Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 125 (2018) 93–98

Procedia Computer Science

www.elsevier.com/locate/procedia

6th International Conference on Smart Computing and Communications, ICSCC 2017, 7-8 December 2017, Kurukshetra, India

Region-based Segmentation of Social Images Using Soft KNN Algorithm

Seema Wazarkar*, Bettahally N. Keshavamurthy, Ahsan Hussain

National Institute of Technology Goa, Ponda 403401, India

Abstract

Social image data is very useful to solve many real world problems. In this paper, a novel soft classification approach is proposed to deal with the problem of vision segmentation in social networks. Proposed approach is inspired by the k-nearest neighbour and soft classification concepts. K-nearest neighbour is one of the popular and simplest classification algorithms. Soft classification has provision for assigning more than one class label to a single object. Here, soft classification concept is incorporated in k-nearest neighbour algorithm to detect the ambiguous regions of the image. Experimentation is carried out on the images collected from social networks. Three social image datasets i.e. synthetic, standard and real-world are used. Proposed approach performed much better as compared to the traditional k-nearest neighbour approach. It is useful for accomplishing various tasks like fashion analysis, emotion detection, event detection, etc. through object detection and recognition.

Peer-review under responsibility of the scientific committee of the 6th International Conference on Smart Computing and Communications.

*Keywords:*Image segmentation; Soft k-nearest neighbor; Social images

1. Introduction

Social images collected from popular social networks like Facebook, Twitter, Flickr, etc. provide very precious information. These are utilized further for the betterment of business, government and many more other fields. Social images are analyzed to extract important information [1]. Analysis of interest region provides useful regions. It is possible to get the interesting regions by segmenting the given image. Image segmentation is a process of

* Corresponding author.
*E-mail address:*wazarkarseema@nitgoa.ac.in

1877-0509
Peer-review under responsibility of the scientific committee of the 6th International Conference on Smart Computing and Communications
10.1016/j.procs.2017.12.014

partitioning of an image into meaningful structures or regions on the basis of similarities among pixels. Image segmentation follows following properties [2]:

- Pixels from the same region have similar greyscale of multivariate values.
- Adjacent pixels present in different regions have different values.

Threshold-based, edge-based and region-based are the general categories of the image segmentation. Threshold-based segmentation is performed by allocating pixels to a particular region on the basis of range of values where a pixel value fits. In edge-based segmentation, pixels are categorized as edge or non-edge by applying edge filter ongiven image. Here, pixels which are not partitioned by an edge are assigned to the same region. Region-based segmentation approach groups neighbouring pixels with similar values and splits groups having distinct pixel values iteratively.

Soft classification approaches are useful while segmentation of image to deal with the ambiguous regions in image. It is a process of assigning data points to more than one class on the basis of similarities found among them [3].

In this paper, Soft K-Nearest Neighbor (S-KNN) approach is applied for the social image segmentation. Proposed approach is a region-based segmentation as it follows iterative process for assigning similar neighboring pixels to the same region and vice versa. Experiment is performed on three datasets i.e. synthetic, real-world and standard. Our contribution is given as follows:

- S-KNN method is proposed for region-based segmentation of the social images.
- Experiments are performed on three different datasets having social images.
- Real-world applications of the proposed system are provided.

Remaining paper is organized as follows: In Section 2, related work is provided. Proposed work is presented in Section 3. Then, experimental results are discussed in Section 4 and paper is concluded with future work in Section 5.

2. Related work

Research work carried out in image segmentation mainly includes areas like medical [4, 5] (e.g. brain, tissues, nerve cells, etc. images), remote sensing [6] (e.g. forest, agricultural area, etc. images), object detection [7] (e.g. face detection), etc. Some of the key existing methods are discussed below:

Fuzzy c-means clustering i.e. soft approach is applied by Schafer et al. [5] to detect nerve cells through image segmentation. Fuzzy approach is useful in order to deal with uncertainty in given data. Senthil kumaran et al. [8] studied soft computing approaches such as fuzzy, neural networks and evolutionary (genetic algorithm) approaches for image segmentation. S. N. Kumar et al. [9] also used fuzzy c-means for segmentation of abdomen CT images. As fuzzy c-means does not use the spatial information from the image fully, fuzzy c-means with spatial information is applied by the Chuang et al. [10] for segmentation of MRI images.

Soft fuzzy rough set-based approach is proposed by A. Namburu et al. [11] for the segmentation of MR brain images. It extracts white and gray matter as well as cerebro spinal fluid from the MR brain image. This techniqueis evaluated by comparing its performance with k-means, rough k-means, fuzzy c-means, rough fuzzy c-means and other hybrid techniques. This algorithm is also performed well while extraction of tumor present in the brain tissue.

Acharyya et al. [12] presented a hybrid method based on wavelet and neuro-fuzzy concepts for segmentation of remotely sensed imagery. M-band wavelet decomposition is used to get the efficient representation of image in the form of frequencies at different directions, orientations and resolutions. Then, neuro-fuzzy algorithm is applied to evaluate and select obtained wavelet features. For experimentation two four-band images collected from Indian remote sensing 1A satellite are used.