

# A Concept-Based Interactive Visualization Approach to Web Image Search



Enamul Hoque, Orland Hoeber, Minglun Gong  
Memorial University of Newfoundland  
St. John's, NL Canada  
{enamulp, hoeber, gong}@mun.ca



## 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

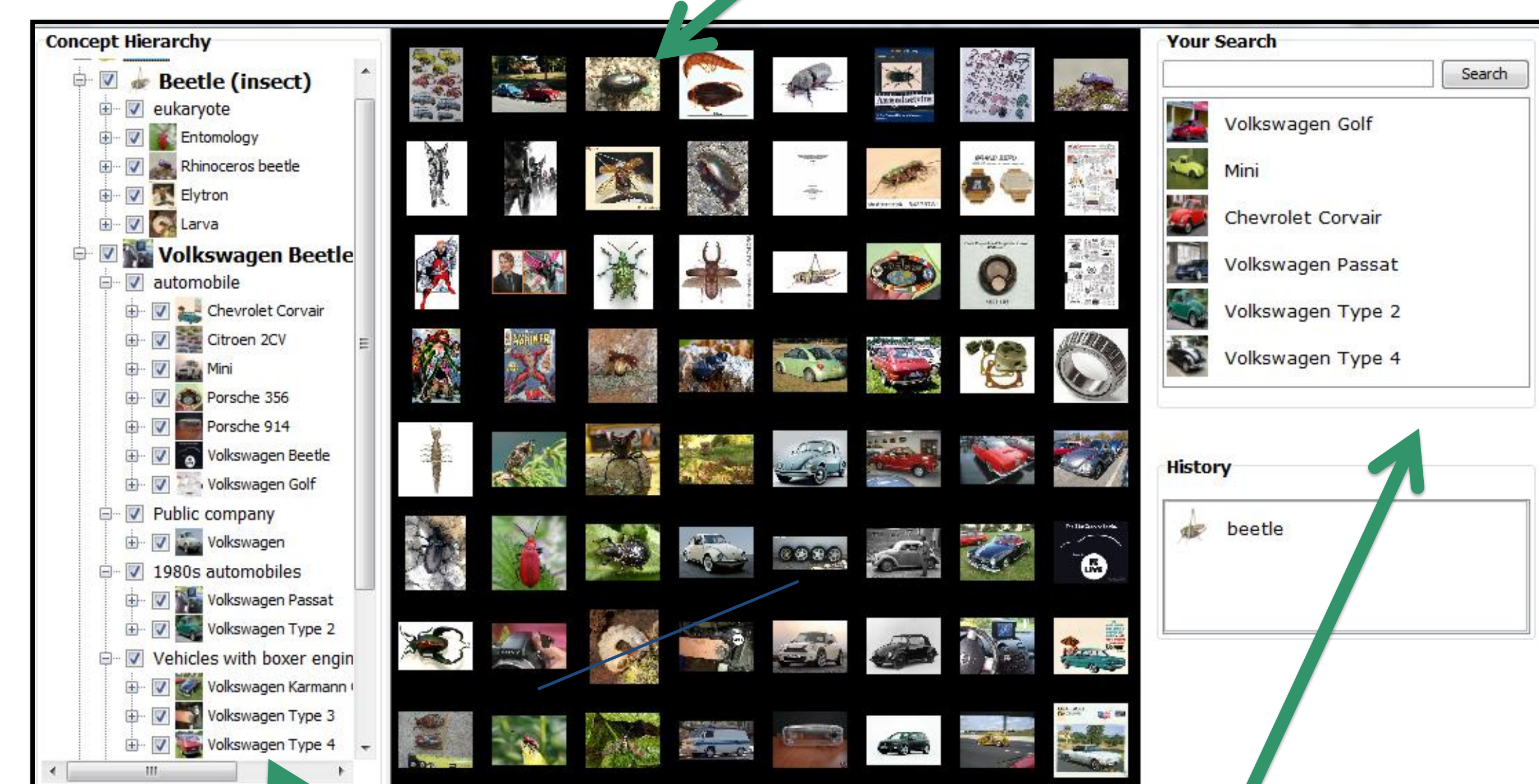
Our work focuses on enhancing the image search experience:

