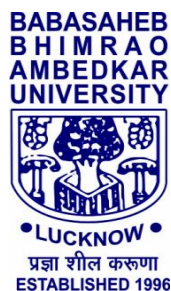


# A STUDY OF CONTENT BASED IMAGE RETRIEVAL SYSTEM

SUMMARY OF THESIS

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*Bably Dolly*

ENROLLMENT NO.-1415/16

UNDER THE SUPERVISION OF

*DR. DEEPA RAJ*

ASSOCIATE PROFESSOR

DEPARTMENT OF COMPUTER SCIENCE

SCHOOL FOR INFORMATION SCIENCE & TECHNOLOGY  
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY  
(A CENTRAL UNIVERSITY; NAAC- 'A' GRADE)  
VIDYA VIHAR, RAEBARELI ROAD, LUCKNOW-226 025 (U.P.), INDIA

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# SUMMARY

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Image retrieval is widely required instead of text retrieval in the current scenario. The CBIR (Content-Based Image Retrieval) System becomes more valuable in this scenario to excess the most similar images from the large set of images. In CBIR, image retrieval is based on the similarity measures between the query image and the targeted dataset with concerns to color, shape, and texture descriptors which are taken as low-level feature descriptors. With the advancement of the CBIR system, its advantages in different areas of research are in need like in satellite image detection, army security, image security, medical stream, etc. In this regards many works have been carried out by taking the low-level features. As a result of the widespread use of the internet and online technologies, a large variety of data collections containing a wide variety of images are available. Book categories, educational content, newspaper ads, newspaper articles, and other media are all being digitised and will be made available to users as they see fit. Different ways have been used to extract images from databases, depending on the user's requirements. The computer vision's application from the perspective of image problems is the content-based image retrieval system. Based on the extraction of local features including colors, forms, and textures, our research aims to find the most comparable images to the given Query image. It takes a lot of time, effort, and money to manually annotate images. We present a method for image retrieval systems based on a variety of techniques. the proposed work can be used to search for a specific image that is content-based (i.e. it's based on colors, shapes, or textures).Our objectives are Extracting the color feature, shape feature and texture feature of the image in data base and same for the query image and retrieving the most similar image related to the query image from the data base. Machine learning approach is also used for fast retrieving of similar images after doing classification using training set to train the model by using classifier algorithm and retrieving the similar images related to the query image.

## CHAPTER I

### INTRODUCTION

This chapter describe the fundamental aspects of Text based image retrieval system as well as content based image retrieval system. Starting with the content based image retrieval system and describe all the local level features like color, texture and shape. Focus on previously various ways which have been created to obtain images from

different set of databases. Various methods have been created to retrieve images based on their utility. The content-based image retrieval system utilises computer vision to solve an image issue. There are use of diverse multimedia data, such as music, video, and , has increased in recent years, particularly in the last couple of years, as a result of the widespread use of smartphones, internet surfing, and the digitization of a wide range of applications, among other factors. The retrieval of such multi-media material is one of the most difficult challenges facing researchers in the contemporary environment. Different ways are used to meet all of the requirements from time to time.Extracting the color feature, shape feature and texture feature of animage Some of the application areas of CBIR system also defined. Machine learning approach is also used for fast retrieving of similar images after doing classification using training set to train the model by using classifier algorithm and retrieving the similar images related to the query image. This chapters described the different color features, texture features, shape features with machine learning approaches.

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## **CHAPTER II**

### **LITERATURE SURVEY**

This chapter is summaries previously published techniques for content-based image retrieval in medical applications, highlighting areas that could be improved. Researchers have worked tirelessly over the last decade to advance automated content-based image retrieval methods to assist medical practitioners in diagnosing, monitoring drug application results, and conducting medical research. However, a content-based image retrieval system that is efficient, user-friendly, fast, and commercially viable is still a long way off.A content-based image retrieval system combines several processes, such as image processing, machine learning, information retrieval, and computer vision. Based on a review of the literature, a few of the features are summarized in this.

