1. Introduction

For the public, large collection of images and videos are available and this is the main reason of high demand of multimedia information and rapid development of multimedia and communication technology. To handle the huge database efficient tools are required for image and video retrieval. Earlier text keyword approach was used where each image was manually annotated by a set of keywords and then using these keywords for image retrieval. But this approach has two demerits. First is that manual annotation being very tiresome and time consuming. Second is that human perception subjectivity varies from person to person and this may lead to annotation inaccuracy. To overcome the limitations of earlier approach in 1980s, the content based image retrieval system was introduced. In this system, by its visual content like color, shape and texture in the form of feature vectors in spite of a set of keywords the image is indexed. The use of only low level features for image retrieval makes this system computer centric. Such systems don't perform satisfactory because of semantic gap and human perception subjectivity.

Semantic gap occurs due to the difference between the extracted information from the visual data and its interpretation in real world. By using the image processing technique, the extracted features from the image are low level features like shape, color and texture whereas to measure their similarity and to understand the contents of images, the concept of keywords which are used by humans are high level features. For the development of Content Based Image Retrieval (CBIR) systems, too much research efforts have been used because there is no direct mapping between the high level and low level features of an image. Still due to difference between the features generated by the system and semantic concepts, the performance of CBIR systems is not satisfactory. Other cause is human perception subjectivity, because human perception varies differently for different person under different circumstances. Human may observe the same image differently. So to overcome these problems, research focus should be on high level querying and browsing.

Query By Image Content (QBIC) and Content-Based
Visual Information Retrieval (CBVIR) are another name of CBIR that helps to solve the problem of searching for digital images in large collection of images. To provide computer vision techniques to the image retrieval problem, the content based image retrieval (CBIR) act as an application. Here “Content” means colors, shapes, textures, or any other information that helps to recognize the image itself. Figure 1 shows the framework of CBIR which represents how this content based system work by inputting different types of images.

![Figure 1. Framework of Content Based Image Retrieval System (CBIR).](image)

**Relevance Feedback Techniques:** It is a method of step by step automatic refinement of the query given by user. It was first implemented in text based information retrieval. It is applied to lessen the gap between the high level image concepts and low level features. In Content Based Image Retrieval (CBIR) system to implement the relevance feedback, minimum requirements which need to be fulfilled are that based upon the predefined similarity metrics the initial results should be shown to the user by the system. Secondly, user must indicate the relevancy of an image that is which one is relevant and which is irrelevant. Lastly, depending upon the negative and positive feedback the system must change its mechanism. Understanding the needs of users is main purpose of this technique and returns them refined results. Query shifting concept is also used which means moving the query more towards the relevant image than the region of irrelevant image.

### 2. Previous Findings

In [1] have proposed FIRST i.e. fuzzy image retrieval system. To represent an image, the system uses the fuzzy set theory, similarity measure and relevance feedback technique. FIRST incorporates these ideas and make use of attributes, spatial relations and linguistic queries to handle the exemplary based graphical sketches. Fuzzy attributes relational graphs are used to characterize these images.

In [2] made use of Gaussian mixture model for the representation of user’s distribution of target which is responsible for the reduction of the gap between high level and low level features. Since current image recovery frameworks are unequipped for catching client’s conflicting aims, system is proposed to determine client’s contention input. Trial results demonstrate that framework which can continuously enhance its recovery execution through gathered client communications.

In [3] have suggested that, for the protection of data privacy the data must be in encrypted form before it is outsourcing to cloud. The traditional technique of data utilization that was based on plaintext keyword search is replaced by it. It focuses on the multi-keyword search over encrypted cloud data. For the future work authors have suggested schemes to reduce overhead over computation and communication.

In [4] have analyzed the contents of image and suggested that retrieval of semantics is important during semantic based image retrieval. PCA (Principal Component Analysis) is applied to extract the image features and then concatenate them with Fuzzy-ARTNN.

In [5] have explained that Cloud will reshape the entire industry as a revolution. In this, the aim was to discuss the challenges and issues of Cloud computing. First two related computing paradigms - Service-Oriented Computing and Grid computing have discussed and also their relation with Cloud computing.

In [6] have proposed an algorithm which is strong as it can manage interpretation, scale, and rotation fluctuations in pictures. The calculation has quadratic time unpredictability regarding the aggregate number of articles in both the database and inquiry pictures. Authors presented the thought of measuring a framework’s recovery quality by having a specialist indicate the normal rank requesting concerning every question for an arrangement of test inquiries. This empowered us to exhaustively assess the nature of calculations for recovery in picture databases.

In [7] keeping in mind the end goal to enhance the recovery exactness of substance based picture recovery frameworks, examination center has been moved...
from planning modern low-level highlight extraction calculations to diminishing the ‘semantic hole’ between the visual highlights and the abundance of human semantics. They have endeavored to give a thorough overview of the late specialized accomplishments in abnormal state semantic-based picture recovery.

