# EFFECTIVE CONTENT BASED COLOR IMAGE RETRIEVAL USING SIMILARITY DEEP LEARNING

## A PROJECT REPORT

Submitted by

**ANCHAL JAIN (311613205007)** 

RITHIKA.H (311613205032)

VAISHALI.P (311613205050)

in partial fulfillment for the award of the degree

of

## **BACHELOR OF TECHNOLOGY**

IN

## INFORMATION TECHNOLOGY



# MISRIMAL NAVAJEE MUNOTH JAIN ENGINEERING COLLEGE

THORAIPAKKAM, CHENNAI-600 097

ANNA UNIVERSITY: CHENNAI 600 025

**APRIL 2017** 

## ANNA UNIVERSITY: CHENNAI 600 025

## **BONAFIDE CERTIFICATE**

Certified that this project report "EFFECTIVE CONTENT BASED COLOR IMAGE RETRIEVAL USING SIMILARITY DEEP LEARNING" is the bonafide work of "ANCHAL JAIN [311613205007] RITHIKA.H [311613205032] and VAISHALI.P [311613205050]" who carried out the project work under my supervision.

**SIGNATURE** 

Dr.A.SRINIVASAN, M.E, Ph.D

**PROFESSOR** 

HEAD OF THE DEPARTMENT

Department of Information Technology

Misrimal Navajee Munoth Jain

Engineering College, Thoraipakkam,

Chennai-97

**SIGNATURE** 

Dr.A.GAYATHRI, Ph.D.,

**SUPERVISOR** 

ASSISTANT PROFESSOR

Department of Information Technology

Misrimal Navajee Munoth Jain

Engineering College, Thoraipakkam,

Chennai-97

#### **ACKNOWLEDGEMENT**

We express our sincere gratitude to our honorable **Secretary** (Administration) Dr. **Harish L Mehta and Secretary** (Academic) **Shri. L. Jaswant Munoth** for providing the infrastructure facilities to do this project during our course period.

We thank our **Principal**, **Dr. C. Chandrasekar Christopher**, **M.Tech.**, **Ph.D.** for his valuable suggestions and guidance for the development and completion of this project.

We express our profound sense of gratitude and heartful thanks to our **Head of the Department, Dr. A. Srinivasan, M.E., Ph.D.** for his valuable suggestions and guidance for the development and completion of this project.

Words fail to express our gratitude to our Project Guide, **Dr.A.GAYATHRI**, **Ph.D.**, who took special interest in our project and gave her consistent support and guidance during all stages of this project.

Finally, we thank all the **Teaching and Non-Teaching faculty** members of our Department who helped us to complete this project.

Above all we thank the Almighty, Our Parents and Siblings for their constant support and encouragement for completing this project.

**ANCHAL JAIN** 

RITHIKA.H

**VAISHALI.P** 

# TABLE OF CONTENTS

# **CHAPTER**

NO.		TITLE	PAGE NO
	ABSTR	ACT	vi
	LIST O	F FIGURES	vii
	LIST O	F TABLES	X
	LIST O	F ABBREVATION	xi
1.	INTRO	DUCTION	
	1.1	Overview	1
	1.1.1	Classical techniques of image retrieval	1
	1.1.2	SVM	3
	1.2	Project objective	12
	1.3	Software Description	13
	1.3.1	About Matlab	13
	1.3.2	The Matlab system	14
	1.3.3	The Matlab language	14
	1.3.4	The Matlab working environment	14
	1.3.5	Handle graphics	14
	1.3.6	The Matlab mathematical function library	14
	1.3.7	The Matlab application program interface	15
	1.3.8	Uses of Matlab	15
	1.4	Software and hardware requirements	15
2.	LITER	ATURE SURVEY	16
3.	<b>EXIST</b>	ING SYSTEM	
	3.1	Introduction	21
	3.2	System architecture	22
	3.3	Data flow diagram	23

	3.4	Module description	24	
	3.4.1	Query image preprocessing	24	
	3.4.2	Feature extraction	24	
	3.4.3	Similarity based ranking	25	
	3.5	Drawbacks of existing work	31	
4.	PROPO	OSED SYSTEM		
	4.1	Introduction	32	
	4.2	System description	32	
	4.3	System architecture	33	
	4.4	Data flow diagram	34	
	4.5	Module description	35	
	4.5.1	Query image preprocessing	35	
	4.5.2	Support vector machine	36	
5.	EXPE	RIMENTAL ANALYSIS AND RESULT		
	5.1	Database	44	
	5.2	Performance evaluation for existing system	45	
	5.3	Performance evaluation for proposed system	46	
	5.4	Comparison between existing and proposed	48	
6.	CONC	CLUSION AND FUTURE ENHANCEMENT		
	6.1 (	Conclusion	50	
	6.2 I	Future enhancement	50	
	APPE	NDIX 1 (CODING)		
	APPE	NDIX 2 (SCREEN SHOTS)		
	REFE	RENCES		

