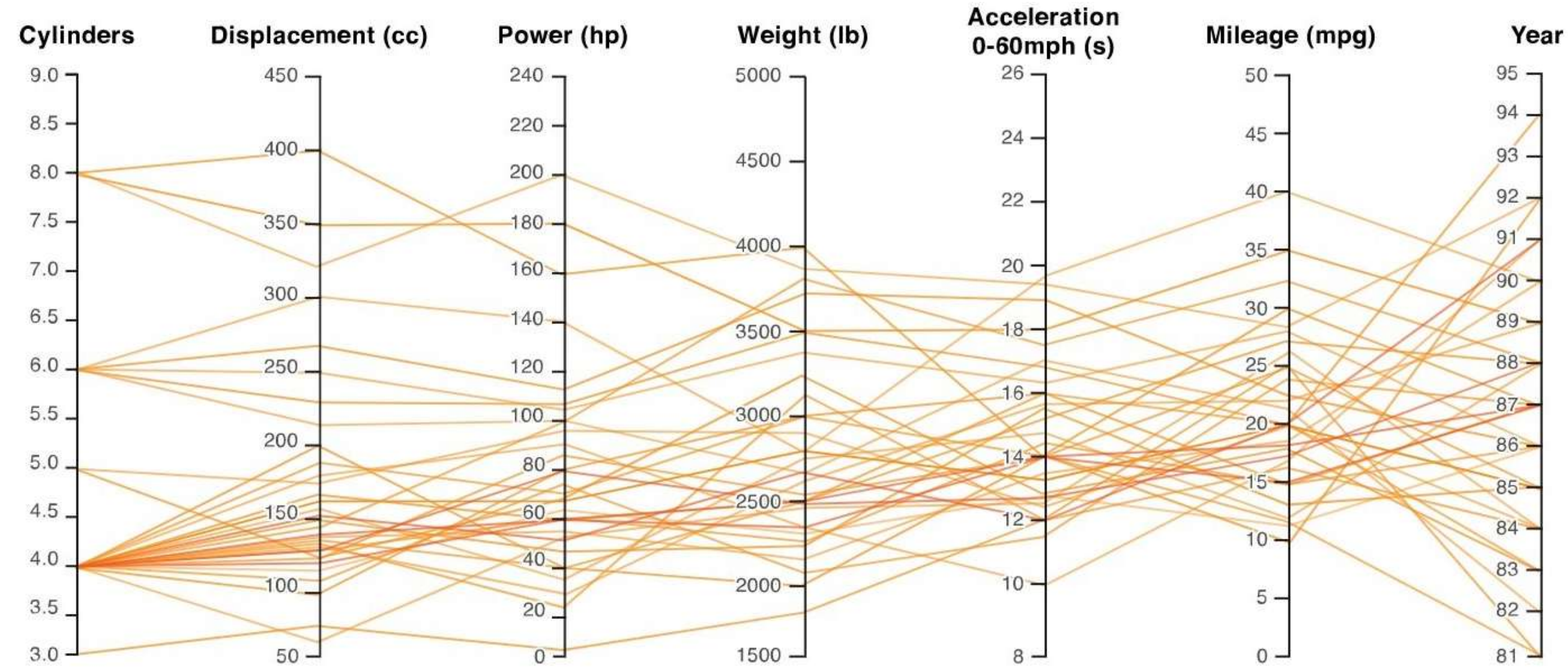
Below the summary, a histogram shows the distribution of the 'price' variable. The x-axis represents price values, and the y-axis represents the count. Key statistics are displayed:

