Filter Dials – Combining Filter Criteria to Visualize Data Availability

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Motivation
An increasing amount of data is being made publicly available. In particular, based upon the technologies of the Semantic Web, data is getting published in standardized formats as RDF datasets and made accessible via standard-ized SPARQL endpoints. Various tools provide means for a step-by-step exploration of the data by retrieving specific, known data items and by allowing a navigation along links between those data items. Achieving an overview of how many data items are available based on one or more combinations of filter criteria is still problematic. Filter Dials are a visual concept for interactively exploring a variety of filter combinations to get an idea of the available data.

Current Progress and Next Steps
- Prototype for testing and demonstrating the concept: under construction
  - written in C# with a WPF GUI
  - easy portability to Microsoft PixelSense tabletop displays
  - option for reusing underlying logic on mobile devices with Mono for Android and MonoTouch
  - User study: evaluation of the interactive visualization is planned
  - Various datasets: testing and evaluation with different target groups
    - scientific literature in Faceted DBLP (RDF port of DBLP) http://dblp.l3s.de
    - movie database LinkedMDB (RDF dataset with information extracted from OMDB, FreeBase, and others) http://linkedmdb.org/

Several Filter Dials can be Linked
The result sets from the central area can be used for further filtering. In the following example, the left and the right Filter Dial filter subsets of papers from Faceted DBLP. Some of these sets of papers are then used as input for filters in the middle that filter authors by their publications.

"Find any authors that have published on AVI or IV, and who have published papers with one out of various keywords in their title. Only consider papers from 2012 and 2013."

Interaction
The boundaries of each ring section can be freely moved, and ring sections can be inserted and removed by the user in order to examine more attribute values at a time. Likewise, complete rings can be rotated to modify the active combinations of attribute values.

Any such change is directly reflected by the central results area; the results sections get repartitioned and the results count preview is updated on the fly.

Query Generation
When determining the query required to retrieve the size of a given result set, a query generator component invokes the ring sections that are relevant for the respective result set. Each ring section adds its own restrictions to the query.

As we are working with RDF datasets, we are preparing a SPARQL query generator. The concept can, however, just as well be used as the basis for any other query language.

Open Questions
- Integration with other concepts: Can Filter Dials be integrated into other data visualizations, taking advantage of the compact way Filter Dials are displayed?
- Results preview: How can the results area convey more information about the result set than the number of items? Can colors be encoded with a meaning in that area?
- Configuration: Users have to configure filters in dialog boxes; can this be integrated into the visualization?
- Target context: Are Filter Dials useful on mobile, touch-enabled devices?