- 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



### Concept Hierarchy:

- Arrange concepts in a tree view

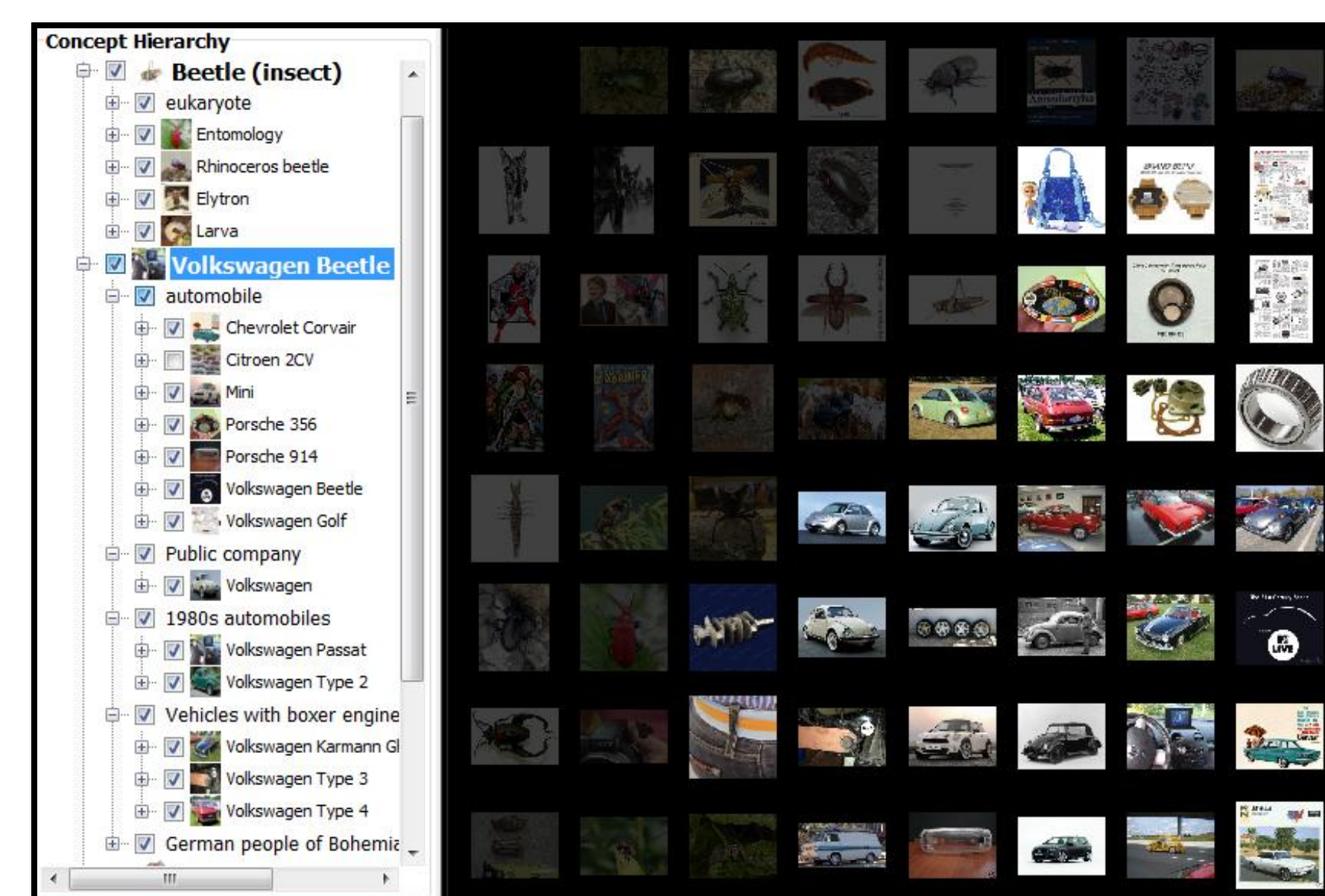
### Query Panel:

