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Image Retrieval Scheme for Classification

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Abstract— ***To accomplish the target of an acceptable system as per user's expectations. User fires a query or says a group of queries as an image to obtain matching desired images. The Methodology is to supply a query to a system which discriminates the images inside the dataset. System builds visual vocabulary by using Bag-of-Words (BoW) Model. Our approach makes use of k-means clustering algorithm and non-linear support vector machines (SVMs). It was observed that the query can be fired to obtain the ranked relevant the images matching with the user's query. This paper implements the image based searching and retrieving scheme for large datasets. The system is capable of running on single query also.***

Keywords— ***image search, object retrieval , visual words, features point***

I. INTRODUCTION

Now-a-days social communication websites are having the common trend on photo sharing. Retrieving an image is essentially content based. Content Based Image Retrieval is a very hot topic for all the active researchers due to its promising results over a decade. The interest in CBIR is due to the need of efficiently managing of images as they are tremendously available on internet. The project aimed at building a powerful and efficient indexing, searching and retrieving mechanism. It provides a stable platform for extracting specific content from the immense of images. The need of searching of a right image from the large dataset this is to be accessed. Classic method for accessing an image is via keywords. [10]

To beat the hurdles from the textual image retrieval CBIR is used. The clear objective of our system is to retrieve particular image from the dataset. Matching of an image to retrieve the relevant image is crucial task. Bag-of-Words (BoW) model is used for building the visual vocabulary from the visual word. It represents the images in the form of Term Frequency – Inverse Document Frequency (tf-idf), which are nothing but vectors. Interpretation of the images from the datasets is done based on their feature vectors. Datasets can consist of collection of all types of diagrams, charts, photos, paintings. Communication is done in a better way by visualizing. [3] Neural network is a learning system which operates on input data which are then transformed into feature vectors. Modern generation of algorithms has acquired great performance which also improves accuracy. There are other professionals like designers, artist, films, photographers who are heavily depending on the imagination capabilities.

II. RELATED WORK

In recent development, digital image processing is popular as an image is very effective as it contains visual information in it. Our mind is also tuned for the quick retrieval of images. CBIR have contributed to growing of many new techniques. Moreover digital imagery has widened its scope in all ways. Different search engines like Google support images and allow it to be retrieved. The retrieval system earlier was textual based.

CBIR uses visual effects for extracting images from datasets. In term weighting (tf-idf) term frequency- inverse document frequency, terms which are having high importance are assigned higher value than other with low value. It helps better in ranking results. Demonstrations on recent work proves that SIFT have the capability of solving the computer vision problems. Researchers were attracted towards SVMs as there were many interesting properties which they liked. There are plenty SVMs tools available in market for different purposes.

III. IMPLEMENTATION

A. Generating Visual Vocabulary

To generate a visual vocabulary for large dataset is really a tough job. Bag-of-words (BoW) Model is the reliable one. The image consists of several pixels. The pixels are stored in the vectors form those are our feature vectors.[1] In proposed work, we generate bag-of-words for the query image.

B. Clustering using k-means

Cluster analysis is the major objective of data clustering. The task of clustering is to discover 'natural' grouping of similar objects, patterns or points. The idea is used in different technique like data mining, machine learning, pattern recognition, and bioinformatics. Clustering is simply quickening the process of classification and raising the precision.

Non-hierarchical clustering is usually used where large datasets are involved. K-means is one of the partitioned clustering algorithms from pattern recognition. K-means is the concept that operates in data mining and it is also a method of vector quantization.

The approach here is doing not rely on purely on feature-space based. It assumes that, the data forms a single cluster in the infinite feature space which is induced by Gaussian kernel. It also determined the support vectors delimiting it.