- min: -3700
- 25%: 1275
- median: 1795
- mean: 2227.6
- 75%: 2400
- max: 25000

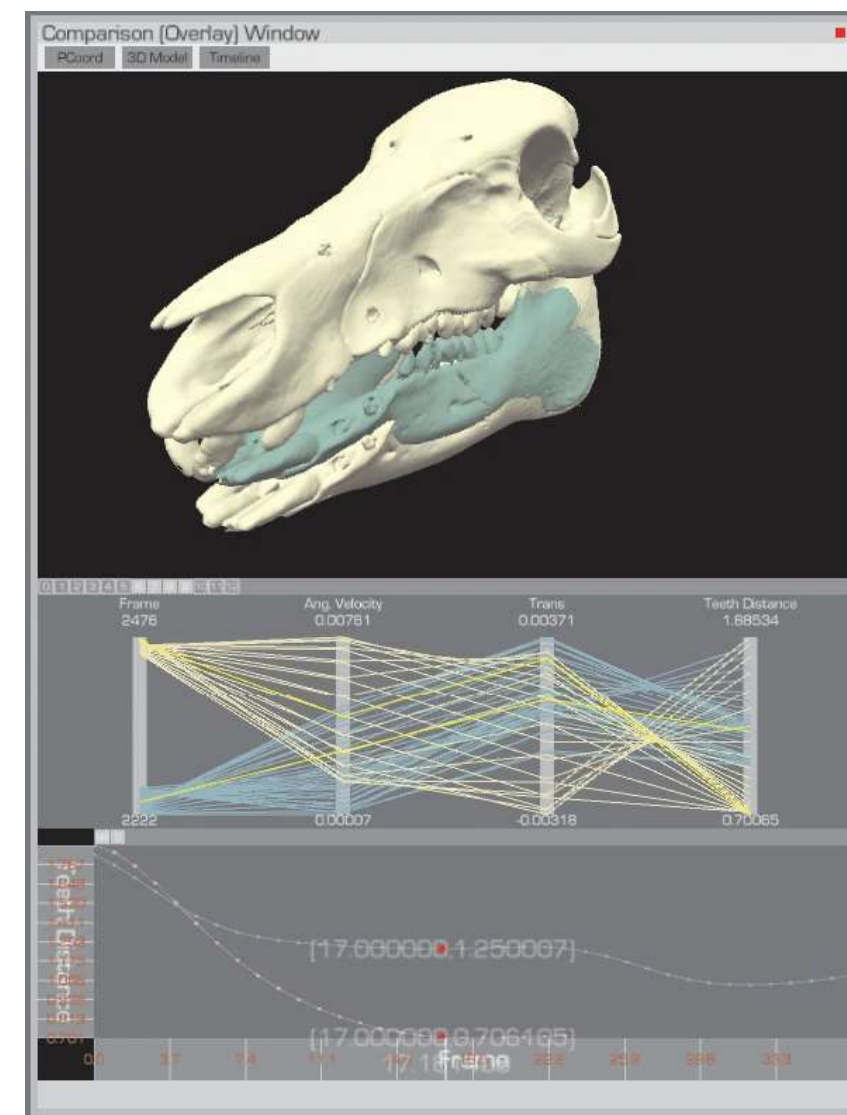
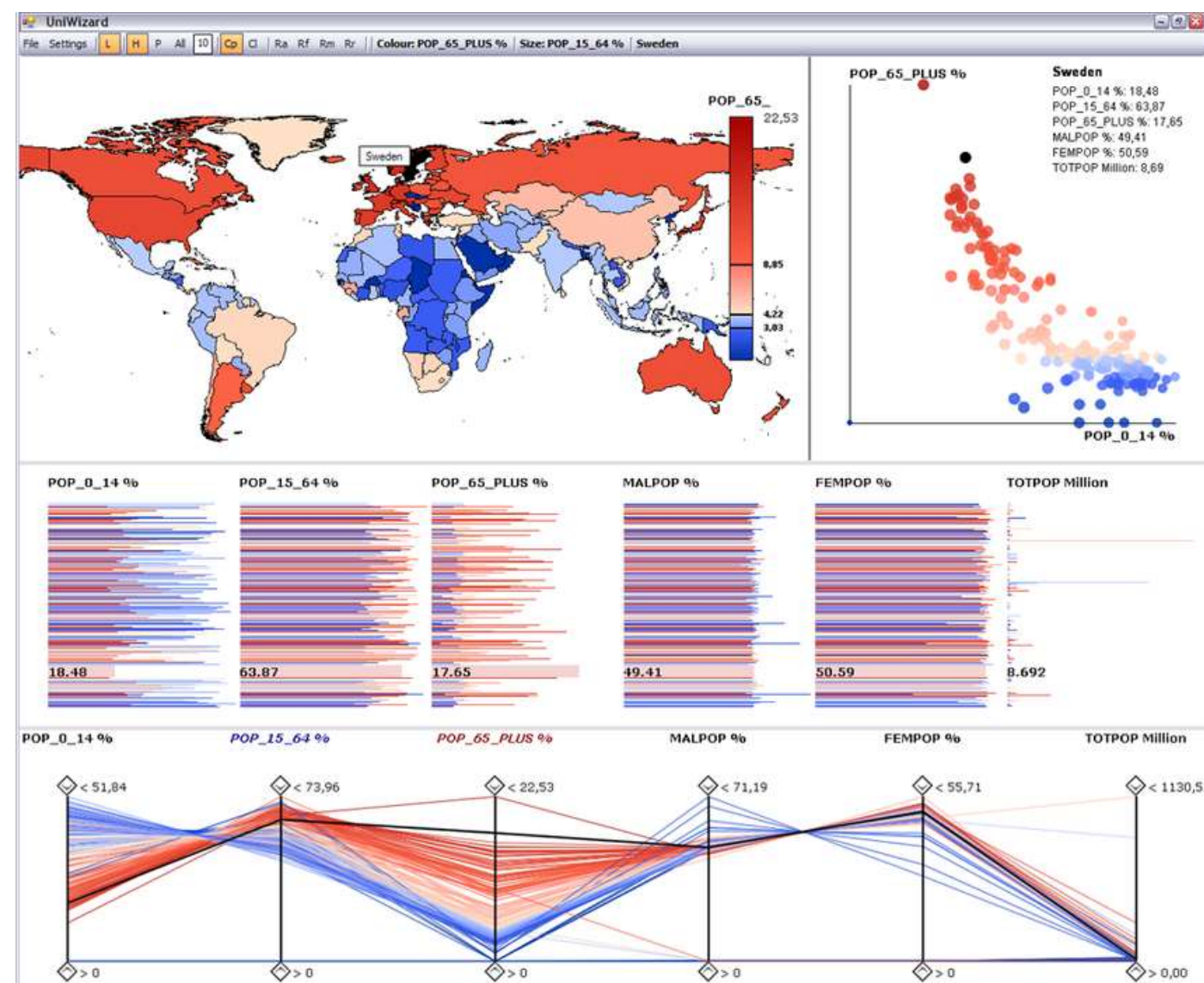
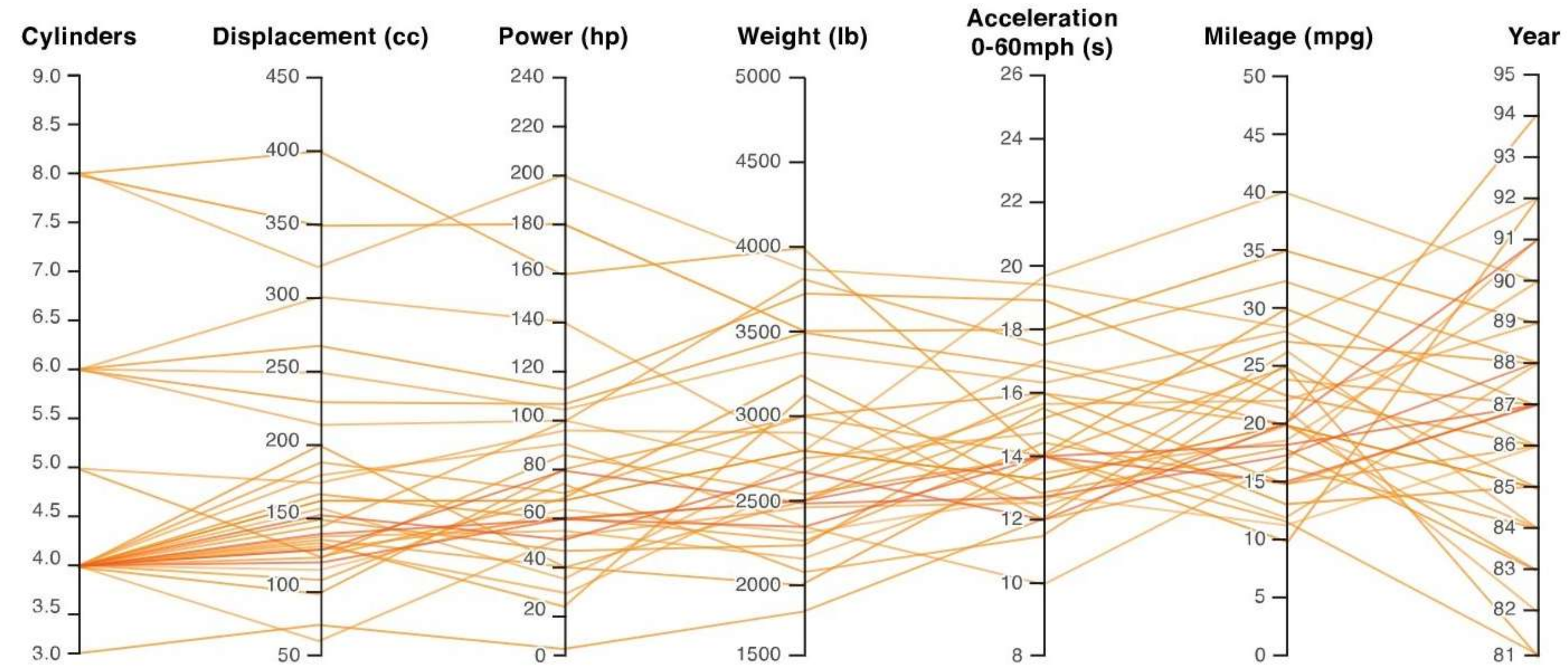
The histogram is titled 'price (binned)'. An 'Export' button is visible next to the chart. A callout box labeled '2' points to the 'Export chart to code' button. The code cell output shows a bar chart of the binned price data, with the y-axis labeled 'count' and the x-axis labeled 'price (binned)'. The bars are colored #fca5a5. A callout box labeled '1' points to the first line of code in the cell.



