



Various Feature Extraction Techniques in Image Categorization: Survey

Nidhi, Vanshikha Gupta

Assistant Professor, Dept. of C.S, JMIT Radaur, India

M.Tech Student, Dept. of C.S, JMIT Radaur, India

ABSTRACT: Image categorization refers to the labelling of images into one of several predefined categories. Classification of remotely sense data is used to allocate corresponding levels with respect to clusters with homogeneous characteristics, with the aim of discriminating multiple object from each other within the image. Classification contains a broad range of decision-theoretic approach to the detection of images. All classification algorithms are based on the hypothesis that the image in question describe one or more features and that each of these features belong to one of numerous distinct and exclusive classes. There are various methods to classify images and they provide good classification results. Content mainly deal with colors, textures and shapes. The estimation of the effectiveness of keyword image search is subjective and is very time-consuming.

KEYWORDS: Image Categorization, Feature Based Image Classification, Weighted Classifier, Feature Extraction.

I. INTRODUCTION

Every day millions of images produced. Every image requires classification, By which they can occur easily and in a higher speed. Humans have the capabilities to classify the images more easily than computers. A simple categorization system consists of a camera fixed high above the interested zone where images are captured and consequently process [1]. Classification is a procedure to classify images into several categories, based on their similarities. Early time Categorization systems were developed to seek out databases for images on basis of color, texture and some other information. Categorization system consists of database that contains predefined patterns that compares with detected object to categorize in to accurate category. Image categorization is an important and challenging duty in a variety of application domains, including biomedical imaging, biometry, video surveillance, vehicle navigation, industrial visual inspection, robot navigation, and remote sensing.

II. RELATED WORK

A simple categorization system consists of a camera fixed high above the interested zone, where images are captured and accordingly processed. Categorization system consists of database that contains predefined patterns that compares with detected object to categorize into proper category. Image categorization is an important and challenging task in different application domains, including biomedical imaging, biometry, video surveillance, vehicle navigation, industrial visual inspection, robot navigation, and remote sensing [10]. Toward a general categorization model, spatial pyramid matching (SPM) is developed that can reflect the rough image geometric properties. Some researchers pointed out that the k-means codebook in SPM is not sufficiently descriptive. Therefore, sparse coding [2] and locality preservation [3] techniques are designed to learn the codebook. Systems were developed when system was used to explain experiments for images categorization based on the colors and shapes. After that process has been started to categorize images based on their features. Techniques, algorithms and tools are used to take place from the field. The primary goal is to build up machine that is capable in the management of images. Human society are taking essential steps to make it a top real world technology. It can be thought of as a hypothetical shift for the further generation in the field of image categorization. Now the main aim is how this technology can progress so that the common person can use it in the same sense that of text based images. We can take example of Google, Gmail. We can see that such of these sites are being used aggressively because of their unlimited benefits. Now we can think of similar success for the image categorization if both researchers and the human being both will take essential steps toward it.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

However there is a slight difference between the growth level of the text based and the content based image categorization.

For the text-based images search-engine like Google successfully retrieves documents without content understanding, which is not an easy way for the user. Most algorithms have failed to correctly find its higher level concept. Problem related with algorithms is dependency on optical similarity in judging semantic relationship. However, semantic match can be thought of as a higher subjective measure [5]. Now several categorization techniques have become available.



Fig: 1 Steps for Image Classification

Thus overall we can conclude that the image categorization proved to be very helpful for us. Because it saves our both time and cost.

III. IMAGE CATEGORIZATION METHODS

Two types of the image categorization methods are used basically:

--- Text Based Image Categorization

---Content Based Image Categorization

A. Text Based Image Categorization

Numerous types of the image databases are available on the web like yahoo image and Alta Vista Photo Finder. Great Web search engines allow image categorization using keywords. These databases are able to index many different images and to do extremely well them at different queries. Concepts of Text Based Image Categorization can also be applied to images [6].

B. Content Based Image Categorization

It is basically the process of categorizing the images from the Meta data or from the database. It is generally performed on the basis of textures, shapes and color [7].



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

IV. SEARCH TYPES

Major obstacle in the image categorization research is because of the lack of quantitative criteria for the comparison of algorithms. Over the search extent, the statistics are presented [8]. We can take example of the number of images that were observed prior to an image found, and that was accurately “analogous” to a required image. We can categorize image searches into the following categories [9].

A. Target Specific Research

It mainly involves the process of retrieving exact target image from the image databases. Searching process continues till the final image is not found in the image database. This type of category is very helpful for the testing purpose [9].

B. Category Search

A category image put up by the user such as cats, dogs. However the same finding criteria will be used that of the target specific research.