- Provide a space where the query can be refined

## Interactive Search Results Exploration

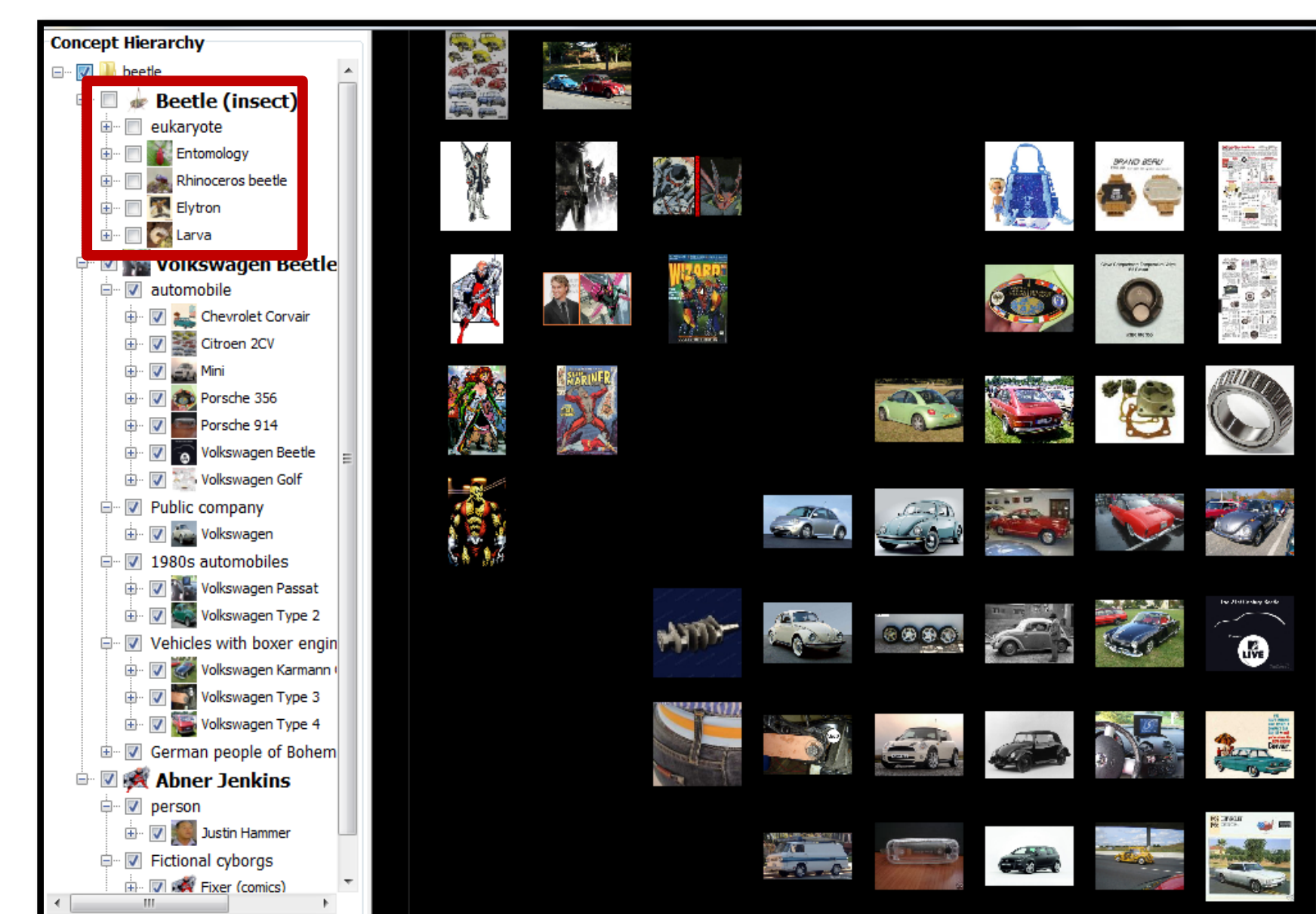
### ➤ Linked Focusing

- 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