# Visualization enables high dimensional data analysis:

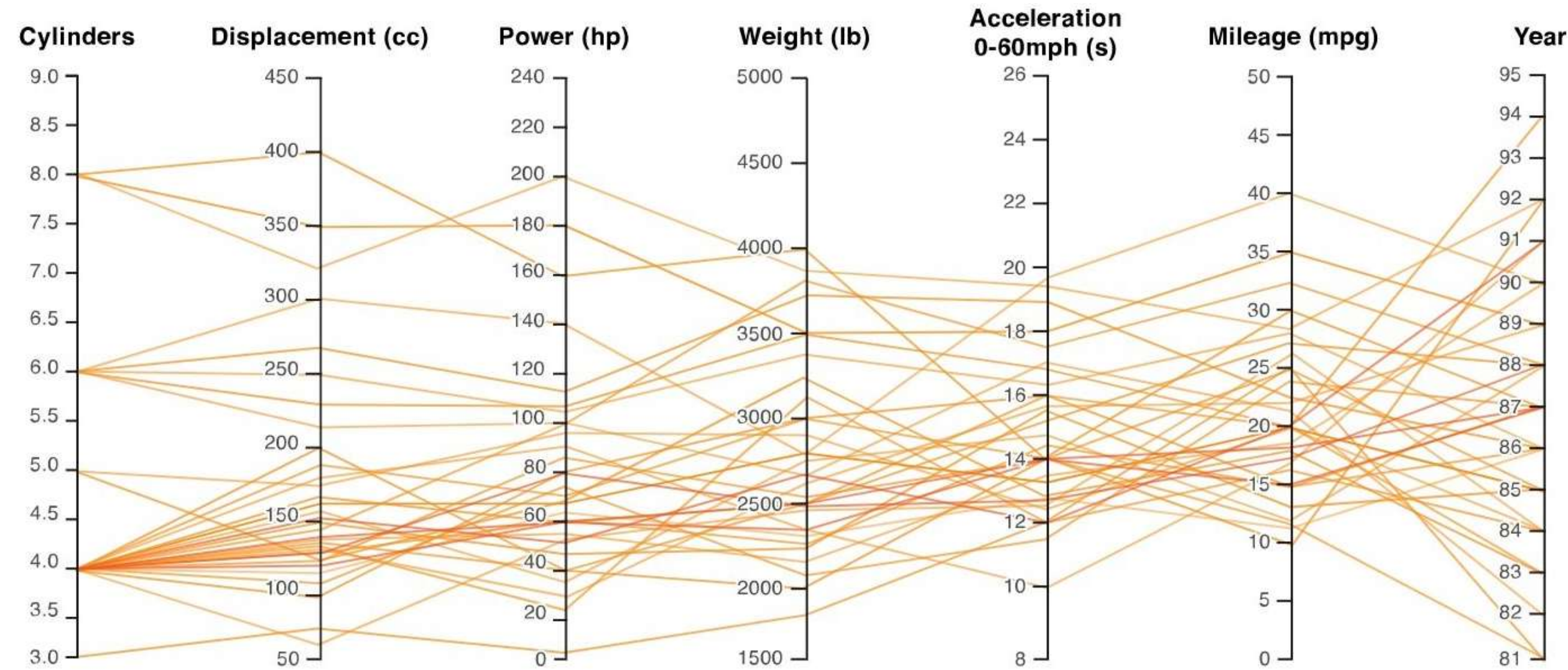


# Visualization enables high dimensional data analysis:





# Visualization enables high dimensional data analysis:



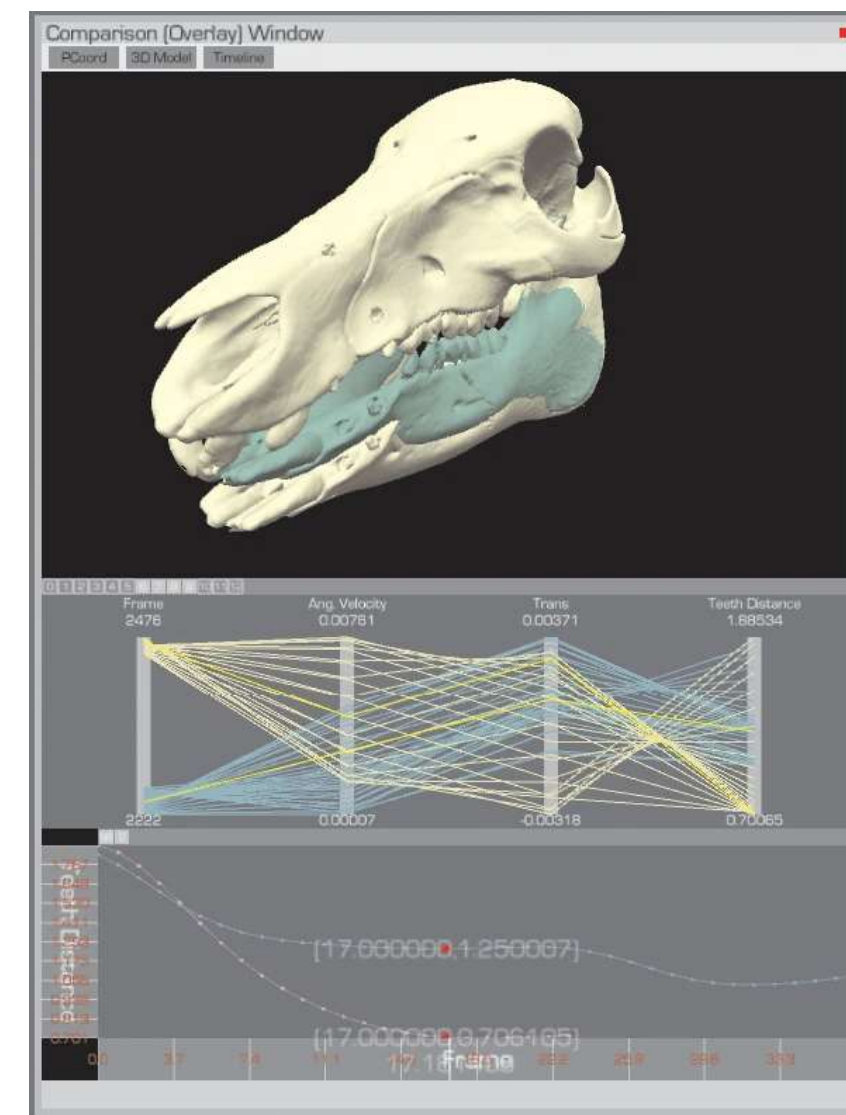
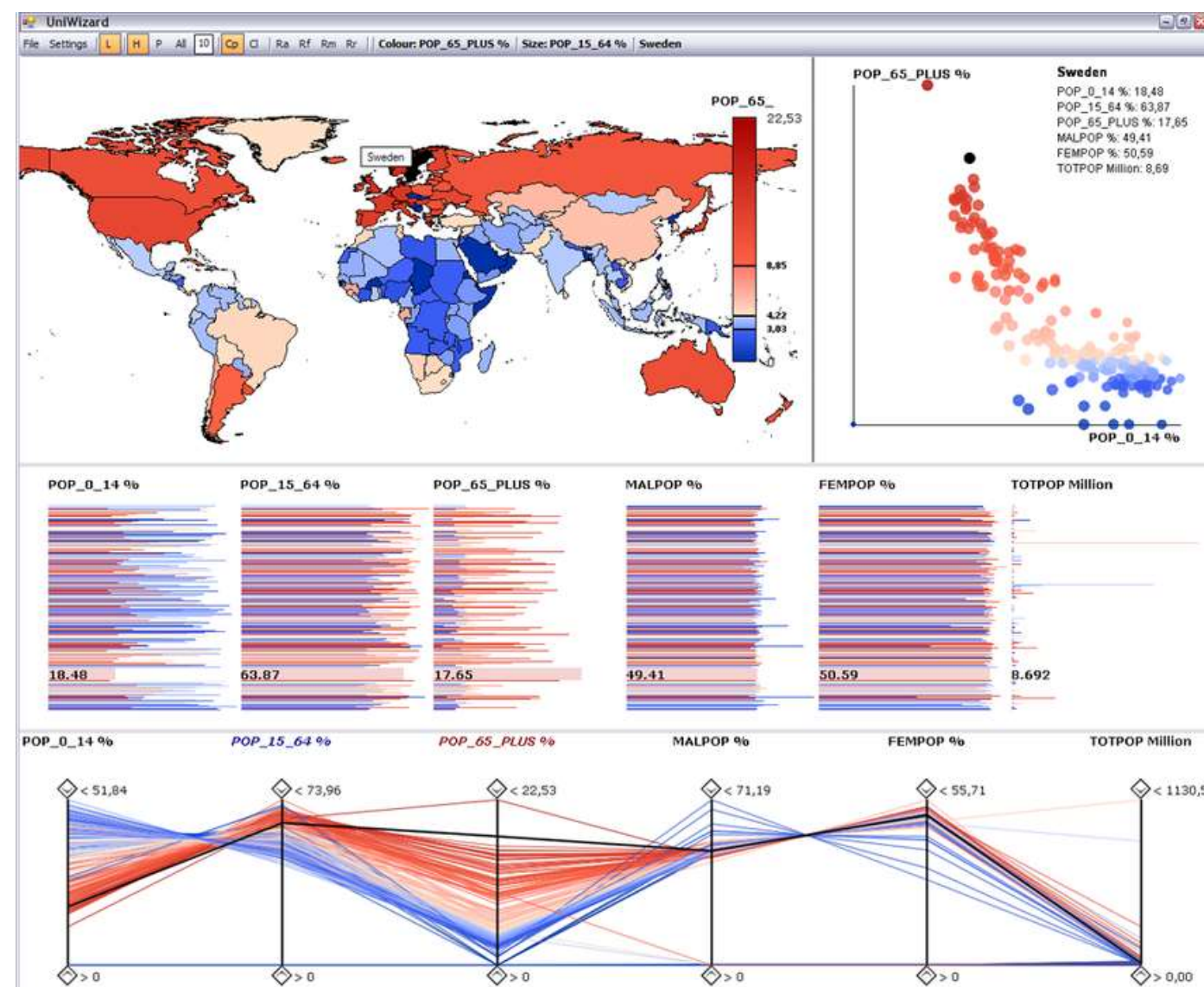
VIS FULL PAPER

