

Data Visualization (DAV)

move information

① Interactions:-

• Change overtime

• Select

• Navigate

→ Item Reduction

Attribute reduction

Zooming on maps

Zoom

Geometric / Semantic

focus on specific area

Zoom / Pan, Translate / Constrained

Slice / Cut / Project

move, right dimension or left. reduce

• Interaction is required

→ • encoding
• arrangement
• ordering• View point
• aggregation level
• attributes being shown• Animated transition → • stacked
• grouped

• Categorical attributes don't need sorting

• Compare these attributes

• Sort them w.r.t ordered attribute.

• Selection target → • items / links / attributes / views.

• user action is selection

• Brushing → certain area selected then highlight

Select & highlight

• Navigation → • Camera → only certain features visible in a frame
analogy

• Zooming • Translating

• Panning • Rotating

• Navigation → • Unconstrained → move freely in any direction without limits.
Constraints navigations• Constrained → movement limited to some area or time
navigations

(limit pan)

Scented Widgets → dropdown/slider.

- Filter → Remove the selected or filter.

Aggregate → Join other than selected.

- Reducing Complexity → • reduce items or attributes

- filtering → item → most common eliminate marks for filtered items.

- Attribute Filtering → • attribute mapped to different channels
 - If mapped to same channel, allows many attributes.

- Queries & Filters

↓
Start with empty set of items & add items

↓
Filters start with all items and remove items.

- Attribute filtering can be combined with item filtering.

Facet (noun) → refers to particular aspect or feature of data being analyzed.
 Facet (verb) → act of splitting or segmenting data into separate views or sub set.

② Manipulate

- Change
- Select
- Navigate

Facet

Juxtaposed (placing side by side)
 partitioned (dividing data in groups)
 Superimposed (overlapping)

- Visualization techniques →
- Juxtaposed
 - Integrated
 - Superimposed
 - Overlaid
 - Nested

• Juxtapose → • Share encoding (same/different)

→ selecting a data point in one view highlights the corresponding data point in another.

→ helps between relationship of datasets or visualization.

• Share data (All/Subset/None)

• Share Navigation → If we pan or zoom one view, other pan or view in the same way.

• maintaining context & consistency b/w the views.

| | | Data | | |
|----------|-----------|------------|---------------------------------|-----------------|
| | | All | Subset | None |
| Encoding | Same | Redundant | Overview / detail | Small multiples |
| | Different | Multi form | Multiform, Overview / detailed. | No linkage |

• Multifarm Views → • Same data visualized in different ways.

- Consumes more screen space
- one view becomes cluttered with too many attributes
- allows greater separability between channels

Items \rightarrow rows
Attributes \rightarrow Columns

• Partitioned View (split dataset into groups and visualize each group)

• Extremes: one item per group, one group for all items

• Can be hierarchy \rightarrow • order \rightarrow

• Which attributes are used to

split? \rightarrow Categorical

Example \rightarrow (Treemap Matrix Assignment)

• Split data into multiple smaller charts (facets)

• Each row or column represents different subset of data

make comparison easy.

• Superimposition \rightarrow • Treemaps ^{Super}imposition.

• Focus / Context (Show everything at once but compress regions that are not current focus)

Embedded

• Elide data (selectively filter & aggregate)

• Superimpose layer

• Distort geometry

Reduce

• Filter

• Aggregate

• Elision (include both filtering and aggregation but goal is to give overall view of data)

~~Dot Trees~~

• Superimposed layers — Alteration \rightarrow alters display to enhance details in selected data.

Suppression \rightarrow highlighting selected connections while hiding the rest

Enrichment

• Distortion \rightarrow (fish-eye lens) • Shape of focus \rightarrow radial, rectangular
• Types of interactions \rightarrow geometric, rubber sheet, movable lenses

Concept in Focus + Context to determine how important a data point is.

• Degree of interest function

$$DOI = I(x) - D(x, y)$$

I : interest function

D : distance

x : location of item

y : current focus point

Interactive: y changes.

• Given data:-

Focus point = $(5, 5)$

$A(2, 3) = 50$

$B(5, 7) = 40$

$C(9, 1) = 60$

$$D(x, y) = \sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2}$$

$$A = \sqrt{(2-5)^2 + (3-5)^2} = 3.61$$

$$B = \sqrt{(5-5)^2 + (7-5)^2} = 2.00$$

$$C = \sqrt{(9-5)^2 + (1-5)^2} = 5.66$$

$$DOI A:- 50 - 3.61 = 46.39$$

$$DOI B:- 40 - 2.00 = 38$$

$$DOI C:- 60 - 5.66 = 54.34$$

→ point very important and close to focus