A Review of *Visual Information Seeking: Tight Coupling of Dynamic Query Filters with Starfield Displays* by Ahlberg and Shneiderman

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Introduction

- User interface design principles that lead to high satisfaction level for vis systems for expert and first time users.
- Principles have potential to help deal with flood of information (finding needles in haystacks).
- Key is to understand enormous capacity of human visual system for information processing.
- Dynamic user control through direct manipulation principles - makes it possible to explore large information spaces with less anxiety.
- "This use of proximity coding, plus color coding, size coding, animated presentations, and user-controlled selections enable users to explore large information spaces rapidly and reliably."

Key Concepts

- Principles of Direct Manipulation:
  - Visual representation of the world of action including both the objects and actions.
  - Rapid, incremental and reversible actions.
  - Selection by pointing (not typing).
  - Immediate and continuous display of results.
- Additional Principles for Information Seeking Tasks.
  - Support browsing - emphasis on rapid filtering to reduce result sets, progressive refinement of search params, continuous reformulation of goals, and visual scanning to identify results.
- VIS designs in paper support these principles

Key Concepts: Dynamic Query Filters

- Query components in Dynamic HomeFinder act as filter, reducing items in search result set.
- Effects combined with simple AND logic to account for natural queries.
- When OR logic required, users satisfied with results, or preferred generating a sequence of queries (they could see size of ORed components instead of just the unioned result).
- This paper advances dynamic queries by "demonstrating the efficacy of selection of items in alphanumeric lists with the Alphaslider.
- "This query component allows users to select one item from a list of 10,000 or more, with a simple selection tool that takes little screen space, avoids use of the keyboard, and prevents typing errors.

Key Concepts: Starfield Display

- Points of light work well for HomeFinder.
- But they do not work well when a natural map does not exist (documents, photos, songs, etc.).
- Starfield approach is scatterplot with features to support zooming and selection.

Key Concepts: Tight Coupling

- Principle of tight coupling began to emerge in user interfaces.
- Example: if a user saves a document, the SAVE menu item is disabled (grayed out) until the document is changed again.
- More complex example of tight coupling is interrelationship between text and a word processor (the relationship between page number, position in text, and the scroll bar thumb).
- Tight coupling applies to query components also.
- "In a well-designed facility, users should be able to see the impact of each selection while forming a query."
- For example, if user specifies they want films before 1935, then only certain actors or directors are selectable.
- Another aspect is linkage of output-is-input support (e.g., hypertext).
- Output-is-input manifests in selectable displays.
- Tight coupling aspects:
  - Comprehensible and consistent affordances.
  - Rapid, incremental, and reversible interactions among components.
  - Preserve display invariants.
  - Continuous display.
  - Progressive refinement.
  - Details on demand.

FilmFinder Design

- Application to explore a film database and test these principles.
- Before designing the tool, they held informal interviews with video store clerks and film aficionados.
- Detailed discussion of how the FilmFinder applies principles.

FilmFinder Scenario

- FilmFinder application could be in a video store on a TV menu, etc.
- Intuitive way to let viewers explore choices of what to watch.
- This scenario is presented by the authors in detail.

Future Work

- Dynamic query mechanism must be extend to work with larger databases, more varied kinds of information, and a greater range of query types.
- Desirable to incorporate fuzzy searching to find similar films (or other information.
- Zooming should be done smoothly so users have a feeling of flying through the data.
- Natural extension is to add third dimension so some films appear closer than others.

References

[1] C. Ahlberg and B. Shneiderman, "Visual Information Seeking: Tight Coupling of Dynamic Query Filters with Starfield Displays," *Proceedings of Human Factors in Computing Systems*, Boston, Massachusetts, Apr. 1994, ACM, pp. 313–317, 479–480.