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A Review: Diverse Techniques in Object Retrieval

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Abstract: ***In order to assist the user for the correct image retrieval from large corpus, distinct techniques were used to improve the performance, quality and accuracy of an image. We present the overview from BoW model to multiple query images to give enhanced results. It addresses prominent issues of the past times and existing. The foundation of an image retrieval initiated with the process of retrieving keywords. The user enters the query object which is nothing but a query image and then the system returns a list of images.***

Keywords: Image Retrieval; BoW model; group query

I. INTRODUCTION

There is abundant number of images on the web (world-wide-web) and many more are still increasing (such as the most popular ones are www.facebook.com , www.flickr.com). So retrieving the images which are relevant for users demand from such a huge database is a crucial task and for this the usage of discriminative vocabulary is essential [7]. The problem here is related with applications in Web image retrieval, mobile visual search (to find an image), or auto-annotation (automatic image annotation or image tagging). Dataset is plentiful with a variety of images with its object type such as landmark buildings like most popular Eiffel tower (France), leaning tower of Pisa (Italy), scenery, or other 3D objects. There are diverse reasons due to which an image may fail while retrieving that comprises of**:** noisy descriptors, descriptor quantization and others [6]. In query retrieval methods, a query is nothing but an "a bag of" which consists of visual words from different users viewpoints [2]. Our interest lies in retrieving the object which is specific from the image database. The dataset used for retrieval purpose are Oxford 5k, Paris, and Oxford 105k.

II. BAG-OF-WORDS(BOW)MODEL

Searching an image from the large scale corpus is a challenging job. This methodology earlier aimed for text retrieval and then adapted by computer vision. It gives out awesome performance for image classification, CBIR (Content Based Image Retrieval). The representation of the image is using term frequency inverse document frequency (tf-idf) weight vectors. Numerical vectors of the feature representation are feature descriptors. Spatial relationships are ignored in this model. Visual word carries information related to color changes, texture changes etc. Popular search engines use the Bag-of-visual-words which are the collection of visual words. SIFT (Scale-Invariant Feature Transform) is used as a descriptor which converts into 128 dimensional vector each patch. Using RootSIFT is encouraged over SIFT due to its high benefits like simple implementation and cheap cost-wise [4]. State-of-the art large scale image retrieval in real time adopting BoW model and it result in term of accuracy of the retrieval image. Spatial properties are not supported for local descriptors which are given by BoW. This BoW architecture is successful in achieving high precision at low recall.

III. Soft and Hard Assignment.

Soft assignment (SA) is also referred to as a visual word. It transforms local descriptor to histograms. The features of an image said to be identical if they are assigned to same visual word in the same cluster. Variations are like noise in the image, due to which the feature descriptor of the hard assignment leads to errors. The distortions in an image may change the value of the descriptor. Soft assignment gives away good results. The problem of failing image is by addressed by soft-assignment. Each descriptor in hard assignment is associated to the nearest visual word in the given dictionary. Gaussian Mixture model is an approach used by soft assignment [7]. Soft assignment relieves the problem induced by descriptor quantization.

A. TF-IDF weighting

This is the standardised weighting tactic known as Term frequency-inverse document frequency. Visual words should lower weights for having similarity between images. There is a possibility of some visual words not been stable. It's actually working is like determining relative frequency of the specific document, comparing with the inverse proportion of the word. This scheme is generally been redesign for soft clustering [7].

B. Spatial Re-ranking

It perfectly identifies the relevant images [2]. Re-ranking of images based on spatial consistency highly improvises the retrieval system along with the query. Computationally spatial consistency is expensive. For every individual query re-ranking is been performed on top *R* results using the queried image. Progressing from hard to soft assignment, one feature may have more than one visual word.

TABLE I

No	Image Retrieval		
	Retrieval Methods	**Contents**	**Related with**
1	Keyword Based	It uses text to retrieve the content of the image	Field based depending upon the paring of the fields
2	Content Based	Contents can be colour, texture	Images related with web depend on metadata.
3	Ontology based	Indices are used as file names for image searching	It depends on human-annotations

IV. Different Ways of Query Expansion.

A. Query Expansion (QE)

Text retrieval uses a common strategy that is Query expansion [2]. For enriching the BoW model in image retrieval it can be adapted. Affine invariant interest regions called features are detected for each image in the dataset. Visual word occurrences are represented as sparse vector of the query in the corpus. Well performing and uncomplicated way is the average query expansion. AUG (augmentation) is a supplement to the QE. Limitation of QE is that it depends on the query to generate a enough number of high precision results to be placed in the beginning. Automatic query expansion gave out boosting performance [2].

B. Average query expansion (AQE)

It is simple as well as well performing method [2]. For a given query region ranking is done using tf-idf scores. The number of document descriptor can be averaged with the help of new query construction [7].

C. Discriminative Query Expansion (DQE)

This method exceeds than Average query expansion. Complexity during implementation is somewhat increased. DQE is recommended to use instead of AQE as it is one hand upper. Automatic collection of positive and negative samples is done by query instances.

V. TECHNIQUES AVAILABLE QUERY RETRIEVAL

A new concept here is established i.e. a 'Group Query'. Grouping of multiple queries is done. For quick retrieval learnt weight vectors should be sparse. Discriminative Ranking is suitable for multiple group queries images and also can accommodate various set of images as it uses positive samples. Methods supporting BoW model find it difficult in capturing the various appearance of the query object.

A. Support Vector Machine (SVM)

These are supervised learning model in machine learning.Support Vector Machines (SVM) are used for the classification of images, the results show that they achieve higher accuracy than traditional methods. They are associated with learning algorithms that analyze and also recognize the patterns. Degradation of linear ranking is there due lower quality objects. Linear classifiers are simple, efficient and are so adopted as weak learners for boosting. New type of pattern classifiers is SVM's. SVM's performance mostly depends on the choice of kernels.

B. *AdaBoost:*

AdaBoost is the short used for Adaptive boosting in machine learning. A combination of other algorithms can also be used to improve the performance [1].

C. Discriminative Ranking :

The problem of set of images in various views is resolved here as it supports discriminative ranking [1].

D. *Multiple query images retrieval methods :*

By using this technique of multiple query images, it improves the recall [4].

i. Average Query:

It has a similarity with AQE method where the queries are averaged. Ranking of images are done by tf-idf score.

ii. Maximum of multiple queries:

For each BoW vector the query is issued which is then set and retrieved. In case of each query maximum of the individual scores ranked list are combined for each image.

VI. CONCLUSION

In this paper, it shows the bag-of-words (BoW) model in image retrieval task, which relies on the local descriptors such as SIFT. This paper provides the survey of different image retrieval techniques. Expanded query have superior results than single query image [2]. We will try to extract the features from the image or the part using SIFT. The parallel SVM will be based on neural network which will perform faster than AdaBoost.

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