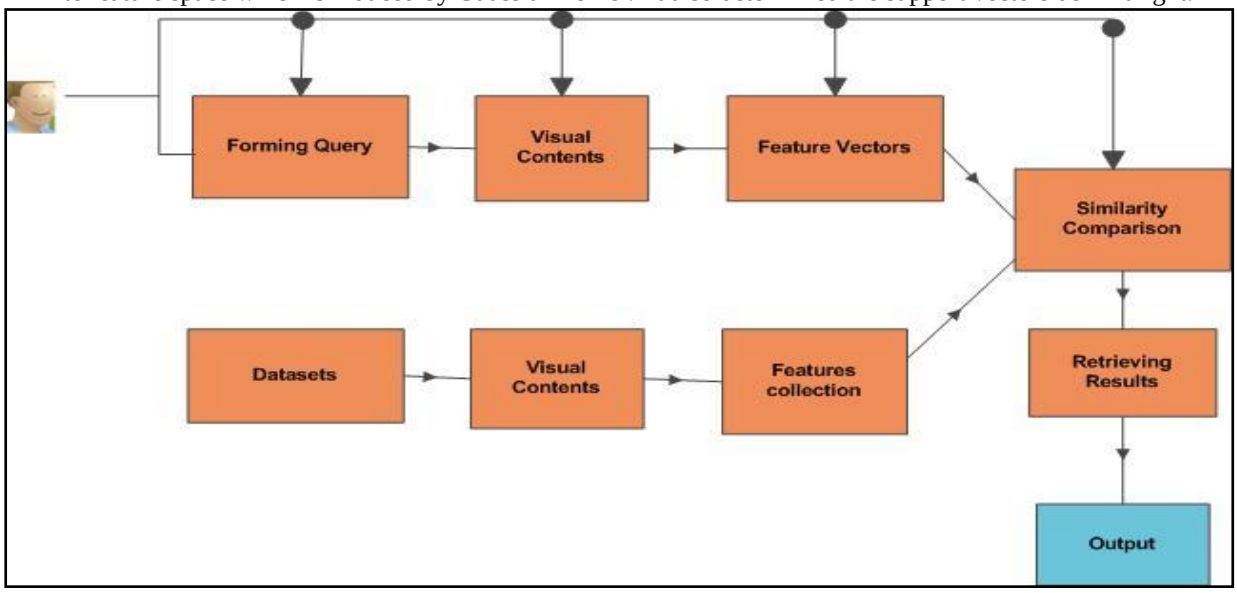

Fig1. System Architecture

C. Feature extraction

Features are actually the measure which can be drawn out for the consumption purpose. There many techniques which extract different features like colour, texture, shape, sketch. [8] In proposed work, we are trying to extract the corners, which are considered as most important features. As, for the purpose of image recognition it is required to have unique features those are corners. Key points of image are also known as interest points. Features must be unique to identify an image. So we consider the corner points as our feature. These corner points stands distinctive compared with other features.SIFT 128-dimension.

Fig 2. Keypoints

IV. EVALUATION AND EXPERIMENTAL RESULTS

A. Description of Dataset

The demonstration of the system is done on the oxford 5k dataset. It is mostly used for object retrieval. This dataset consist of 5,062 images in all which are collected from flickr. It has 11 landmarks of buildings, eg: all souls, ashmolean, Christ church etc. It has 1.9 GB of descriptors. The dataset here achieves high performance.

B. Details of Implementation

Input to the system is the query provided by the user. The dataset contains both the positive and negative samples. The Bag-of-words (BoW) uses local descriptors of the images like Scale-Invariant Feature Transform (SIFT). The descriptors calculate the feature vector. The images are loaded as gray scale. Key points are detected from the image. K-means algorithm is used for clustering.[1]

Fig 3. Query Image

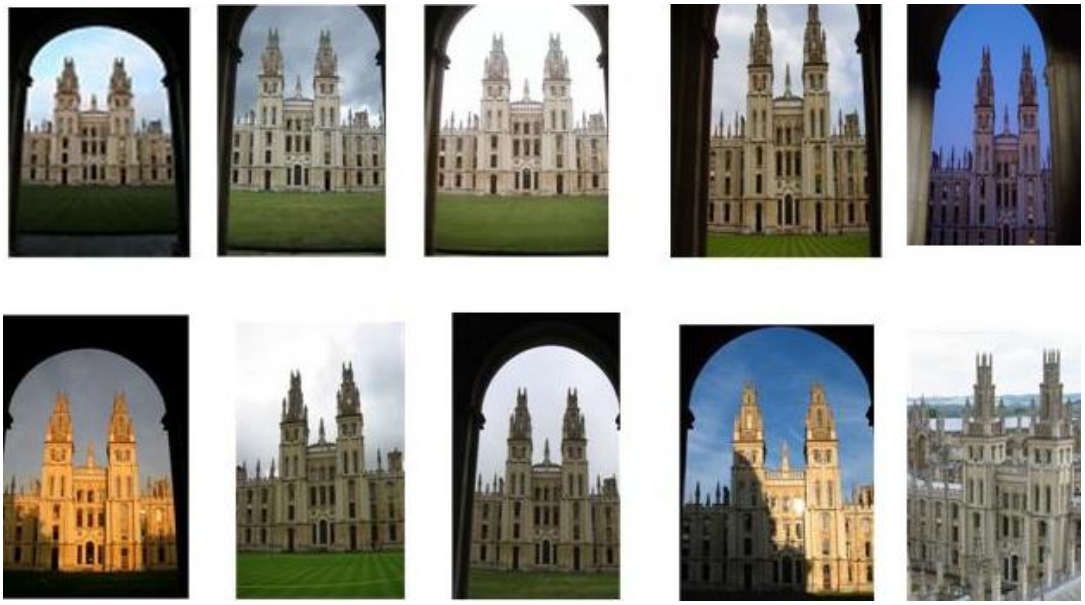

Fig 4. Ranking

Feature Matching Analysis Results

SetName	Source	Template	PercentMatch	MatchQuality
Set1	3913	3913	100%	Good
Set2	5115	487	70%	Average
Set3	1579	1972	0%	Poor
Set4	3494	1446	70%	Average
Set5	3552	3552	100%	Good
Set6	1470	3628	0%	Poor

Fig 5. Results of Feature Matching

V. CONCLUSION

In this paper, novel image retrieval algorithms have been introduced. I have demonstrated that by using k-means algorithm along with non-linear SVM using Radial Basis Function (RBF). Interest in CBIR have motivated for the creation of this work. Our CBIR system has tried to retrieve most relevant images from datasets with high accuracies. The Experimental results of our system confirm that, they were successfully able to achieved target by improving the system performance. We look towards the system as a step forward in building the good image retrieval system.

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