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Content Base Image Retrieval using Combination of Colour, Shape and Texture Features: A Meta-Analysis

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Abstract-Efficient image retrieval from huge database is a major research area and trending now days. It is a part of Content Base Image Retrieval (CBIR). There are several works had been already proposed but still there is the need of efficient retrieval techniques. It became more important as the diversity of these techniques is very wide like *in* data mining, medical image processing, education, crime reporting etc. So our paper main motivations are in the direction of finding the leads in the previous techniques which can be collaborative more important and provide better and efficient image retrieval. We have also analyses these techniques and suggest some future suggestions. We have also discussed the discriminative indexing power as well as the dominant colour extraction. Our discussion is focused on Colour, Shape and Texture Features.

***Keywords*— CBIR, Content Retrieval, Colour, Shape and Texture**

I. INTRODUCTION

Research on content based picture recovery has increased gigantic in the last decade. A considerable measure of examination work has been done on Image Retrieval by numerous analysts, extending in both profundity and expansiveness [1-5]. The term Content Based Image Retrieval (CBIR) appears to have started with the work of Kato [6] for the programmed recovery of the pictures from a database, in view of the shading and shape present. From that point forward, the term has generally been utilized to portray the procedure of recovering coveted pictures from an expansive gathering of database, on the premise of picture elements (Colour, Texture and shape). The algorithms, techiues and the system used that are utilized, start from the fields, for example, measurements, design acknowledgment, data preparing, and information mining and computer vision. In the previous decade, numerous picture recovery frameworks have been effectively grew, for example, the IBM QBIC System [7], created at the IBM Almaden Examination Center, the VIRAGE System [8], created by the Virage Incorporation, the Photobook Framework [9], created by the MIT Media Lab, the VisualSeek System [10], created at Columbia University, the WBIIS System [11] created at Stanford University, and the Blobworld System [12], created at U.C. Berkeley and SIMPLIcity System [13]. Since essentially shading, surface and shape highlights can't adequately speak to picture semantics; semantic-based picture recovery is still an open issue. CBIR is the most imperative and compelling picture recovery system and generally examined in both the scholarly world and industry enclosure [14-18].

Essentially, most CBIR frameworks work in the same way: An element vector is extricated from every picture in the database and the arrangement of all highlight vectors is composed as a database record. At inquiry time, a component vector is extricated from the question picture what's more; it is coordinated against the element vectors in the record. The essential contrast between the different frameworks lies in the components that they extricate and in the calculations that are used to look at highlight vectors.

The shading components are the most generally utilized visual elements in picture recovery in light of the fact that they are less demanding to separate contrasted and surface and shape data. Shading highlight is moderately powerful to foundation intricacy and free of picture size and introduction. Measurably, it indicates the joint likelihood of the intensities of the three shading channels.

Texture is an essential element of normal pictures. Combinations of methods have been created for measuring composition comparability. Most strategies depend on looking at estimations of what are known as second-request measurements computed from inquiry and put away pictures [19]. These routines figure measures of picture surface, for example, the level of difference, coarseness, directionality and consistency [20-21]; or periodicity, directionality and arbitrariness [22]. Elective techniques for surface investigation for picture recovery incorporate the utilization of Gabor channels [23] and fractals [24].

So in this paper our main attention is to perform the comparative analysis.

II. LITERATURE REVIEW

In 2005, Xiaojun Qi et al. [25] propose a novel combination way to deal with substance based picture recovery. In their recovery framework, a picture is spoken to by a situated of shading-bunching based divided locales and worldwide/semi-worldwide edge histogram descriptors

(EHDs). Accordingly, the likeness of two pictures is measured by a general closeness combining both district based and worldwide/semi-worldwide based picture level similitudes. In their methodology, each portioned district relates to an item or parts of an article and is spoken to by two arrangements of fuzzified shading and composition highlights.

In 2008, N. S. Vassilieva [26] presents an overview of normal element extraction and representation methods and measurements of the comparing element spaces. Shading, composition, and shape elements are considered. A point by point grouping of the right now known highlights' representations is given. Test results on productivity examination of different strategies for speaking to and contrasting picture content as connected with the recovery and order undertakings are exhibited by the creator.

In 2011, Chandan Singh et al. [27] proposed a novel answer for substance based picture recovery framework. Neighborhood highlights extraction isdone by processing histograms of separations from edge lines to the centroid of edge picture, where edge lines are recognized utilizing Hough change. It is a powerful and viable system as per the creators. It gives relationship among contiguous edge focuses, which represent ttheir linear relationship with each other. Zernik emoments are used to depict the worldwide components. They have connected calculations for the quick processing of Hough change and Zernike minutes to make our framework quick and productive. Bray–Curtis similitude measure is connected to process the comparability among pictures. Countless is completed to assess the framework execution more than six standard databases, which speak to different sorts of pictures.

In 2011, Daniel Carlos et al. [28] present the Distance Optimization Algorithm (DOA), meaning to enhance the viability of Content-Based Image Retrieval (CBIR) frameworks. DOA Considers an iterative grouping methodology in light of separations connection and on the comparability of positioned records. Their calculation investigates the way that if two pictures are comparable, their separations to different pictures and along these lines their positioned records ought to be comparative too.

In 2011, Xiang-Yang Wang [29] proposed viable and novel shading picture recovery in view of shading, composition and shape. They firstly apply quantization calculation for bunch consolidating. Second the spatial composition components are separated utilizing steerable channel disintegration. At long last they apply pseudo-Zernike snippets of a picture for the shape descriptor. As per the creator they give a proficient and vigorous ability of picture recovery in the wake of applying the above strategies.