HONORABLE MENTION

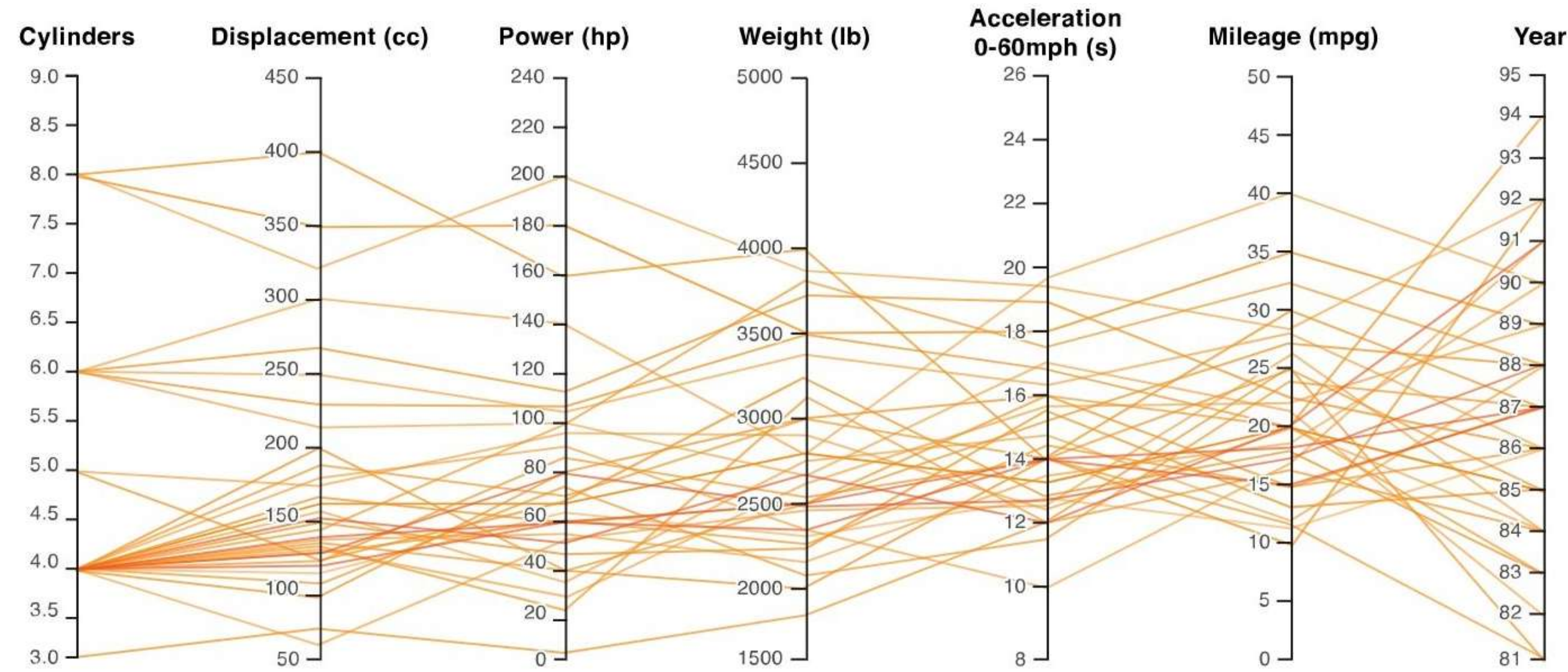
## ManiVault: A Flexible and Extensible Visual Analytics Framework for High-Dimensional Data

Alexander Vieth, Thomas Kroes, Julian Thijssen, Baldur van Lew, Jeroen Eggermont, Soumyadeep Basu, Elmar Eisemann, Anna Vilanova, Thomas Höllt, Boudewijn Lelieveldt

High Dimensional Data  
09:00-10:15, Wednesday (Oct 25)



