Task Abstraction

Why a Vis tool is being used
Actions of Vis Tools

• Consume or produce information
• Actions:
  – To present, to discover, to enjoy
  – To generate or verify a hypothesis
  – To search: either the identify or the location of the target
  – To identify one object, compare some objects, summarize all objects
  – To find trends or outliers; the minimum or maximum values; the distribution of values; the dependencies, correlations, or similarities; the topology of a network or a path; the shape of the data
Three Levels of Actions

Analyze  Search  Query
Three Levels of Actions

Analyze

Search

Query

- Consume
  - Discover
- Produce
  - Annotate

- Present
- Enjoy

- Record
- Derive
### Three Levels of Actions

<table>
<thead>
<tr>
<th>Analyze</th>
<th>Search</th>
<th>Query</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location known</td>
<td>Target known</td>
<td>Target unknown</td>
</tr>
<tr>
<td>Location known</td>
<td>Lookup</td>
<td>Browse</td>
</tr>
<tr>
<td>Location unknown</td>
<td>Locate</td>
<td>Explore</td>
</tr>
</tbody>
</table>
Three Levels of Actions

Analyze

→ Identify

Search

→ Compare

→ Summarize

Query
What are the targets?

- All Data
  - Trends
  - Outliers
  - Features

- Attributes
  - One
    - Distribution
    - Extremes
  - Many
    - Dependency
    - Correlation
    - Similarity
What are the targets?

Network Data
- Topology
  - Paths

Spatial Data
- Shape
How? The Choice of Vis Idioms

**Encode**
- Arrange
  - Express
  - Order
  - Use

- Separate
- Align

**Manipulate**
- Change
- Select
- Navigate
How? The Choice of Vis Idioms

- **Facet**
  - Juxtapose
  - Partition
  - Superimpose

- **Reduce**
  - Filter
  - Aggregate
  - Embed
How? The Choice of Vis Idioms

Map
from categorical and ordered attributes

> Color
  > Hue
  > Saturation
  > Luminance

> Size, Angle, Curvature, ...

> Shape
  + ● ■ ▲

> Motion
  Direction, Rate, Frequency, ...

Iterative Design

Diagram showing iterative design process with labeled steps: What?, Why?, How?