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**Quantum Cryptography**", DOI: 10.4018/978-1-7998-6677-0 ISBN13:  
9781799866770-Scopus

## **CHAPTER III**

### **IMAGE RETRIEVAL BASED ON COLOR FEATURE SIMILARITY**

This chapter introduces the concept of a color based image retrieval system with different approach. This chapter focuses on extracting images from a large image database using color features of an image, and give a novel approach for retrieving images from large image database. Color is the most important, dependable, and extensively used of the visual elements. The RGB color combination is considered in this chapter for image retrieval. Using color projections, we were able to find images in a vast collection by applying segmentation and quantification to several color models and comparing the results. This method has been tested on a variety of image sets and its retrieval rate has been examined in a variety of models.

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## **CHAPTER IV**

### **COMPARATIVE ANALYSIS OF FEATURE EXTRACTION APPROACHES BASED ON TEXTURE DESCRIPTORS**

In this chapter, we examine and compare the efficiency of image retrieval using different texture feature extraction techniques, such as Gray Level Co-occurrence Matrixes (GLCM), Local Binary Pattern (LBP), and Local Phase Quantisation (LPQ), by analysing and comparing different research papers based on texture feature extraction. The comparison of the GLCM, LBP, and LPQ methodologies is the focus of this research. A wide range of applications, from remote sensing to biological

imaging, require some raw data image to extract relevant features that characterise the image's features. When searching for images that are similar to a query image, content-based image retrieval (CBIR) plays an important role. However, there is still a lot of work that needs to be done in these areas. In this research, we analysed and compared the efficiency of image retrieval with reference to their texture feature vectors dataset of images with the use of different texture feature extraction techniques, including GLCM, LBP, and LPQ. A comparative study of GLCM, LBP, and LPQ procedures is the subject of this research project.

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## **CHAPTER V**

### **IMAGE RETRIEVAL BASED ON HYBRID INVARIANT FEATURE EXTRACTION TECHNIQUES**

In this research work, a texture-based feature extraction framework is proposed and compared with the existing techniques available. The images of the Brodetz database are used in this research, and belong to the same category, but have varied wall tile textures in the TIFF format and are of the same size. The proposed work shows a texture-based retrieval framework for retrieving similar images. To build this framework, used database colors and then returned the relative texture characteristics retrieved from each image to the database. Using a distance metric, the same procedure is used to extract texture features from of the query image. The similarity between the query image and<sup>2</sup> the returned images has been calculated.

Content of this chapt<sup>0e11r</sup> published in published in **Algorithms for Intelligent Systems, Springer** and another communicated in **IETE Technical Review**

## **CHAPTER VI**

### **FEATURE EXTRACTION FOR IMAGE RETRIEVAL BASED ON HYBRID FEATURES OF COLOR, TEXTURE AND SHAPE**

In this chapter an experimental analysis is carried out to improve the optimal method of feature extraction. These results showed that the color (L\*a\*b, RGB), hybrid texture (GLCM, LBP, LPQ), and shape (zero-crossing rate) features for efficient and effective retrieval. This efficient image retrieval model study may be utilised in a different area of the present scenario. In the current scenario, many databases of images and video for any area have grown rapidly. Retrieving the query-based image is in demand for a quick response. In this chapter, a hybrid feature based content retrieval system proposed using color descriptors, shape descriptors, and texture descriptors. The proposed system was evaluated on COREL database. The color descriptors such as color histogram, color moments, color map, in the LBP model, LBP and LPQ, and GLCM for the texture feature, color feature, and shape features and shape descriptors as HOG features.