# Visualization enables high dimensional data analysis:



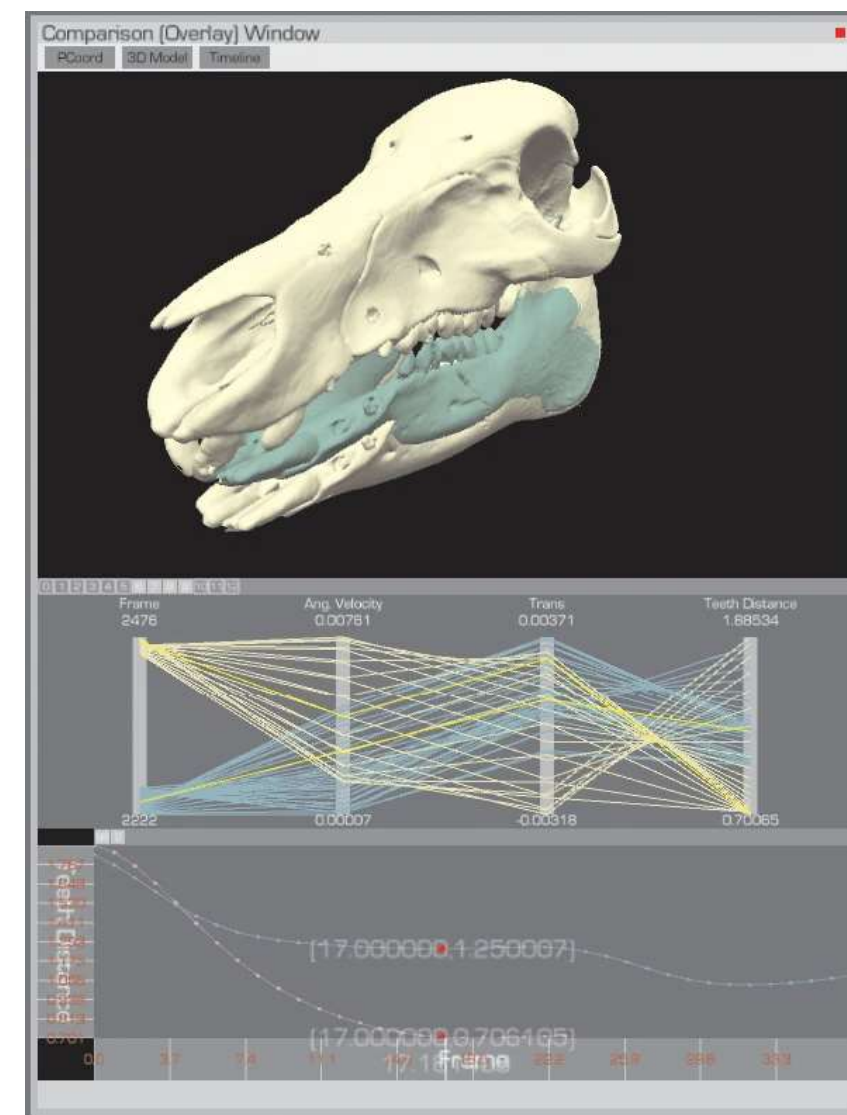
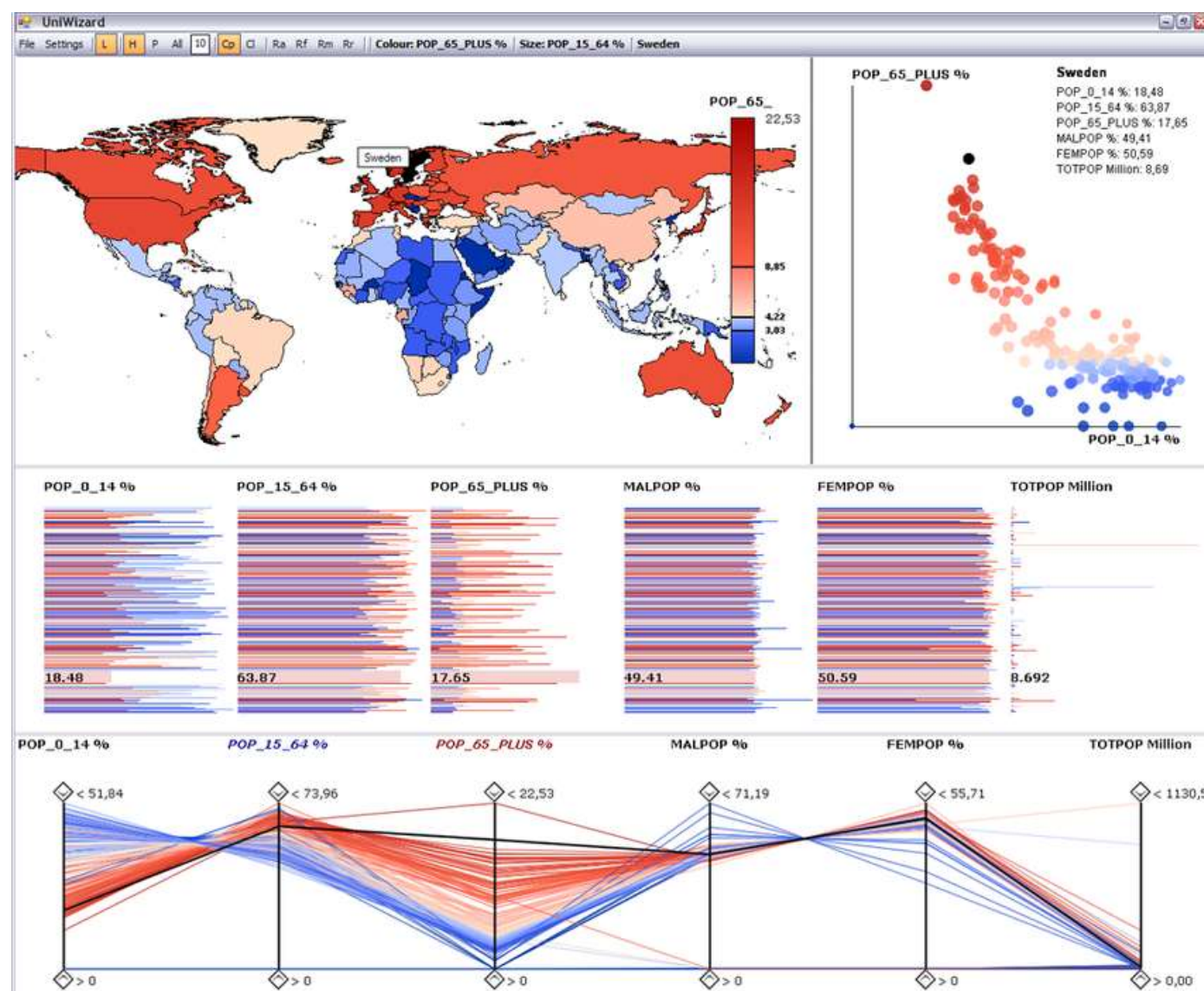
**VIS FULL PAPER**

**HONORABLE MENTION**

## ManiVault: A Flexible and Extensible Visual Analytics Framework for High-Dimensional Data

Alexander Vieth, Thomas Kroes, Julian Thijssen, Baldur van Lew, Jeroen Eggermont, Soumyadeep Basu, Elmar Eisemann, Anna Vilanova, Thomas Höllt, Boudewijn Lelieveldt

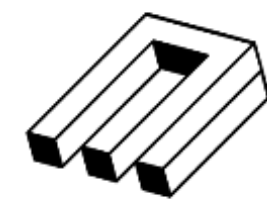
High Dimensional Data  
09:00-10:15, Wednesday (Oct 25)



