

A Relational Vector-Space Model of Information Retrieval Adapted to Images

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The increase of digital image acquisition devices, combined to the growth of the Web, requires the definition of Information Retrieval (IR) models and systems providing fast access to images searched by users among large amounts of data.

The aim of our work is to define an IR model suited to images, integrating a rich semantics for representing these visual data as well as users' queries, while allowing the application to large corpora.

Our proposition merges the vector space model of IR – a widely tested model in textual IR – with Conceptual Graphs (CG) formalism, based on the use of star graphs (a star graph is an elementary CG made up of a single relation connected to some concepts representing image objects) as image descriptors.

A novel weighting scheme based on:

- objects size, i.e. their relative surfaces in the image,
- objects position, i.e. their distances to the centre of the image,
- and image heterogeneity, i.e. the overall complexity of the image objects distribution

is defined for star graphs, and carefully validated in the experiments.

We show that integrating relations into the vector space model through star graphs increases the system precision, and that the results are comparable with graph projection systems, while decreasing the processing time for users' queries.