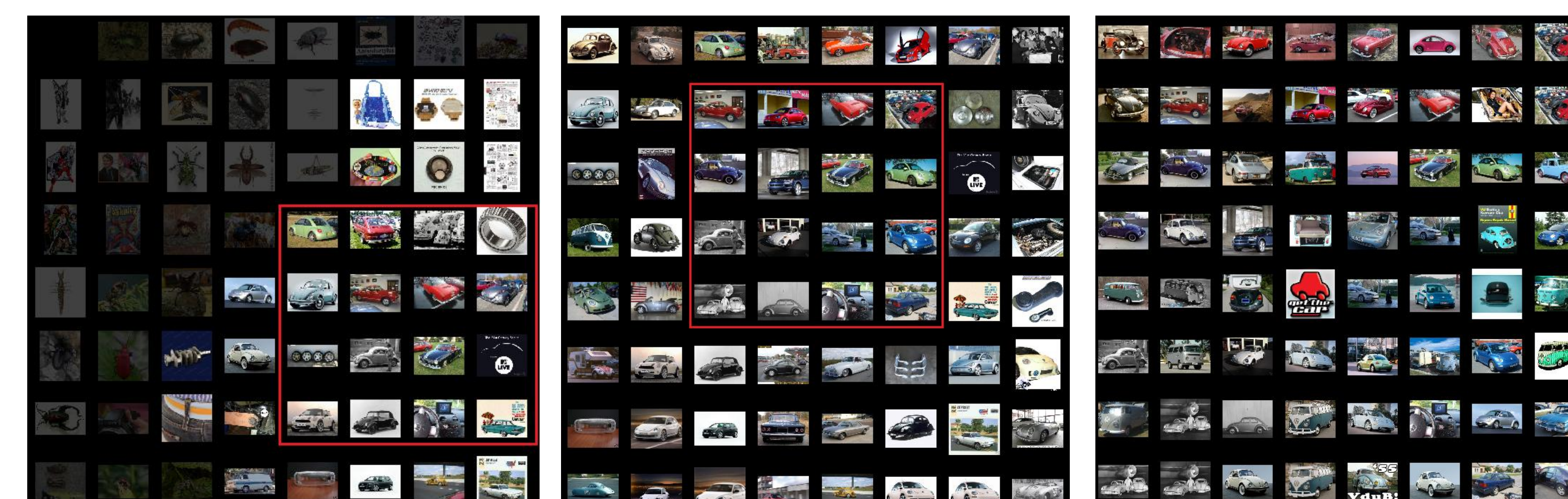
### ➤ Concept-Based Filtering

- Unchecking irrelevant concepts removes the associated images from the search results