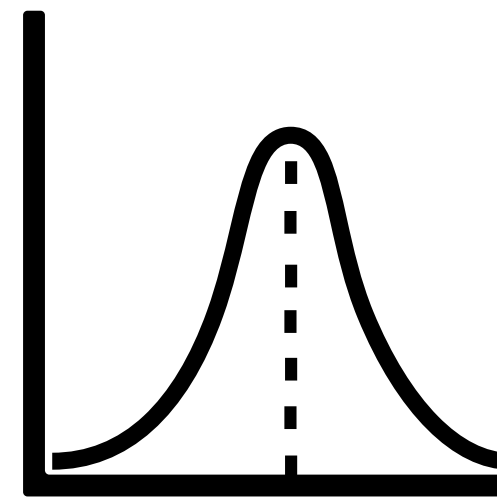
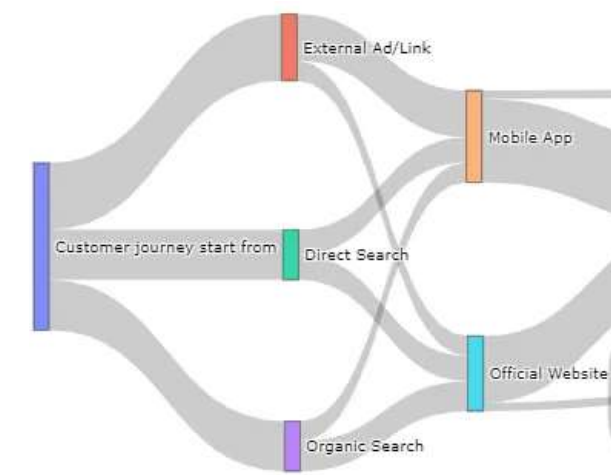
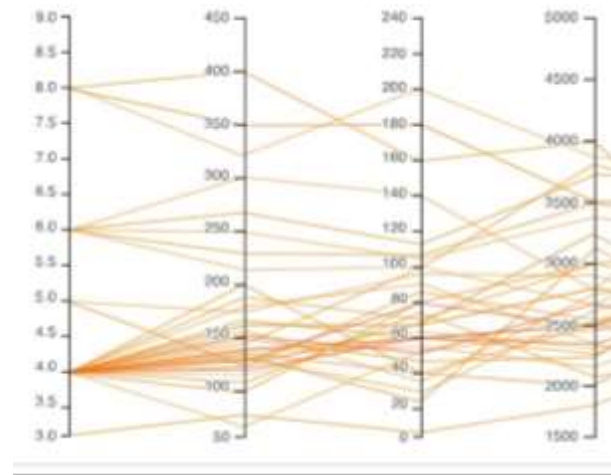
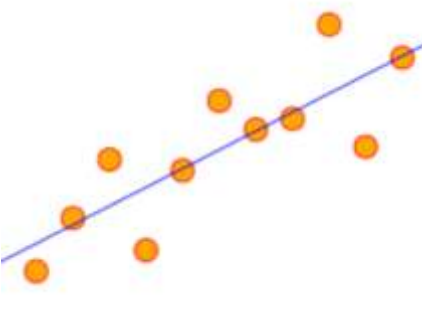
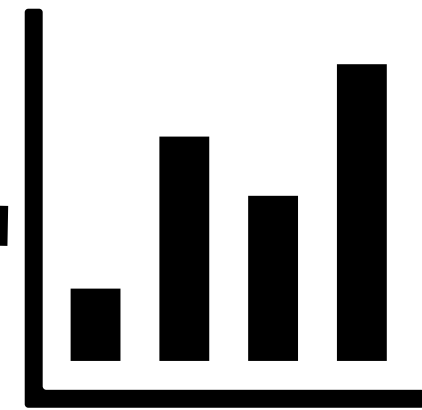
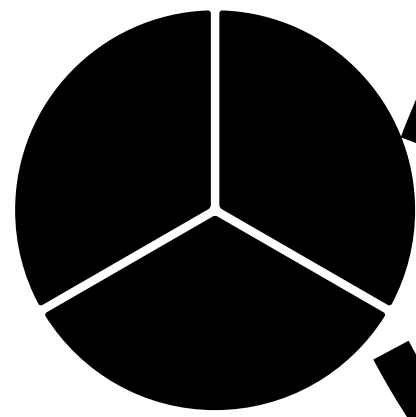
To get to this stage:



OTS toolkits (Python, Observable), special projects

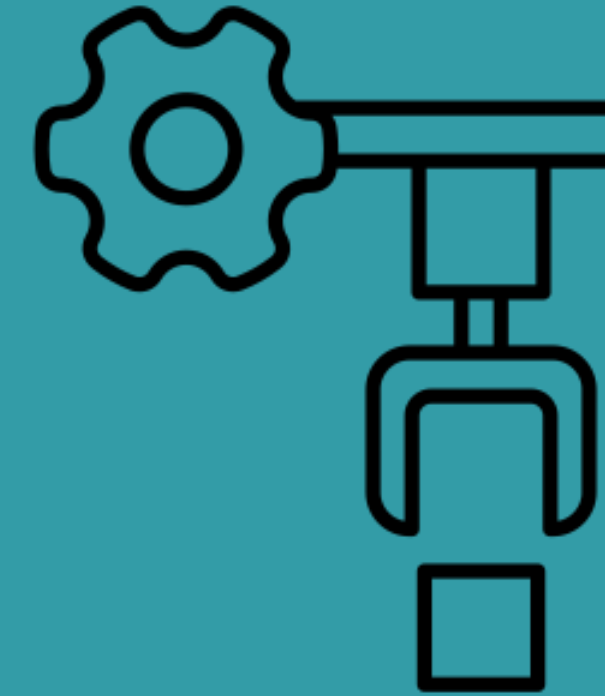


Scale (long data) and dimensionality (wide) may be difficult to handle together.

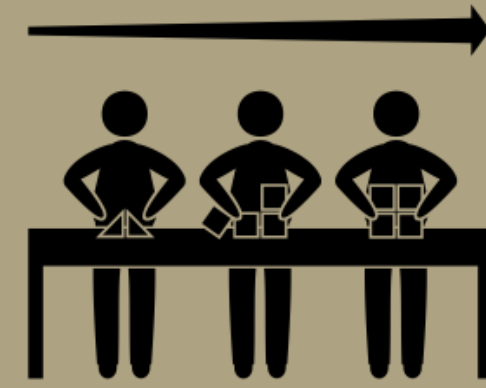


# Industry 4.0

## Industry 3.0



## Industry 2.0

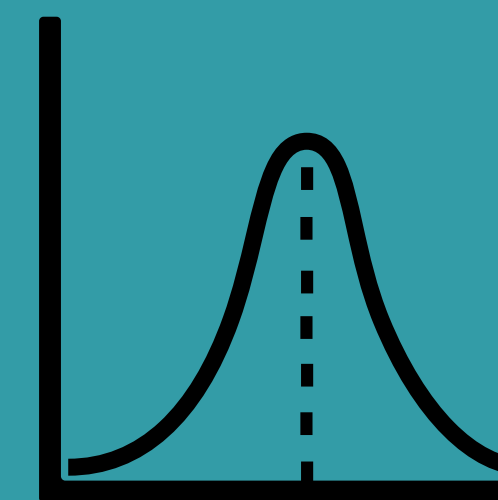
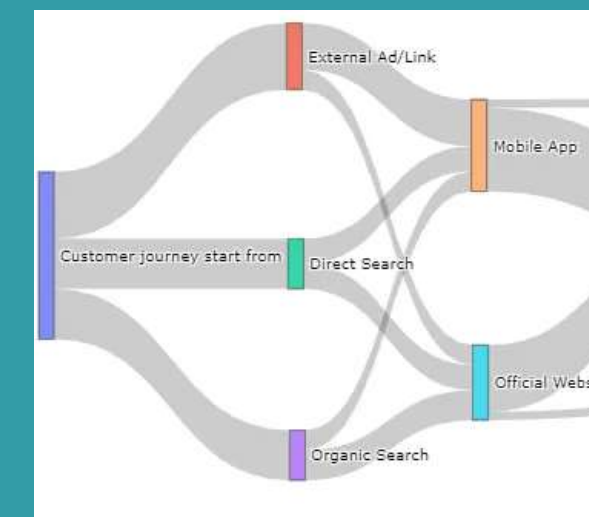
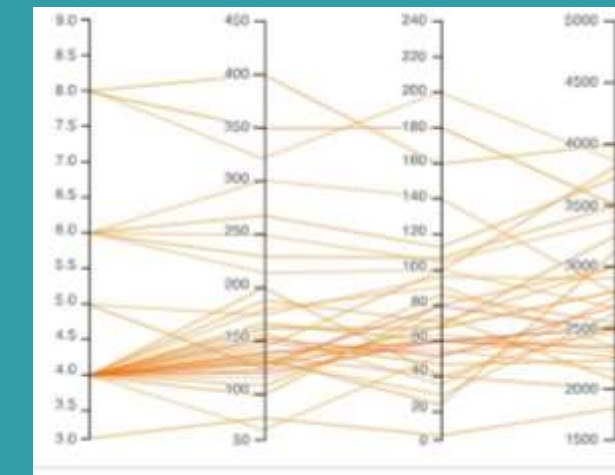


