A Concept-Based Interactive Visualization Approach to Web Image Search

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Overview
The core interfaces of the top search engines have not changed much over the last decade:
- Images are organized in paged grids that support only linear evaluation
- Limited support for refining or enhancing the query

Our work focuses on enhancing the image search experience:
- Automatic query expansion using Wikipedia concepts
- Organization of images based on conceptual and visual features
- Interactive features that support exploration and filtering of the search results
- Interactive query refinement features that support the construction of queries based on concepts and/or example images

Interface Features

Image Search Results View:
- Organize images by their conceptual and visual similarity
- When space is limited, only show images that are representative of the region

Interactive Search Results Exploration

- Linked Focusing
  - Selecting a concept causes all associated images to be highlighted
  - Selecting an image causes the associated concept and other images retrieved based on that concept to be highlighted

- Concept-Based Filtering
  - Unchecking irrelevant concepts removes the associated images from the search results

- Pan & Zoom in the Visual Space
  - Zooming into a region allows more images to be shown that were previously hidden due to space constraints

Interactive Query Refinement

- Concept-Based Refinement
  - Add a concept to Query Panel
  - The concept is expanded as a new query
  - The new search results are organized and displayed

- Image-Based Refinement
  - Add images to the Query Panel
  - Click Search button
  - Retrieve more images for concepts associated with the query images
  - The new search results are organized and displayed