### ➤ Pan & Zoom in the Visual Space

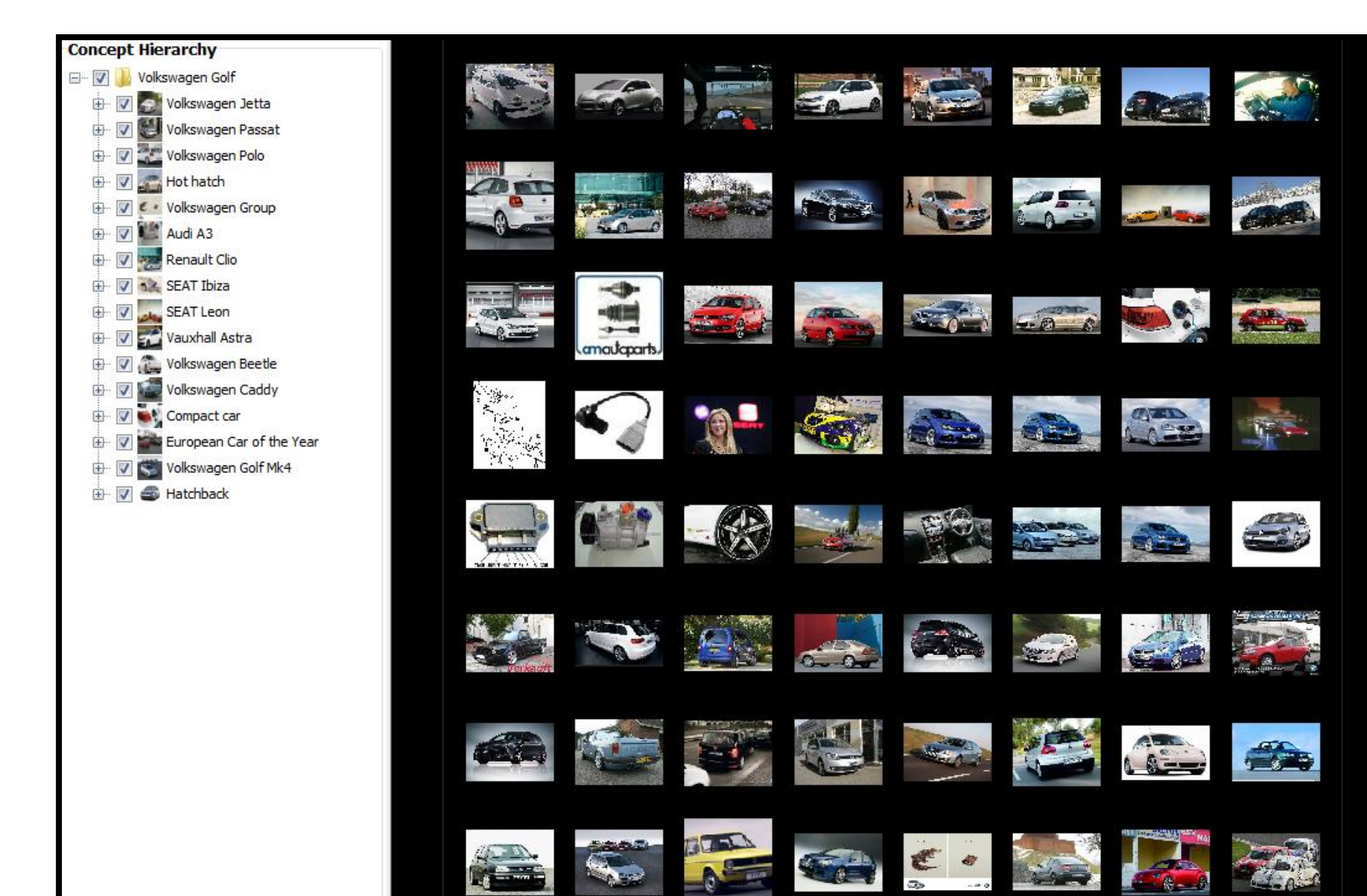
- Zooming into a region allows more images to be shown that were previously hidden due to space constraints



## Interactive Query Refinement

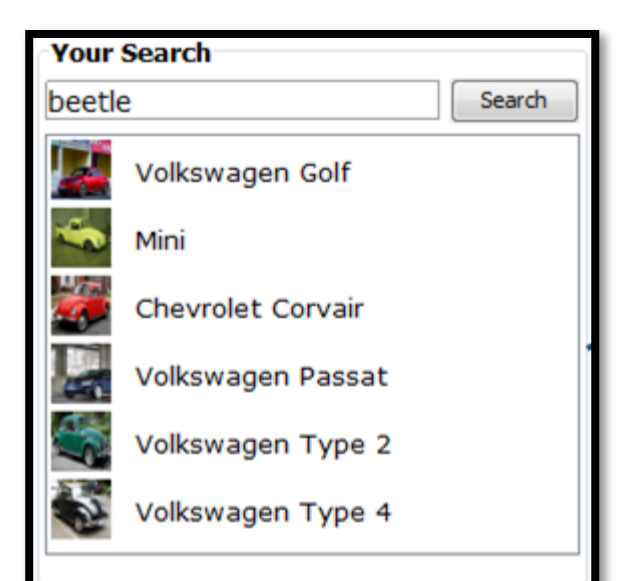
### ➤ Concept-Based Refinement

- 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

