4.Task Abstraction

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Outline

- Why Analyze Tasks Abstractly?

- Who: Designer or User

- Actions

  – Analyze

    - Consume, Produce

  – Search

    - Lookup, Browse, Locate, Explore

  – Query

Why Analyze Tasks Abstractly?

- Vis framework encourages you to consider tasks in **abstract** form, rather than the **domain-specific** way.

- Transforming task descriptions from domain-specific language into abstract form allows you to reason about **similarities** and **differences** between them.

- Otherwise, it's **hard to make useful comparisons** b/w domain situations, because if you don't do this kind of translation then everything just appears to be different. That apparent difference is **misleading**.

Who: Designer or User

- Who has a goal or makes a design choice: the designer of the vis or the end user of the vis.

- The designer has built many choices.

- Tools are limited(kinds of data and tasks that they can address), but their strength is that users are not faced with an overwhelming array of design choices.

- The breadth of choices is both a strength and a limitation:

Who: Designer or User

- Users have a lot of power, but they also may make ineffective choices if they do not have a deep understanding of many vis design issues.

Actions

- Three levels of actions that define user goals.

- The high-level choices describe how the vis is being used to analyze, either to consume existing data or to also produce additional data.

- The mid-level choices cover what kind of search is involved, in terms of whether the target and location are known or not.

- The low-level choices pertain to the kind of query: does the user need to identify one target, compare some targets, or summarize all of the targets?

Actions

The choices at each of these **three levels** are independent from each other, and it's usually useful to describe actions at all three of them.
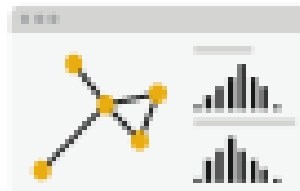
Actions - Analyze

- Two possible goals

- 1.Consume existing information(common).

  – Discover something new

  – Analyze information that is not already completely understood

  – For users to enjoy a vis to indulge their casual interests in a topic

Actions - Analyze

- Two possible goals

- 2.Actively produce new information.

- There are three kinds of produce goals:
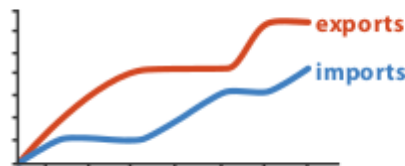
  – Annotate
  – Record
  – Derive

Search

- All of the high-level analyze cases require the user to *search* for elements of interest within the vis as a mid-level goal.

- The classification of search into four alternatives according to search target is ***already known or not***.

	Target known	Target unknown
Location known	·:·. Lookup	·○·. Browse
Location unknown	⟨·◉·⟩ Locate	⟨·◉·⟩ Explore

Search - Lookup

- If users already know **both** what they're looking for and where it is, then the search type is simply lookup.

- Example, a user of a tree vis showing the ancestral relationships between mammal species might want to look up humans, and can get to the right spot quickly by remembering how humans are classified.

Search - Locate

- To find a known target at an unknown location, the search type is locate: that is, find out where the specific object is.

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- User might not know where to find rabbits, and would have to look around in a number of places before locating them as lagomorphs (not rodents)!

Search - Browse

- Users don't know exactly what they're looking for, but they do have a location in mind of where to look for it, the search type is browse.

- For instance, if a user of a tree vis is searching within a particular subtree for leaf nodes having few siblings, it would be an instance of browse because the location is known in advance, even though the exact identity of the search target isn't.

Search - Browse

- When users are not even sure of the location, the search type is explore. It entails searching for characteristics without regard to their location, often beginning from an overview of everything.

- Examples - Searching for outliers in a scatterplot, for anomalous spikes or periodic patterns in a line graph of time-series data.

Query

- Once a target or set of targets for a search has been found, a low-level user goal is to query these targets at one of three scopes:

    – Identify - refers to a single target

    – Compare - refers to multiple targets

    – Summarize - refers to the full set of possible targets.

Thank You