Information fusion between short term learning and long term learning in content based image retrieval systems

**Esmat Rashedi · Hossein Nezamabadi-pour ·
Saeid Saryazdi**

Abstract Content based image retrieval (CBIR) systems could provide more precise results by taking the user's feedbacks into account. Two types of the relevance feedback learning paradigms are short term learning (STL) and long term learning (LTL). By using both STL and LTL, a collaborative CBIR system is proposed in this paper. The proposed system introduced three fusion methods: including fusion in retrieved images, fusion in ranks, and fusion in similarities to make cooperation between STL and LTL. The proposed fusion methods are examined in a CBIR system equipped with a proposed statistical semantic clustering (SSC) method of LTL. The SSC method works based on the concept of semantic categories of the images by clustering techniques and constructing a relevancy matrix between images and semantic categories. The results of the SSC method with the suggested fusion methods are compared with two state-of-the-art LTL methods, namely virtual feature based method and dynamic semantic clustering. Comparative results confirm the efficiency of the proposed method. Furthermore, experimental results demonstrate that for a unique LTL method, various fusion methods lead to different results.

Keywords Content based image retrieval · Relevance feedback · Short term learning · Long term learning · Information fusion · Similarity function

1 Introduction

Due to the huge advances in information technology and the availability of the storage capacity for storing image datasets, there is an increasing demand for image management tools. Content-based image retrieval (CBIR) is one of the important research topics in the field of pattern recognition and machine vision. CBIR is the process of retrieving desired images from image datasets [1, 19, 34]. In the practical applications, the desire of the CBIR systems is the high precision as well as the fast response to the users.

E. Rashedi (✉) · H. Nezamabadi-pour · S. Saryazdi
Department of Electrical Engineering, Shahid Bahonar University of Kerman, P.O. Box 76169-133, Kerman, Iran
e-mail: e.rashedi@kgut.ac.ir

H. Nezamabadi-pour
e-mail: nezam@uk.ac.ir

 Springer