IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
Volume 13, PP 70-74

Effectiveness of Saas Cloud Model For Retrieving Images From CBIR System

Dr. Mamta Meena[1], Shrutika Mallya[2] , Shrusti Talati[3]
[1](Assistant Professor, Department of Computer Engineering, Atharva College of Engineering, Mumbai, India)
[2,3](Student, Department of Computer Engineering, Atharva College of Engineering, Mumbai, India)

Abstract : *The interest in the digital imaging has led a potential growth thus fuelling up the problem of its storage and retrieval. The traditional methods which supported for local machine image retrieval met a lot of problems related to the image indexing and massively the space for efficient storage. The computational capabilities suffered with the growing need for a digital imagery space leading to a poor computing efficiency. Also, just a huge storage space can merely solve the problem of efficient image retrieval. In the directory of several images, locating the desired image might cost considerable time and effort. It makes it easier to search an image by its feature thus short listing images, out of many in the database, thus decreasing the computational cost.*

An image can be better remembered by its contents such as its shape, color, texture, etc. thus making it a key to a list of pictures possessing similar characteristics, out of a bunch of images in the database. This position brings CBIR (Content based image retrieval) as an efficient technique for image retrieving interface. Thus, this research proposes a system that retrieves images from large set of distinct images, based on the content for efficient retrieval and with an enormous storage capability using the cloud computing technology.

Keywords : *Blob Storage, Content Based Image Retrieval (CBIR), Cloud Computing, Web Role, Windows Azure, Worker Role.*

I. Introduction

With the advent of digital imagery, many organizations demand for a better performance in its retrieval and storage since a traditional Database could merely satisfy the needs of an organization. Retrieving it using the manual annotational texts makes it difficult and also affects the time constraint. CBIR(Content Based Image Retrieval) technology enables the low level feature like the reflecting colour , texture, shape and salient points in an image to be a key to display the required image in a cost effective way. CBIR along with the cloud technology provides with a better storage and easy retrieval capabilities [1]. Thus, CBIR possess a very broad and important application in many areas including medical sciences, education, architectural design, military affairs, etc.

1.1 The Two-Phase Strategy:

CBIR (Content Based Image Retrieval) technology implements a two phase strategy which follows as:

In the first phase, images are stored in the database using the feature vector indexing for the ease of retrieval by performing just the index evaluation.

And in the second phase, a query is issued by either a query image or any random image from the set of images in the Database.

Thus, CBIR will retrieve a set of shortlisted images after the comparison of the feature vector of query images with the images in the Database through indexing. The CBIR technology is enhanced with the incorporation of the Cloud Computing Aspect as it improves the processing time and promotes for a speedy retrieval in a centralized way. As it offers better flexibility to the storage of tons of images ,it improves the retrieval speed. This results in improved scalability for future applications to be inherited with minimal changes to the existing system [2]. Thus, Cloud Computing ensures minimal or no change in the structure of storage and retrieval inspite of the changing technologies at place. Cloud computing, thus, proves to provide a virtual environment to the user's bulk data eliminating the extra overheads of the computer and the expenses over mainframe servers for data storage [3].

1.2 The Advent of Cloud Computing:

Cloud computing is a powerful tool for driving the principle of on-demand computing. It becomes economical with a huge storage of data and managing computing on a centralized platform. Using the solution provided by Cloud , any organization can fulfill their needs of infrastructure, platform and application [1].

IaaS : Infrastructure-as-a-Service is used to start, stop, access and configure their virtual servers and storage.

PaaS : Platform-as-a-Service in the cloud is defined as a software and product development tools hosted on the provider's performance.
SaaS: Software-as-a-Service cloud model, the vendor supplies the hardware infrastructure, the software product and interacts with the user through a front-end portal.

II. Review Of Literature

2.1 Content Based Image Retrieval System using improved SVM technique [4].

In this paper, the author proposed a CBIR system for easy and efficient retrieval of the images using a Modified Support Vector method or SVM. This methodology proposes a system which pre-processes the image by removing noise and later clusters up, referencing the RGB model. It applies the SVM methodology before the final image retrieval. This methodology aims at providing best retrieval using a modified SVM.

2.2 Online Signature Recognition using Software-as-a-Service (SaaS) model on Public Cloud [5]

Authorization, Authentication and privacy form the backbone of an organization to stay intact in terms of commercial and official transactions. For larger organizations with larger requirements for security, a standalone database fails to keep up with the efficiency needs. This forces the implementation of Cloud Computing along with the CBIR technology in order to provide with a faster processing time and capacity.

2.3 NIR: Content Based Image Retrieval On Cloud Computing [6].

NIR is an open ended source which allows for increased flexibility of the database for image storage and retrieval with the increasing needs of the users. As proposed by the authors, Zhuo Yang, Sri-ichiro KAMATA and Alireza AHRARY, NIR system is a scalable platform which can be employed for image retrieval and can be integrated with any of the existing system at place.

