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A SURVEY ON VARIOUS METHODS USED FOR FINDING IMAGE SIMIARITIES FOR FEATURE EXTRACTION

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***Abstract*— Feature extraction involves reducing the amount of resources required to describe a large set of data. When performing analysis of complex data one of the major problems stems from the number of variables involved. Common feature extraction techniques include Histogram of Oriented Gradients (HOG), Speeded Up Robust Features (SURF), Local Binary Patterns (LBP), Haar wavelets, and color histograms. This paper gives a survey on various methods used for finding image similarity for feature extraction.**

I. INTRODUCTION

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval. Feature detection, feature extraction, and matching are often combined to solve common computer vision problems such as object detection and recognition, content-based image retrieval, face detection and recognition, and texture classification.

II. LITERATURE SURVEY

R.Venkata Ramana Chary, Dr.D.Rajya Lakshmi and Dr. K.V.N Sunitha in [1], proposed a system on visual contents of an image such as color, shape, texture and spatial layouts and selected 10000 image databases with common feature values. It extracted all images features separately R, G, B values for problemsolving.Proposed system implemented features like color histogram, color projections, Mathematical approaches like mean, median and standard deviation are proposed forefficient retrieval.

Kalavathi, in [4], proposed image comparison method based on Fourier Mellin transformation which accurately compares two images and computes the overlapping similarity and handsoff distance. For some images, the proposed method has failed to produce accurate result when the spatial difference between the images is high. This may be avoided by modifying the Fourier Mellin (FM) transformation registration. The proposed method has efficiently compared the given images and has produced accurate comparison result. The drawback of this method is that for some images it fails to register the images correctly when the difference in spatial coordinates is high.

Ritu A. Mundada, Akash D. Waghmare, in [7], proposed image similarity system using Content based image retrieval method. The image retrieval can be done using the contents of the image i.e., visual features of an image such as shape, texture or color. This system uses wavelet decomposition for decomposition of the image, followed by feature extraction using F-Norm theory. Using segmentation process, clusters of the images are formed and image similarity is done based on Euclidian distance.

Li Li [3],proposed algorithm that matches the image based on feature point and special type of descriptors name as DAISY descriptor. SURF descriptors improve the time than the existing one.DAISY descriptor works in circular fashion because circular neighborhoods give better feature than the rectangular neighborhoods. Gaussian function is used for selecting the proper key points.It provides more robustness to the image. But this algorithm is not suitable for large image scale variation.

P.M.Panchal, in [2], proposed Scale Invariant Feature Transform (SIFT) and Speed Up Robust Features (SURF) local descriptors. Rotation, orientation, scaling can be done using the SIFT. SIFT produces the key point descriptors. It consists of the four step algorithm. First one is detecting the extrema, second is key point localization, and third is orientation assignment and the last one is key point description. Hessian matrix is used in SURF. It is multi-scale theory. SIFT compare more feature than SURF. SURF has less speed than SIFT.

Shanmugapriya, in [5], proposed method uses three approaches to retrieve the relevant images from the database. Images can be retrieved based on Color, Texture, both Color and texture respectively. The proposed method uses algorithms such as auto color correlogram to retrieve color based images, Gaussian mixture models to retrieve texture based images and Query point movement for relevance feedback. The experimental results conforms that the proposed method gives maximum accuracy when compared to existing

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work. This method lacks when the structure of object is similar between each other.

Elbakry, in [6], proposed Bag-of-Visual Word (BoVW) that can be used successfully in Content-based Image Retrieval. Image retrieval system that uses local feature descriptors such as SURF and SIFT. BoVW retrieve efficiently similar images from standard databases. The proposed system uses SIFT and SURF techniques as local descriptors to produce signatures of the image that are invariant to rotation, orientation and scale. The proposed system is to extract the local descriptors from the processed image and key points are extracted from the image. The system combines the robust techniques, such as SIFT, SURF, and BoVW, to enhance the retrieval process. In the system, we use a k-means algorithm to cluster the feature descriptors in order build a visual vocabulary. But they have many limitations when dealing with the broad content of image.

In [8], Mutual information, an effective similarity measure for comparing images, has a drawback such as it calculates only on a pixel by pixel basis not considering the relationship between the neighbouring pixels, which is overcome by the method proposed by Daniel. According to Daniel, Region Mutual Information(RMI) considers regions of corresponding pixels that improves the robustness of standard mutual information as a similarity measure.

In [9], according to Gal, et. al., presented OASIS, an Online Algorithm for Scalable Image Similarity learning that learns a bilinear similarity measure over sparse representations. It is an online dual approach using the passive-aggressive family of learning algorithms, which is both fast and accurate at a wide range of scales: for a data set with thousands of images. It achieved better results than existing state-of-the-art methods. For large, web scale, data sets, OASIS can be trained on more than two million images from 150K text queries within 3 days on a single CPU. When compared to human evaluations, 35% of the ten nearest neighbors of a given test image, as found by OASIS, were relevant to that image. This suggests that similarity could be accurately learned even for large scale data sets that could not be handled before.

[10], Gang, et al., learned similarity from Flickr groups and use it to organize photos. They proposed a fast Stochastic intersection Kernel Machine (SIKMA) training algorithm, which produced a classifier that is more accurate than a linear classifier, trained on tens of thousands of examples in two minutes. The experimental results showed better performance on image matching, retrieval, and classification.

In [11], Siti, et, al., proposed an expert image processing system on template matching to locate and determine the symmetrical value between breast mammogram using cross-correlation method. Cross-correlation algorithm operates well on two-dimensional images and gives the best result for the matching process. They have developed a template matching algorithms for detecting similarity and the authors have calculated the matching percentage which is more than 80% of matching percentage. These results indicated that the new technique has improved the performance of our computer aided diagnosis system for mammographic breast cancer detection effectively.

In [12], Qin proposed a new similarity search method consisting of three parts. The first is a new region feature representation with weighted L1 distance function, and EMD* match, an improved EMD match, to compute image similarity. The second is a thresholding and transformation algorithm to convert feature vectors into very compact data structures. The third is an EMD embedding based filtering method to speed up the query process. The results show that the proposed method can achieve more effective similarity searches than previous approaches and can speed up the query process by a factor of 5 or more with little loss in query effectiveness.

[13]Sangeeta Arora, Lakhan Singh , Aditya Kumardiscussed an algorithm, Matching Images According to Coordinates (MIAC) based on the methodology of pixel by pixel comparison of two digital images. The comparison time of images is also calculated in this paper. In our observation when the comparison are allowed we found an excellent performance. It gives the result of different size of images, black & white images, colored image and the images which are of the same objects in different position. The main aim of this paper is to increase the accuracy of two similar objects' images which are clicked on different location and in different position.

III. CONCLUSION

This paper presents the various views of authors for feature extraction using image similarities.

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