#### **ABSTRACT**

Content Based Image Retrieval is a term used to describe the process of retrieving desired images from a large collection of database on the basis of syntactical image features. The key challenge is the semantic gap issue that exists between low-level image pixels captured by machines and high-level semantic concepts perceived by human. There are various techniques existing in CBIR used to retrieve images from database which are similar to each other. But still the semantic gap issue remains unsolved. The precision rates are high and the performance remains inconsistent. A method is proposed using support vector machines for retrieval of images based on content. It is a two step process. First 190 dimensional feature vectors are extracted. Then, using SVM learning techniques, the images which are similar to the query image are retrieved and displayed.

# LIST OF FIGURES

FIG NO.	NAME OF THE FIGURE	PAGE NO
1.1	Images projected on a 2D plane	4
1.2	Interpretation of geometric margin	6
1.3	Support vectors and maximum margin separating hyperplane	8
3.1	Existing system architecture	22
3.2	Existing data flow diagram	23
3.3	Retrieved images in existing system when query image is from the Africa class.	26
3.4	Retrieved images in existing system when query image is from the Beach class.	26
3.5	Retrieved images in existing system when query image is from the Monument class.	27
3.6	Retrieved images in existing system when query image is from the Bus class.	27
3.7	Retrieved images in existing system when query image is from the Dinosaur class.	28
3.8	Retrieved images in existing system when query image is from the Elephant class.	28
3.9	Retrieved images in existing system when query image is from the Flower class.	29

<ul> <li>image is from the Horse class.</li> <li>3.11 Retrieved images in existing system when query image is from the Mountain class.</li> </ul>	
image is from the Mountain class	30
image is from the Mountain class.	
Retrieved images in existing system when query	30
image is from the Food class.	
4.1 Proposed system architecture	33
4.2 Proposed data flow diagram	34
4.3 Retrieved images of proposed system when query	37
image is from the Africa class.	
4.4 Retrieved images of proposed system when query	37
image is from the Beach class.	
4.5 Retrieved images of proposed system when query	38
image is from the Monument class.	
4.6 Retrieved images of proposed system when query	38
image is from the Bus class.	
4.7 Retrieved images of proposed system when query	39
image is from the Dinosaur class.	
4.8 Retrieved images of proposed system when query	39
image is from the Elephant class.	
4.9 Retrieved images of proposed system when query	40
image is from the Flower class.	
4.10 Retrieved images of proposed system when query	40
image is from the Horse class.	

4.11	Retrieved images of proposed system when query image is from the Mountain class.	41
4.12	Retrieved images of proposed system when query image is from the Food class.	41
5.1	Depicts the classes present in dataset with number of images.	44
5.2	Sample images from every dataset	44
5.3	Comparison of datasets for precision using existing approach.	45
5.4	Comparison of datasets for F-score using existing approach.	46
5.5	Comparison of datasets for precision using proposed method.	47
5.6	Comparison of datasets for F-score using proposed method.	48
5.7	Comparison of average precision of existing and proposed approach.	49
5.8	Comparison of average F-score of existing and proposed approach.	49

# LIST OF TABLES

TABLENO.	TABLE NAME	PG NO.
5.1	Comparison of precision, Recall and F-score for query image from every class of the dataset using existing approach.	45
5.2	Comparison of precision, recall and F-score for every class of dataset using SVM.	46
5.3	Comparison of the average precision and average recall of existing and proposed approach.	48

## LIST OF ABBREVIATION

CBIR Content Based Image Retrieval

SVM Support Vector Machine

MPEG Moving Picture Experts Group

SIFT Scale Invariant Feature Transform

SURF Speeded Up Robust Features

PCA-SIFT Principal Component Analysis SIFT

ORB Oriented FAST and Rotated BRIEF

BOW Bag Of Words

MATLAB MATrix LABoratory

SGLCM Scaled Gray Level Co-occurrence Matrix

2D CS Two Dimensional Compressive Sensing

HSV Hue, Saturation and Value