

Semantic Web Navigation Based on Adaptive Views

Karol RÁSTOČNÝ*

*Slovak University of Technology
Faculty of Informatics and Information Technologies
Ilkovičova 3, 842 16 Bratislava, Slovakia
xrastocny@stuba.sk*

The amount of information in web repositories is growing exponentially. This natural evolution affects the number of identified results for user queries, which can decrease the relevance of results. Users can increase the success rate of their query for conventional search engines (like Google or Bing), when they can exactly describe required result with keywords. This problem is quite successfully solved with keyword-based query expansion [3] and with approaches based on exploratory search [1]. But it will often happen that a user has already found the required result and wants to find similar and/or related results. One type of this service is provided by Google Similar, but results offered by this service are only displayed in list view without any information, why they are evaluated as similar (e.g. why the second result for a similar image to cotton bolls photo is the photo of a dog). In our approach we address this problem via view-based search using zoom-based graph navigation.

Our graph navigation approach is based on bachelor work of Adrian Rakovský [2], where the concept of web browsing based on graph visualization was proposed. The main benefit of this approach was that users could see dependencies between the resource (original result) and new results visualized in a graph. Despite the advantages, this approach also introduced new challenges: the visualized graph can quickly grow to enormous size and become unclear and unusable for conventional users. To avoid this we extend this approach with result clustering, facet marking, and adaptation to user interests, next action recommendation and zoom-based navigation. The first three extensions aim to reduce the number of nodes displayed in the graph. The main task of next action recommendation is to help users with orientation in graph with highlighting of nodes, with which other users interactive under similar conditions. Our zoom-based navigation approach offers four types of graph visualizations: literal attributes graph view, object attributes graph view, restricted RDF graph view and full RDF graph view. These visualizations gradually increase the detail of displayed information (see Figure 1).

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Users employ different strategies to find and explore information on the Web such as lookup, learning and investigation [1]. These kinds of user search activities cannot be easily separated as they are often performed in succession. When users start searching for information they do not know the information space very well. Users then often redefine queries while learning about the identified results. Once users have found the desired results and learned basic information about them, they often switch to browsing of related resources (e.g., when a user finds a painting, he often explores its author), so they need support for navigation in them. We address this problem via navigation based on adaptive views that helps users navigate from searching to browsing among related and similar results. This navigation starts with hierarchical cluster-based result browsing, where we display results of a faceted browser classified in hierarchical clusters. After identification of the desired results, details about them are displayed in adaptive item details view and lastly discoverable via zoom-based graph navigation.

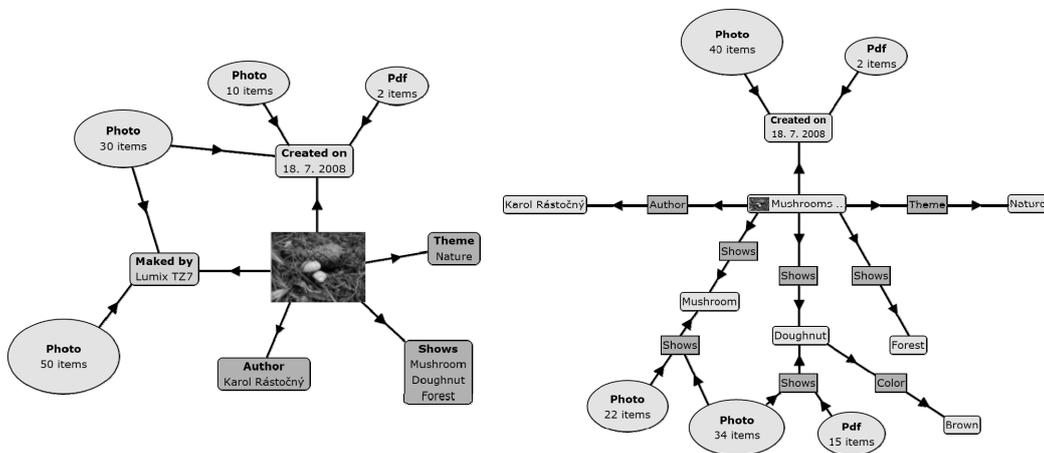


Figure 1. Visualization of object attributes graph (on the left) and RDF graph (on the right). Object attributes graph contains less nodes and is better readable, but RDF graph allows users to change context and shows attributes of objects in values of the original object's attributes.

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References

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