2.4 Content Based Image Retrieval (CBIR) using the Hybrid Technique [7].

A research delivered by Zainab Ibrahim Abood, Israa jameel Muhsim and Nabeel jameel Tawfig in the year 2013, proposed a CBIR(Content Based Image Retrieval) technique possessing four feature extraction. The colored histogram features technique, gray level co-occurrence matrix(GCCM), the hybrid technique, properties feature technique and statistical features technique were used for the purpose of extraction.

The features that are common between the query image and the images in the database are used as a parameter for easy retrieval. The normalized Mahalanobis distance, Euclidean distance and Manhattan distance are used for the similarity measures. Thus, the proposed research concludes to have a higher probability of faster extraction of the images using all kinds of similarity measures.

2.5 Content Based Image Retrieval (CBIR) algorithm using the Color models [8].

Digital image Processing mainly deals with changing the nature of image as required. Ms. K Arthiand, Mr. J Vijayaraghavan suggest the use of color models along with the CBIR technology for processing image to improve its pictorial information. An algorithm based on CCM(Color Co-occurrence matrix) is proposed to be an efficient way for image retrieval from large Databases. The CCM for each pixel in an image is found using the Hue saturation value(HSV) and compared to HSV of the images already existing in the Database for the efficient retrieval.

III. Windows Azure Cloud And Storage Services

3.1 Windows Azure Cloud and Storage Services:

The Azure Cloud provides a platform to run highly scalable custom code on a Platform as a service (PaaS) environment. The Cloud service introduces two roles i.e. Web role and Worker role.
The Web role instance accepts the requests from the users and then passes them to the worker role for further processing. Web roles don't maintain an operating system and virtual machines [9][10].

3.2 Services provided by the Azure Cloud platform :

Using the web services, the feature vectors of the image is uploaded in the blob and table storage on the cloud, on the web role.
The following steps fall in order for uploading the images on the cloud :

- The user uploads the images using the web services on the web role.
- Using the Hybrid Wave Transform, the web role computes the feature vectors of the images.
- The blob storage will finally hold both the feature vector and the respective image.
- Once the image is uploaded in the blob, an entry of an ID and location of the computed feature vector of an image will be stored in the Table.

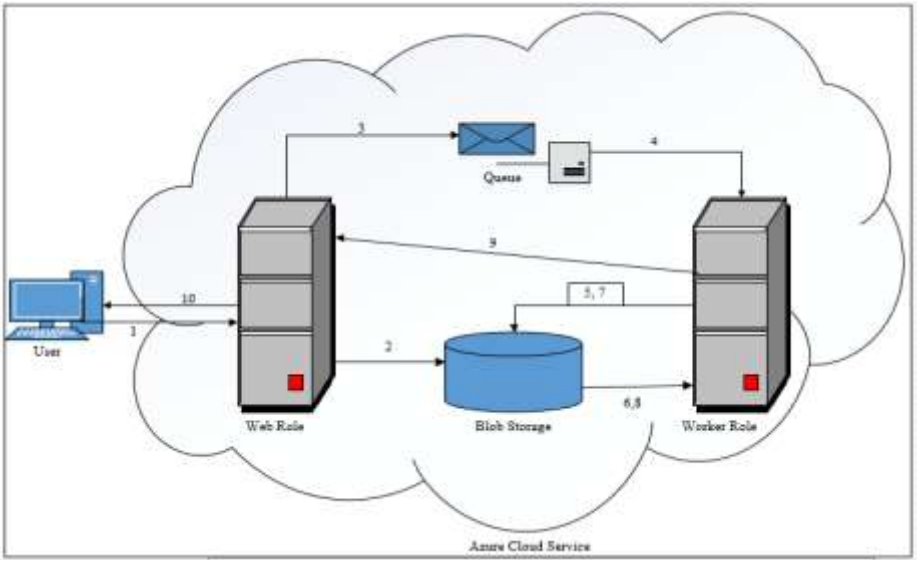

Fig. Detailed Architecture of Microsoft Azure Cloud

Windows Azure platform puts forth multiple storage capabilities that are highly scalable as well as constantly available. The benefits of using the Azure storage service is that :

It can persist both structures as well as unstructured data in a way that it can be easily stored and retrieved from anywhere on the cloud, irrespective of the data length. It can be scaled to store any amounts of data, thus, enabling good flexibility. Inspite of a larger storage space, the user only pays for the the amount of space used for storage.

This platform thus provides support for many applications encouraging a huge number of concurrent users.