V. FEATURES EXTRACTION TECHNIQUES

A. Low Level Based Feature:

The low level based feature is mainly the most significant feature of the Categorization system [21]. Image extraction can be done either from the entire area or from the region. Basically the Categorization system is based upon the regions. So generally people deals with the regions basically. Global level retrieval is mainly a very simple task over the process of the image retrieval. Global level retrieval is mainly a very simple task over the process of the image categorization.

B. Color Based Features:

Color level feature is the most generally used feature in the area of the image retrieval. There is a enormous accessibility of the color spaces and the varieties of color are presented on different sectors. Throughout the image feature, image can be easily detected by the person. It relies on the property of the light reflection and the brain processing. There has been the improvement of the system based on the textures and the color features [22]. To determine the texture feature statistical texture methods are used. For the color feature RGB color histogram is used mostly [23].

C. Textures Based Features:

This is one of the secret quality. Texture based basically provides numerous types of the real world images. For the texture based feature Gabor filtering, wavelets transforms, Scale Invariant Feature Transform etc are used basically for extracting the image feature[24]. Gabor filter and the wavelet transforms are mainly designed for the rectangular images.

D. Miscellaneous:

The most popular way to search huge collections of images and video which are generated daily in a great amount is realize by keywords and meta tags or by browsing them [4]. Galleguillos et al. [11] proposed an algorithm that uses spatial context information to categorize image. The input image was first segmented into regions and each region was labelled by a classifier. Then, spatial contexts were used to correct several of the labels based on object co-occurrence. The outcome shows that combining co-occurrence and spatial contexts improves the categorization performance. Supervised methods [6],[12] guess the saliency map using a classifier which is trained with samples for which saliency is well categorized. Marchesotti et al. [13] trained a classifier each target image using the images most similar to an annotated database for saliency detection. The basic hypothesis is that images sharing a worldwide similar visual look are expected to share similar saliencies. This supervised saliency detection wishes a very large well labelled database, which is not simple to obtain.

VI. CONCLUSION

This paper defines the mixture of all the feature extraction like low level features, color based features and texture based features. With the growth of technology, more images come into analysis and have become a part of our daily life. There is a Sabundant range of applications which require image processing tools.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

REFERENCES

- [1] Pooja Kamavisdar, Sonam Saluja, Sonu Agrawal. "A survey on image classification approaches and techniques", Department of Computer Science & Applications, SSCST, Bhilai, India, IJARCCCE, Vol 2, Issue 1, Jan 2013.
- [2] H. Lee, A. Battle, R. Raina, and A. Y. Ng, "Efficient sparse coding algorithms," in Proc. NIPS, 2006, pp. 801-808.
- [3] J. Yang, K. Yu, Y. Gong, and T. Huang, "Linear spatial pyramid matching using sparse coding for image classification," in Proc. CVPR, Jun. 2009, pp. 1794-1801.
- [4] A. Akusok, Y. Miche, J. Karhunen, K. Bjork, R. Nian, A. Lendasse, Arbitrary category classification of websites based on image content, Comput. Intell. Mag. IEEE 10 (2) (2015) 30-41, doi:10.1109/MCI.2015.2405317.
- [5] Content-Based Image Retrieval - Approaches and Trends of the New Age Ritendra Datta Jia Li James Z. Wang The Pennsylvania State University, University Park, PA 16802, USA.
- [6] Text and Image Metasearch on the Web.
- [7] Image Categorization Using Colour Strings Comparison Kommineni Jenni¹², Satria Mandala^{123*}, Mohd Shahrizal Sunar²³.
- [8] Introduction to Query Techniques for Categorize Systems International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-1, March 2012.
- [9] M. Jankovic, G. Zajic, V. Radosavljevic, N. Kojic, N. Reljin, M. Rudinac, S. Rudinac, B. Reljin, "Minor Component Analysis (MCA) Applied to Image Classification", Eighth Seminar on Neural Network Applications in Electrical Engineering, IEEE, pp. 11-16, 2006.
- [10] Swapna R. Kharche, Prof. B.K. Chaudhari, "A survey on Saliency Driven Nonlinear Diffusion Filtering for Classifying Image Using Multi-scale Information Fusion" International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE), Vol. 4, Issue 2, February 2016.
- [11] Galleguillos, A. Rabinovich, and S. Belongie, "Object categorization using co-occurrence, location and appearance," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit, Jun. 2008, pp. 1-8.
- [12] P. Gehler and S. Nowozin, "On feature combination for multiclass object classification," in Proc. IEEE 12th Int. Conf. Comput. Vis., Oct. 2009, pp. 221-228.
- [13] L. Marchesotti, C. Cifarelli, and G. Csurka, "A framework for visual saliency detection with application to image nailing," in Proc. IEEE 12th Int. Conf. Comput. Vis., Oct. 2009, pp. 2232-2239.