Mapping the Design Space of Faceted Search Interfaces

Bill Kules
School of Library and Information Science
The Catholic University of America
kules@cua.edu

Introduction

Faceted search, guided search, and categorized overviews are becoming accepted techniques to support complex information seeking tasks like exploratory search. There are a growing number of applications that use these techniques for library catalogs, web search, shopping, image collections, and other domains (Antelman, Lynema, & Pace, 2006; Hearst et al., 2002; Tunkelang, 2006; Yee, Swearingen, Li, & Hearst, 2003). Design guidelines for the application of these techniques are starting to emerge (Hearst, 2006; Kules & Shneiderman, to appear), but there is no systematic description of the design space for faceted search interfaces. An understanding of the design space will aid designers by alerting them to design options and decisions they should address. It will aid researchers by suggesting a framework for guidelines as well as additional areas of study. In particular, it may help understand the actions, tactics and stratagems (Bates, 1990) supported by faceted search interfaces.

The objective of this paper is to begin identifying and structuring a set of dimensions of the design space for categorized overviews of search results. This paper proposes a set of dimensions for the design space of faceted search interfaces and two structures for meaningfully organizing them. These dimensions and the organizing structures emerged from analysis of recent literature and applications from several domains.

Method

We began with design dimensions extracted from Hearst (2006), Smith & Kules (2006), and Kules (2006). Hearst (2006) makes detailed design recommendations for hierarchical faceted search interfaces. Kules (2006) identifies a set of ten dimensions and their corresponding design options for categorized overviews. Smith & Kules (2006) proposes 14 dimensions in three areas (organization, display, and interaction). We extend those 14 dimensions by analyzing additional interfaces from different domains: mSpace (schraefel et al., 2005), the Relation Browser (Marchionini & Brunk, 2003), and several commercial shopping interfaces.

This analysis yielded 28 dimensions. By considering the three primary conceptual elements (the facets, the categories within the facets, and the individual search result items), we structure the interactions by examining how an action on each element can affect that element and the other two. Actions include, but are not limited to, clicking on, dragging, and "hovering" over an interface element. For example, clicking on a category in a faceted search interface often affects the items (by narrowing the set of results to that category) and the categories displayed (by displaying the subcategories). Structuring the design dimensions in this manner yields two tables. Table 1 contains

Table 1. Design dimensions related to the organization and display of facets, categories, and items.

	Organization	Display
Facet	• Ordering • Grouping • Semantics/relationship represented	• Location & layout • Method for determining which facets are displayed (e.g., predetermined, user-selected) • Form of display (textual or graphical) • Display of facets with 0 or 1 non-empty categories (e.g., no change, shrink or hide facet)
Category	• Ordering • Breadth & depth • Labels & terms • Categorization method (e.g., use existing metadata, extract or infer categories, automated clustering)	• Visible levels of hierarchy • Method of determining which categories to display (e.g. all, most common, show/hide empty categories, provision of keyword search/filter on category name) • Sorting/grouping of displayed categories • Display of an "Uncategorized" pseudo-category for uncategorized items
Item	• Ordering	• Method of determining which items to display (e.g. display N per page, display a sample for each visible category)

design dimensions related to the organization and display of facets, categories, and items. Table 2 structures the interaction dimensions into a 3x3 array. The rows represent the element being acted upon and the columns represent the element being affected. The empty cells suggest areas for additional study. One remaining dimension does not fit in these structures: Breadcrumbs (how they are ordered; the effect of removing an element of the breadcrumb list).

Conclusion
The organization and dimensions described here are a work in progress, intended to stimulate discussion. This is one step in developing an understanding of the design space, starting with the current literature and a sample of applications targeted at desktop-based web browsers. Additional actions, interactions, and dimensions will certainly emerge from the study of other applications and non-desktop devices (e.g. PDAs).

Table 2. Design dimensions related to the interaction of facets, categories, and items. The rows contain the elements being acted upon by the user and the columns contain the elements being affected.

		Affected element		
		Facet	Category	Item
Element being acted upon by user	Facet	• Selection (simultaneous or sequential)		
	Category	• Effect of category selection on other facets (e.g., display subcategories as a new pseudo-facet)	• Effect of category selection on display of other categories within facet (e.g. are multiple selections supported) • Previews of subcategories	• Narrowing, broadening • Sorting/grouping items (e.g., group by children of most recently selected category) • Previews
	Item	• Highlight related facet	• Highlight category membership	• Find related items (e.g. "More like this"

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