IV. Proposed Methodology

The primary features of a picture namely texture, color histogram and the image density are examined for the image extraction. The segments of the images are used for the construction of a single feature vector and stored in the feature database in text file format. When a query image is submitted by the user, a single feature vector is constructed to perform the match algorithm. The wavelet transform technique will be used as a similarity comparison mechanism between the image in the database and the user's query image.

Implementation:

Step 1 : Collection of the images in the Database.

- We consider that the Database consists of 100 images stored with a .jpg format.
- All the images use an RGB color model for representation.

Step 2 :

- Feature vector extraction is done using the primary image features like colors, textures or by using shapes.
- The Kekre transform is used for representing the global image properties.
- To represent the local image properties, we have used DCT, Walsh, Haar, Hartley transforms.
- We combine these transforms to generate good properties which will help to reconstruct an image by inverse transform.
- On the application of this hybrid transform, we find an average of root mean square error between the original image and the image reconstructed.

Step 3 :

After image registration, the extracted features are forwarded to the feature vector module and a similarity measure is established using the Euclidian distance. The Direct Euclidian Distance between an image P and query image Q can be given as the equation below

ED= □ (Vpi -Vqi). (Vpi -Vqi). Where, Vpi and Vqi be the feature vectors of image P and Query image Q respectively with size 'n'.

Step 4 : Images are retrieved on the basis of the similarity measure performed.

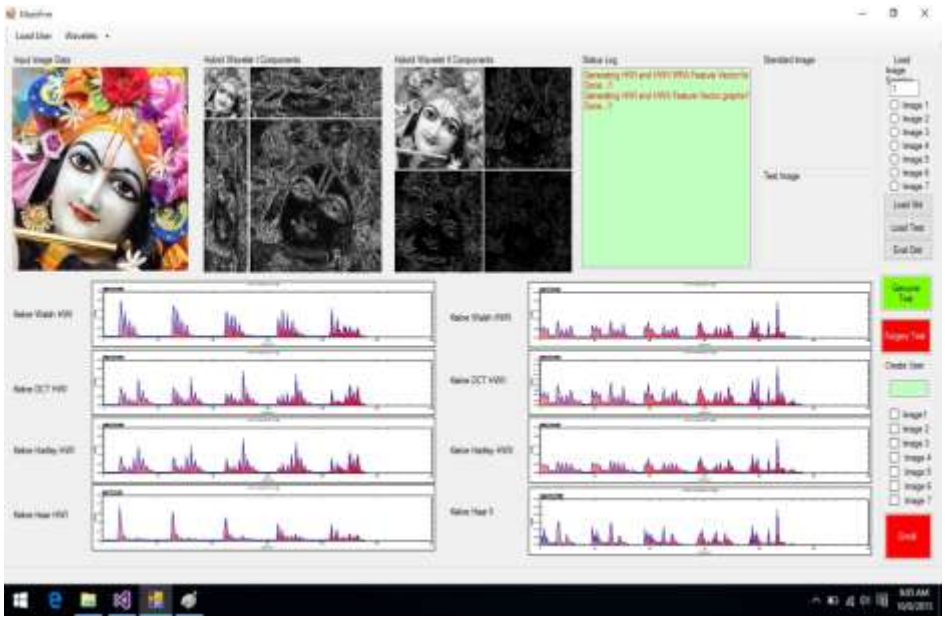

Fig.1 Desktop Application of CBIR (Kekre with different Combinations)

