International Journal of Innovative
Computing, Information and Control
Volume **5**, Number **3**, March **2009**

ICIC International ©2009 ISSN 1349-4198
pp. 763–771

# A SIMILARITY MEASURING METHOD FOR IMAGES BASED ON THE FEATURE EXTRACTION ALGORITHM USING REFERENCE VECTORS

Asako Ohno[1] and Hajime Murao[2]

[1]Graduate School of Cultural Studies and Human Sciences
[2]Graduate School of Intercultural Studies
Kobe University
Tsurukabuto 1-2-1, Nada, Kobe, 657-8501, Japan
asako.ohno@mulabo.org; murao@i.cla.kobe-u.ac.jp

Received February 2008; revised July 2008

Abstract. *We propose a similarity measuring method for images based on our proposed feature extraction algorithm. The method extracts features of an image indirectly by utilizing a number of reference images. Most of proposed methods, categorized as Content-Based Image Retrieval, extract features from images by utilizing image analysis. Results of those methods do not always suit well to users' demands, since a definition of a similarity differs according to aims of retrievals or users' preferences. However, it is difficult for an user to extract features from an image in a different perspective without any special knowledge. In our method, a feature vector is calculated as a quantified value which approximates correlations in difference matrices each of which is generated from an image and one of reference images. Thus, users can easily change a feature space to represent features of images by selecting different reference images. This significant characteristic of the method is expected to be effective to achieve a similarity measurement for images based on users' demands. In this paper, we give a detailed illustration of our method and evaluate its performance through experiments.*
**Keywords:** Image similarity, Reference vector, Subjectivity, User's demand

1. **Introduction.** In recent years, Content-Based Image Retrieval (CBIR) is becoming popular as an alternative to the metadata-based image retrieval. The metadata-based image retrieval achieves a quick retrieval but it is difficult and a time-consuming work to provide an appropriate metadata to all images in a common format. Amagasa, et al. half-automated the metadata producing process. They utilized feature vectors extracted from an image by wavelet transform and chose appropriate keywords for the image [1]. The method is effective only against for specific image databases; an user is required to be conversant with a database to choose a query image which has keywords which indicate the user's intended image.

In CBIR, many of proposed methods quantify features of an image by image analysis such as the wavelet transform or the fractal image encoding to obtain its approximation. A major issue of CBIR is how to extract essential information among redundant information as features from an image and represent them as lower dimensional feature vectors. Oh, et al. proposed a method which extracts chromatic and texture information from an image by the wavelet transform; a self-organizing map is also applied to compress dimensions of the feature vectors [2]. Jacobs, et al. compared quantized wavelet coefficients that commonly appeared in a query and target images [3]. Yokoyama, et al. proposed a method which used contractive mapping information of an image contained in compressed code obtained by the fractal compression to represent structural features of images [4]. Zhang, et al.