In have suggested that relevance feedback is an intense method for image recovery and has been a dynamic exploration bearing for as far back as couple of years. Different impromptu parameter estimation procedures have been proposed for importance input. Furthermore, strategies that perform improvement on multilevel picture substance model have been figured. Nonetheless, these systems just perform significance criticism on low-level picture highlights and neglect to address the pictures’ semantic substance. In this, we offered a significance input structure to exploit the semantic substance of pictures notwithstanding low-level highlights.

In have explained that CBIR is a proficient recovery of important pictures from substantial databases taking into account highlights separated from the picture. They have presented a framework that can be utilized for recovering pictures identified with a question picture from a huge arrangement of particular pictures.

In presents a survey of 200 references in substance based picture recovery. The paper begins with examining the working states of substance based recover: examples of utilization, sorts of pictures, the part of semantics, and the tangible crevice. Ensuing segments examine computational ventures for picture recovery frameworks. Step one of the audit is picture handling for recovery sorted by shading, composition, and nearby geometry. Highlights for recovery are talked about next, sorted by: aggregate and worldwide highlights, notable focuses, question and shape highlights, signs, and auxiliary blends thereof. Comparability of pictures and protests in pictures is evaluated for each of the highlight sorts, in close association with the sorts and method for criticism the client of the frameworks is equipped for giving by cooperation.

3. Proposed Work

To bridge the semantic gap, machine-learning, classification and clustering techniques have been widely used in the preprocessing stages or during the relevance feedback. Relevance feedback makes the user participate in image retrieval system through human machine interaction and capture the user’s search intention in order to improve retrieval results, so it has been widely studied. Recently, there have been many relevance feedback algorithms. They improve the image retrieval results to some extent. Relevance feedback technology can be divided into two categories in the CBIR, one is to adjust some parameters in the similarity measure according to the user’s feedback, the other is probabilistic view, to calculate each image in line with user’s requirement according to user’s feedback and the images with high probability will be return. In this paper, the hybridized feature descriptor is constructed to describe the relevance between the query and database images in the database. The similarity factor is calculated by SVM based learning model. It can achieve very good results under the limited feature matching paradigm.

| Algorithm: HFD based CBIR using Color and Texture |
|--------------------------------------------------|
| 1. Load database in the Mat lab workspace           |
| 2. Resize the image according to the smaller sized image |
| 3. Convert image from RGB to Gray                |
| 4. Normalize the gray image for fixed mean        |
| 5. Generate the histogram of RGB                  |
| 6. Find entropy, standard deviation and local range of Gray |
| 7. Combine the image feature                      |
| 8. Load the test image                            |
| 9. Apply the procedure 2-7 to find combine feature of test image  |
| 10. Determine the normalized Euclidean distance of test image with stored image of database |
| 11. Sort the normalized Euclidean distance values to perform indexing under the SVM classifier. |

4. Experimental Results

Assuming the positive evaluation set is a trustworthy representation of real world images in the content based image retrieval dataset and arranged in the form of different sized images which includes the grayscale, colored or binary images. The image retrieval dataset has been obtained from Professor Wang's official blog and contains multiple category and multi-color scale images classified in the different categories of beach, monuments, urban transport, digital and tribal images, whereas different numbers of images have been kept under the image different categories to form the final training image set. The proposed multi-stage hierarchical CBIR image dataset has been defined with the sensitive image
data to test the real-time accuracy of the CBIR system. The proposed model has been found accurate with the accuracy level of more than 85% in comparison with the existing models using the different feature descriptors and classifiers as shown in Table 1.

Table 1. The table of properties calculated from the hypothesis of statistical type-1 and type-2 errors on the Category-A testing dataset

| PROPERTY NAME              | Proposed Model |
|----------------------------|----------------|
| Positive                   | 113 (TP 106, FP 7) |
| Negative                   | 18 (TN 5, FN 13) |
| Sensitivity                | 89.08%          |
| Specificity                | 41.67%          |
| Positive Likelihood Ratio  | 1.53            |
| Negative Likelihood Ratio  | 0.26            |
| Prevalence                 | 90.84%          |
| Positive Predictive Value  | 93.81%          |
| Negative Predictive Value  | 27.78%          |

Figure 2 shows the time based analysis of research model it is clear that proposed model take less time as compare to existing one. This analysis is based on number of transactions are done within time that measured in seconds.

Figure 2. Time comparison of existing and proposed model.

5. Conclusion and Future Work

In this paper, a reduced set of candidate images are used for querying an image. Color histogram for an image is constructed by measuring various components of an image like the number of pixels of each color and quantizing the colors within the image. By using this histogram, we can derive the feature vector of desired size that can help us to set the number of bins in color histogram. The algorithm is similar to the experience of mechanism of human brain and has an initial learning mechanism. Experiment results clearly show the efficiency of the algorithm. The support vector based proposed model has performed better than the existing schemes when implemented with the Support Vector Machine (SVM) over the Hybridized Feature Descriptor (HFD) computed over the given image data. The proposed model has been developed as the quick response system and has produced the results in the lowest time possible. In the future, the proposed model feature descriptor will be improved and enhanced in order to channelize the behavior classifier as the auto fuzzyfier for the early sample elimination, which may achieve the higher convergence rate in the minimum time to make the system faster.

6. References

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