## Industry 1.0

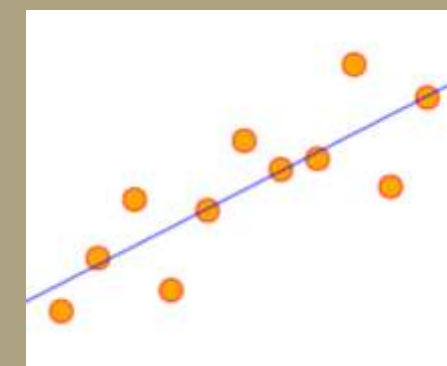
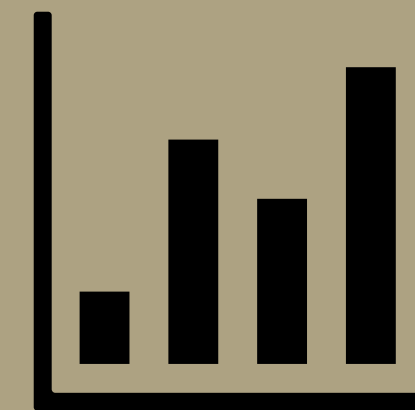


# Data 4.0?

## Data 3.0

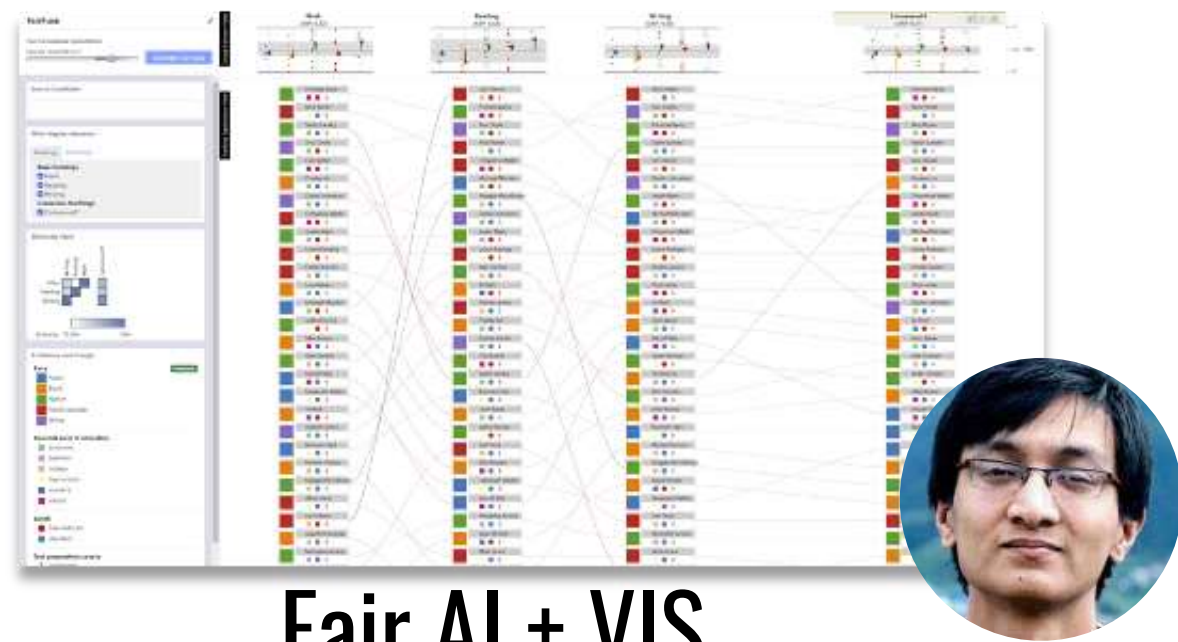


## Data 2.0

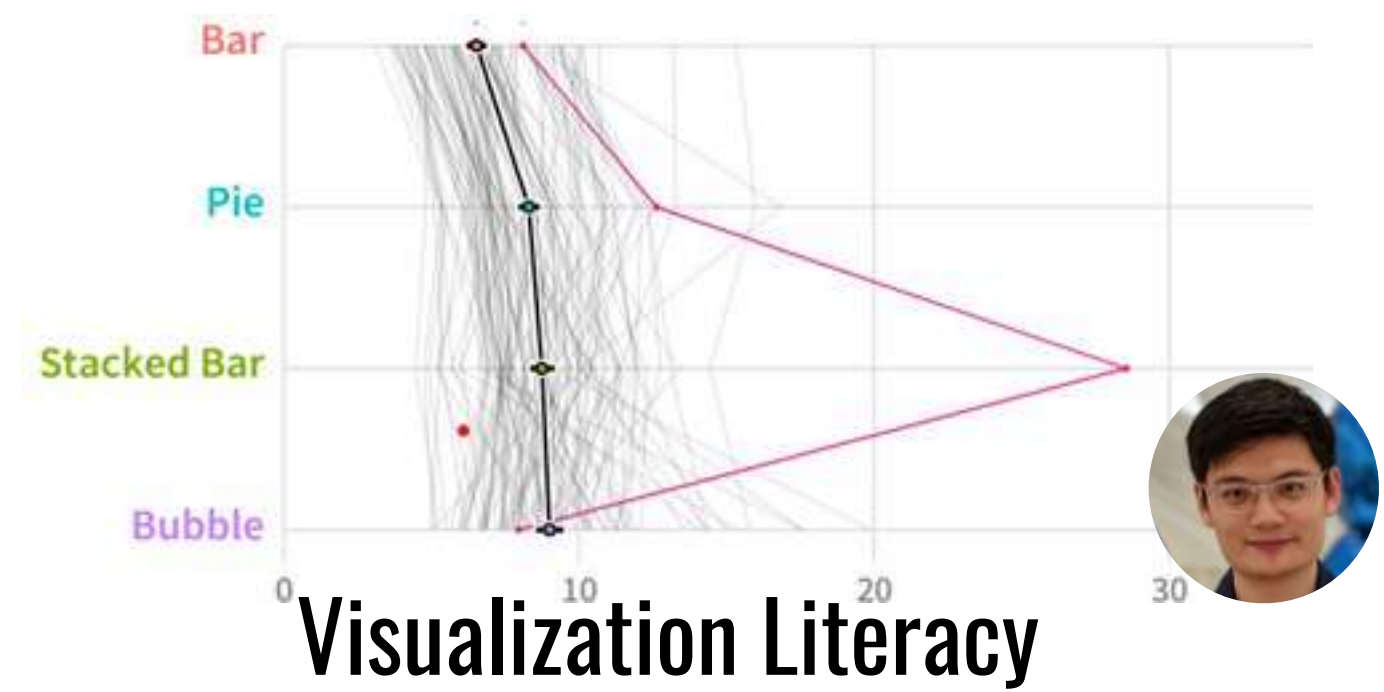


## Data 1.0

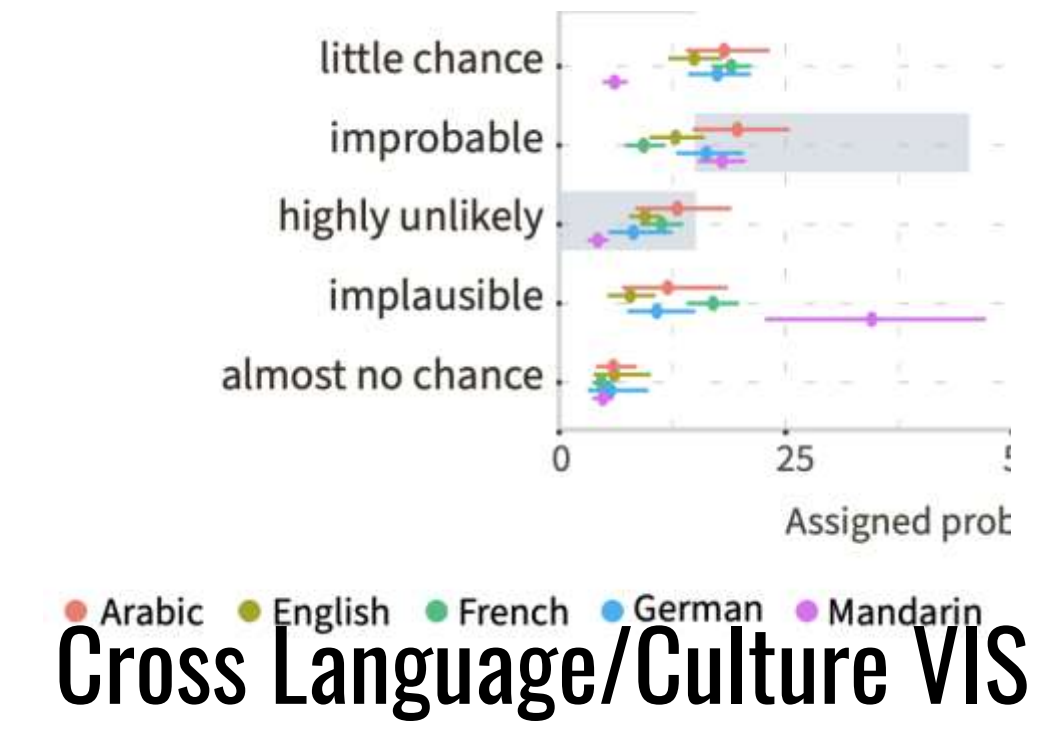




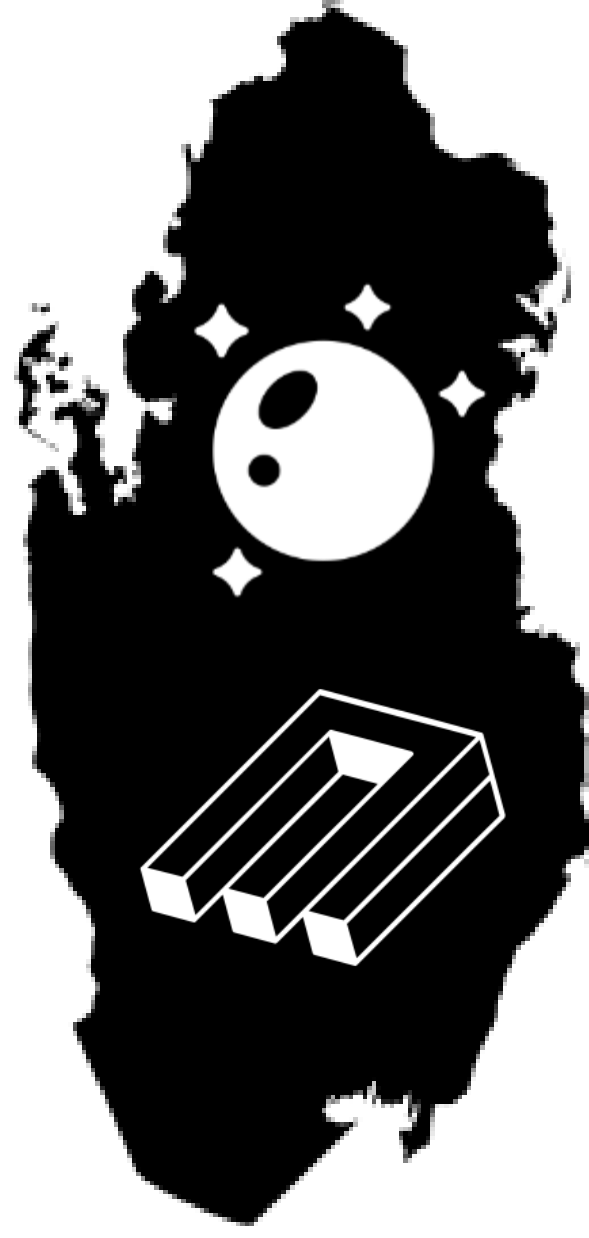
Fair AI + VIS



