

SEMANTIC MATCHING AND ANNOTATION OF IMAGES BY SELF-ORGANIZING MAPS

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ABSTRACT. Image retrieval has attracted lots of attention from both researchers and practitioners. Different methodologies as well as commercial systems have been proposed and developed to tackle this task. Most of these systems are based on one or both of two major image retrieval schemes, namely annotation-based image retrieval and content-based image retrieval. The former is simple and accurate, provided some annotations have been added to the images. However, such annotations are often missed in most of images available in large datasets such as the WWW. To tackle this deficiency, we propose a method that could automatically annotate images with some keywords that could feasibly describe the semantics of the images. A set of training images as well as their annotations are trained to find the relationships between images as well as between keywords. New image could then be annotated and retrieved according to such relationships. Our preliminary experiments suggest promising result in both image annotation task and image retrieval task.

Keywords: Image annotation, Image retrieval, Self-organizing map

1. **Introduction.** Recently the task of image retrieval has received a great deal of attention from the web community since there are so many useful images on web pages. In fact, image retrieval has been studied for decades in library science and computer science communities. Image retrieval is a branch of information retrieval whose task is to retrieve some pieces of information (the *documents*) to meet a user's information needs according to certain (semantic) relevance measurements. Currently most information retrieval systems retrieve documents based on their 'contents'. That is, they measure the relevance between the query and a document according to internal representations or derived features. Such representations or features will vary for different document styles and retrieval schemes. For text retrieval systems, the contents are often represented by a set of selected keywords that are intended to capture the semantics of the documents. Many studies have successfully represented the semantics of text documents [1]. For image retrieval systems, the representation of image content generally fall into two types. The first is to represent an image with a set of keywords that could describe the content of the image. Such keywords are used as annotations for an image and thus we may call this type of representation scheme the annotation-based image representation and call the task of retrieval by annotation the annotation-based image retrieval. The other representation contains a set of visual features extracted from the image that hopefully may