In 2012, Nishant et al. [30] proposed a new image retrieval technique. It retrieves similar images in different stages. The pictures are initially recovered in view of their shading component likeness. The importance of the recovered pictures is then further enhanced by coordinating their surface and shape highlights individually. For the most part a CBIR contrast inquiry picture highlight vector and every single other picture in the database. This declines the exactness of the framework as the pursuit includes the entire database which contains a wide assortment of pictures. Additionally achievement of shape construct CBIR depends with respect to precision of Segmentation system utilized. Lamentably it has been demonstrated that exact division is still an open issue. Present methodology wipes out the reliance over exact division system to some degree by narrowing down the hunt range at every stage.

In 2012, Neha et al. [31] presented a co-histogram based image retrieval which is the combination of color, texture and shape. They have used Wang database for result comparison. They have compared their technique with the previous algorithm and found to be better in terms of precision and recall.

In 2014, Choudhary et al. [32] proposed a content based image recovery coordinated method which separates both the shading (colour) and surface (texture) component. To separate the shading component, shading minute (CM) is utilized on shading pictures and to extricate the surface element, neighbourhood double example (LBP) is performed on the grayscale picture. At that point both shading and composition feature of picture are joined to shape a solitary component vector. At last similitude coordinating is performed by Euclidian separation which contrasts highlight vector of database pictures and question pictures. LBP principally utilized for face acknowledgment. In any case, we are going to utilize LBP for common pictures. This joined methodology gives exact, productive, less perplexing recovery framework.

In 2014, Jenni et al. [33] proposed an efficient technique called pre-processing image database using k-means clustering and genetic algorithm. This procedure uses a few components of the picture, for example, shading, edge thickness, boolean edge thickness and histogram data as the info of recovery. Moreover, a few execution measurements, for example, disarray lattice, exactness diagram and F-measures, have moreover been utilized as a part of measuring the precision of the proposed system. The analysis results demonstrate that the bunching immaculateness in additional than a large portion of the bunches has been over 90 present immaculateness.

III. PROBLEM DOMAIN

Based on the analysis of the previous paper we have found following gaps which are as under:

1. Many CBIR techniques face performance degradation in case of inner region, intra region and image resolution because of domain specific nature.
2. Dominant features are less used but it is relevant in feature selection and better retrieval.
3. Image diversity and semantic gap is also a major problem in efficient retrieval.
4. Huge data size will give a new arise for the clustering and classification techniques.
5. Directional changes in texture and colour is hard to retrieve easily.
6. Edge detection, contour detection and region formation are not taken collectively in maximum research work.
7. Boundary detection and correction is missing.

IV. ANALYSIS

Based on the discussion we have obtained the following analysis:

TABLE I ANALYSIS

S.no	Reference	Method	Result
1	[34]	Multi-modal re-ranking has been used to Integrate learning of relevance score, weights of Modality, distance matrix and its scaling into unified scheme.	More robust than using each Individual modality and better Performance than existing approaches.
2	[35]	They have used circular re-ranking method. Retrieved images are modelled as graphs in different feature spaces like Random walks, Mutual reinforcement and Circular Re-ranking.	Addresses the issue of multimodality Interaction in visual search by mutual reinforcement. In this way, the performance of the weak Modality is also benefited by learning from strong modalities.
3	[36]	They have presented Content Based Image Retrieval as both online and offline.	It is easy and fast to search and retrieve the images. In the same way as a future work it can be done for voice recording and voice searching. The images can be retrieved by both online and offline based on the query image which improves performance of the CBIR system
4	[37]	They have presented ontologically controlled IR method in comparison to the classical CBIR functioning and shows that the introduction of a hierarchical structure improves precision results for the system.	Their result shows that, with the use of minimal semantic information (a term associated to each photo), the results of a CBIR process are fairly improved.
5	[38]	They have identified five major categories of the state-of-the-art techniques in narrowing down the 'semantic gap': (1) using object ontology to define high-level concepts; (2) using machine learning methods to associate low level features with query concepts.	Spatial segmentation is performed on this class-map which can be viewed as a special type of texture composition.
6	[39]	They have introduces semantic extraction methods, and then the key technologies for reducing the semantic gap, ie, object-ontology, machine learning, generating semantic relevance feedback templates and web image retrieval are discussed.	Their result suggest web image retrieval uses additional information to facilitate the retrieval process.
7	[40]	They have applied learnt distance measure directly to applications such as content-based image retrieval and search-based image annotation.	Their results on the two applications in a two million Web image database show both the effectiveness and efficiency of the proposed framework.
8	[33]	They have proposed pre-processing image database using k-means clustering and genetic algorithm.	The perfonnance metric used to represent clustering purity is confusion matrix. This matrix shows the clustering purity is more than half of the clusters had above 90% purity.
9	[32]	They have used , local binary pattern (LBP) for the grayscale image. To extract the color feature, color moment (CM) is used on color images and to extract the texture feature.	Clustering approach will applied to reduce the searching time. ClassifIcation will perform to improve the system performance so that results can be better.
10	[30]	Stage based image retrieval technique is presented which retrieve similar images in stages.	Moreover both global and region features are combined to obtain better retrieval accuracy.

V. CONCLUSION

Many image retrieval systems have been developed but the problem of retrieving images based on their pixel content remain largely unsolved. Moreover all the existing techniques of image retrieval have their advantages and shortcomings. Recent works are mostly lacking of semantic features extraction and user behaviour consideration. Therefore, there is a need of an image retrieval system that is capable to interpret the user query and automatically extract the semantic feature that can make the retrieval more efficient and accurate. This motivates us in the field of image retrieval. We have suggested some technique which would be better than existing technique in some way or the other. The better way is used the pre dominant colour based image retrieval which will be based on classification and clustering is the better way for the efficient retrieval.

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