

Image Search 2.0

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ABSTRACT

This abstract sketches my PhD research towards establishing a generic mechanism for exploiting social intelligence for next-generation image search.

Categories and Subject Descriptors: H.3.3 Information Storage and Retrieval: Information Search and Retrieval
General Terms: Algorithms, Experimentation, Performance

Keywords: Image search, big social data

1. PROBLEM STATEMENT

Image search is crucial for users with varying sorts of information needs. Applications of image search include personalized information delivery, cultural heritage preservation, knowledge representation, and forensic intelligence, to name just a few. The problem is scientifically challenging due to the famous semantic gap problem.

Traditionally, research on image search focuses on ingredients ranging from robust representation of visual content, semantic-sensitive visual rankers, to user-friendly visualization of search results. In this tradition, which we term *Image Search 1.0*, the image data itself is seldom recognized as the source of innovation. However, the world has started to collect massive amounts of user-generated data online. Social image tagging is making a profound impact on the way people manage and access visual content. We hypothesize the proliferation of social data will reshape research on image retrieval. After all, it is not just a matter of big data. Intellectual approaches are essential to conquer the ambiguity, unreliability, and sparseness of social tagging, and to aggregate the immense miscellaneous information scattered in the social web.

The main goal of my PhD research is to study the value of big data on the social web, to gain insight into their visual nature, and to obtain universal knowledge from the data for semantic understanding of visual content, for free. We term this *Image Search 2.0*.

2. APPROACHES AND PROGRESS

Given the subjective nature of social tagging, interpreting the relevance of a social tag with respect to the visual content is crucial for the effective exploration of social data. We propose a neighbor voting algorithm which accurately and efficiently learns tag relevance by accumulating votes from

visual neighbors [3, 5]. In our best paper awarded work [6], we extend the algorithm to fuse multiple tag relevance estimates driven by diverse features. We clean up social data by tag relevance learning, and leverage them for tagging unlabeled images [4].

To bridge the semantic gap for retrieving unlabeled images, we need both positive examples and negative examples for obtaining visual classifiers. Along with our tag relevance learning approach to harvesting positive examples [5, 6], we study how to harvest negative examples from the social web [2, 8]. We show the potential of data-mining informative negative examples without the need of extra manual annotation [8].

Grounded on the above work, we initiate an image search engine which searches for the co-occurrence of multiple visual concepts in unlabeled images, fully driven by social data [7]. We study personalizing image annotation with respect to a user's multimedia tagging history [1]. We consider these two pieces of work as important steps towards answering complex queries for personalized image search.

In sum, this research aims to reveal the value of social multimedia, providing a generic mechanism to exploit social intelligence for image search.

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3. REFERENCES

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