Content of this chapter communicated in **International Journal of Grid and Distributed Computing**

## **CHAPTER VII**

### **CONTENT BASED IMAGE RETRIEVAL USING MACHINE LEARNING**

This chapter proposes a new methodology for image retrieval using the local descriptors of an image in combination with one another. HSV histogram, Color moments, Colormap, are used to form the feature descriptor. In this work, it is found that a combination of all these features produces promising results that supersede previous research. To make a fast image retrieval process Machine Learning approaches have been utilized and also illustrate a comparative accuracy of different used machine learning approach. In this regard a supervised learning algorithm, Quadratic SVM is used for the classification of the images in the database, and then a similar image is retrieved by using distance metric in only the same class images. CBIR is better suited to massive volumes of visual input. Color-based features have been extracted in this work. The proposed system was evaluated on COREL and CIFAR databases. The proposed work outperformed other state-of-the-art methods in terms of retrieval performance. For validation, a database of roughly 500 images was

divided into three categories. to compare based on retrieval of similar images and accuracy through machine learning techniques. The proposed approach results in image categorization accuracy.

Content of this chapter communicated **International Journal of Image, Graphics and Signal Processing (IJIGSP)**

## **CHAPTER VIII**

### **CONCLUSIONS AND FUTURE ENHANCEMENTS**

This research work provides the overall idea of content based image retrieval (CBIR) system. CBIR is very much required in today's scenario. We have developed a novel approach to retrieve most similar images from large datasets based on local features of an image with respect to improved efficiency. Most of the time, there is a maximum chance of not to retrieved most similar images from a large dataset as per queried images. For this, we have some new approaches to extract features based on color, shape, and texture to overcome such issues. We looked into the low-level components of CBIR color features extraction and texture features extraction. This chapter concludes all the research work discussed in the chapters and the potential scope of the thesis. The work produced a CBIR system combining color, texture, and shape features. Inputting an image quickly and accurately retrieves similar images. The system will be strengthened by fusing low-level features with the spatial position in the future. The CBIR system also includes image feature matching and semantic-based image retrieval. Machine learning algorithms have shown promising results in several fields for CBIR and image representation. Recent CBIR research has shifted to deep neural networks, Managing a big image collection for supervised deep network training is complex and time-consuming. Thus, evaluating a deep network's performance on a large unlabeled dataset in unsupervised learning mode is a potential future study direction.

Content of this chapter published in

**LIST OF PUBLICATIONS**

1. **Bably Dolly**, D. Raj, (Jul 2018) “*Various Methods of Enhancement in Colored Images: A Review*”, published in ‘**International Journal of Computer Sciences and Engineering**’, Volume-6, Issue-7-(**UGC Indexed**)
2. **Bably Dolly**, D. Raj,( December 2019)“*Color Based Image Retrieval by Combining Various Features*”, published in ‘**International Journal of Engineering and Advanced Technology**’, ISSN: 2249-8958 (Online), Volume-9, Issue-2, ,Page No. 454-460-**Scopus(UGC Indexed)**
3. **Bably Dolly**, Deepa Raj,(2020) “*Image Retrieval Based on Color Feature Similarity*”, published in **Journal of Physics Conference Series** 1478:012014, **IOP publication-Scopus(UGC Indexed)**
4. Bably Dolly, Deepa Raj(2021), “*Image Processing Using Quantum Computing: Trends and Challenges*”, published in “**Limitations and Future Applications of Quantum Cryptography**”, DOI: 10.4018/978-1-7998-6677-0 ISBN13: 9781799866770-**Scopus**
5. **Bably Dolly**, Deepa. Raj(2021), “*Texture Based Image Retrieval using GLCM and LBP*” , published in **Advances in Intelligent Systems and Computing(AISC) Series, Springer**
6. **Bably Dolly**, Deepa Raj(2021), “*Image Retrieval Based on Texture using Local Binary Pattern and Local Phase Quantization*” published in **Algorithms for Intelligent Systems, Springer**
7. **Bably Dolly**, Deepa Raj “*Image retrieval Based on Hybrid Texture Feature Extraction Techniques*”-communicated in **IETE Technical Review**
8. **Bably Dolly**, Deepa Raj, “*Feature Extraction for Image Retrieval Based on hybrid features of Colour, Texture and Shape*- communicated in**International Journal of Grid and Distributed Computing**
9. **Bably Dolly**, DeepaRaj, “*Image Retrieval Classification using Machine Learning Approach*”-communicated **International Journal of Image, Graphics and Signal Processing (IJIGSP)**