V. Experimental Results

Uploading Images on Azure Storage

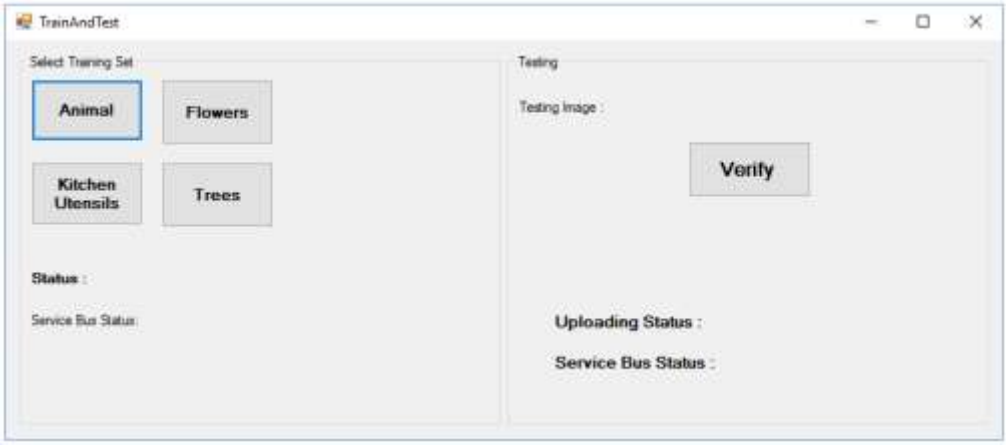

Fig.2 Uploading Images on Azure Storage

Searching Images on Azure Storage

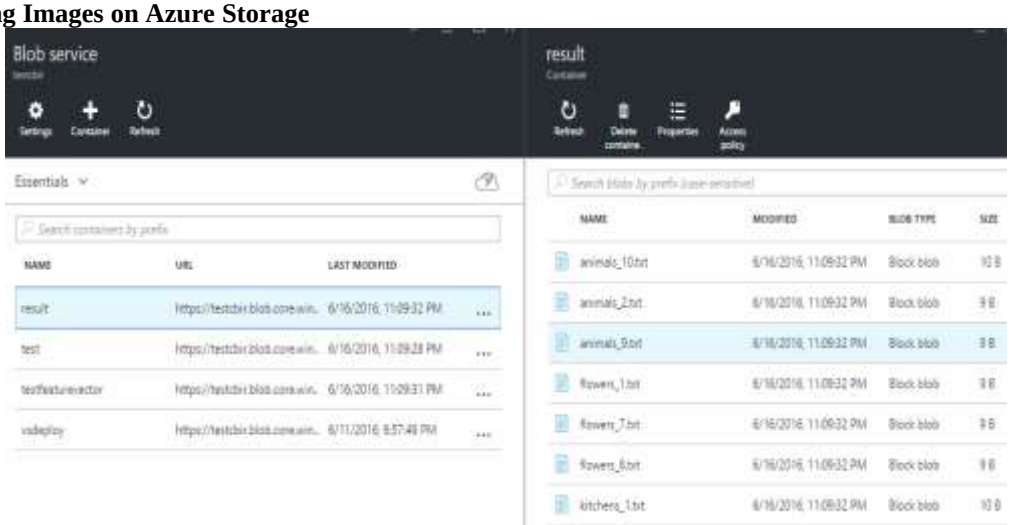

Fig.3 Searching Images on Azure Storage

VI. Conclusion

This paper proposes a cloud based architecture as a solution to many legacy systems.

Cloud Computing proves to be an efficient way for storage, thus eradicating the use of standalone systems for larger purpose. Also, the CBIR SaaS based architecture, presented in this paper, is successfully implemented using the Microsoft Azure platform.

As stated, the system results in efficient performance, scalability and minimized cost, thus building a flexible system that can operate enormous amount of data.

References

[1] Mamta Meena, Vinayak A. Bharadi, Krunali Vartak, Hybrid Wavelet Based CBIR System using Software as a Service (SaaS) Model on public Cloud, *7th International Conference on Communication, Computing and Virtualization, Elsevier, Procedia Computer Science 79 (2016) 278 – 286,*

[2] Ajay Kumar Bansal and Swati Mathur, "Feature Extraction in Content Based Image Retrieval: *A Review" in International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 and International Conference on Advancement in Information Technology(ICAIT- 23 February 2013)*

[3] Michele Saad, Content-Based Image Retrieval – A Literature Survey, 2008.

[4] Deepu Rani, Monica Goyal, A Research Paper on Content Based Image Retrieval System using Improved SVM Technique, *International Journal Of Engineering And Computer Science ISSN:2319-7242 Volume 3 Issue 12 December 2014, Page No. 9755-9760*

[5] Vinayak A Bharadi and Godson M. D'Silva, "Online Signature Recognition using Software as a Service (SaaS) Model on Public Cloud" in IEEE, *Computing Communication Control and Automation (ICCUBEA), 2015 International Conference on 26-27 Feb. 2015.*

[6] Zhuo YANG, Sei-ichiro KAMATA and Alireza AHRARY, "NIR: Content Based Image Retrieval on Cloud Computing" *in IEEE International Conference on Intelligent Computing and Intelligent Systems, 2009.*

[7] Zainab Ibrahim Abood, Israa Jameel Muhsin, Nabeel Jameel Tawfiq, "Content-based Image Retrieval (CBIR) using Hybrid *Technique" in International Journal of Computer Applications (0975 – 8887), December 2013*.

[8] K. Arthi, J. Vijayaraghavan , Content Based Image Retrieval Algorithm Using Colour Models. *International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, Issue 3, March 2013.*

[9] Mamta Meena, Anamika Ram Singh, Vinayak A. Bharadi, Architecture for Software as a Service (SaaS) Model of CBIR on Hybrid Cloud of Microsoft Azure, *7th International Conference on Communication, Computing and Virtualization, Elsevier, Procedia Computer Science 79 (2016), Page No. 569 – 578*

[10] Mamta Meena and Vinayak A. Bharadi , Novel Architecture for CBIR SAAS on Azure Cloud , *International Conference on Information Processing (ICIP), Vishwakarma Institute of Technology. Dec 16-19, 2015, IEEE*