Visualization Literacy



Cross Language/Culture VIS



# Seeking Pearls, Avoiding Mirages: Charting a Course through Data Complexity using Interactive Visualization

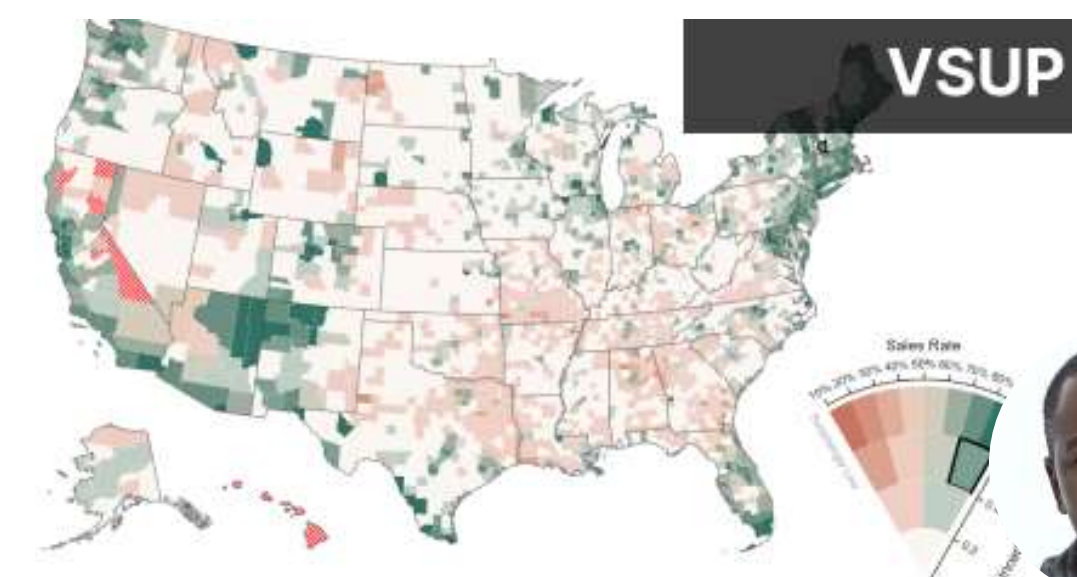
Prof. Lane Harrison | Worcester Polytechnic Institute | Director, VIEW Lab



VIS in Cyber Security Orgs



Immersive VIS



Map models for non-experts

