Object Class Recognition using Combination of Colour Dense SIFT and Texture descriptors

Taha H. Rassem*
Faculty of Computing
College of Computing and Applied
Sciences
Universiti Malaysia Pahang
tahahussein@ump.edu.my

Nasrin M. Makbol
School of Electrical and Electronic
Engineering
Universiti Sains Malaysia
Penang, Malaysia
Nasrin_makbol@usm.my

Bee Ee Khoo
School of Electrical and Electronic
Engineering
Universiti Sains Malaysia
Penang, Malaysia
beekhoo@usm.my

ABSTRACT

Object class recognition has recently become one of the most popular research fields. This is due to its importance in many applications such as image classification, retrieval, indexing, and searching. The main aim of object class recognition is determining how to make computers understand and identify automatically which object or scene is being displayed on the image. Despite a lot of efforts that have been made, it still considered as one of the most challenging tasks, mainly due to inter-class variations and intra-class variations like occlusion, background clutter, viewpoint changes, pose, scale and illumination. Feature extraction is one of the important steps in any object class recognition system. Different image features are proposed in the literature review to increase categorisation accuracy such as appearance, texture, shape descriptors. In this paper, we propose to combine different descriptors which are dense colour scale-invariant feature transform (dense colour SIFT) as appearance descriptors with different texture descriptors. The colour completed local binary pattern (CCLBP) and completed local ternary pattern (CLTP) are integrated with dense colour SIFT due to the importance of the texture information in the image. Using different pattern sizes to extract the CLTP and CCLBP texture descriptors will help to find dense texture information from the image. Bag of features is also used in the proposed system with each descriptor while the late fusion strategy is used in the classification stage. The proposed system achieved high recognition accuracy rate when applied in some datasets, namely SUN-397, OT4N, OT8, and Event sport datasets, which accomplished 38.9%, 95.9%, 89.02%, and 88.167%, respectively.

KEYWORDS

Object class recognition, Feature extraction, Scale-invariant Feature Transform (SIFT), Colour Completed Local Binary Pattern (CCLBP) and Completed Local Ternary Pattern (CLTP)