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RESEARCH ARTICLE

A FRAMEWORK FOR HOSTING IMAGE COMPRESSION IN CLOUD

S. Girija Lakshmi¹, N.R. Gayathiri²

¹PG Scholar, Computer Science and Engineering, United Institute of Technology, Tamil Nadu, India.
girilx5@gmail.com

²Asst.Professor, Computer Science and Engineering, United Institute of Technology, Tamil Nadu, India.
gayathri.rangan@yahoo.com

ABSTRACT

Image compression is the method of transmission with minimal size without degrading the quality of the image however the result of image compression is less than optimal. Image processing is a method to convert an image into digital form and extract useful information. Cloud computing (SaaS) is based on on-demand self services with pay as use model. Software as a Service is a cloud computing service model that makes use of cloud computing infrastructure to deliver an application to many users. In the existing system, to upload a quality image in web, it requires about 20KB. The objective of this proposed work is to further reduce memory space using Haar Wavelet Transform to store and retrieve the images. The compressed image is then deployed in cloud for the efficient sharing of images among the users.

Keywords- *Image Compression, Cloud Computing, Software as a Service, Haar Wavelet Transform*

1. Introduction

Image processing is a technique in which the data from an image are digitized and various mathematical operations are applied to the data. Image compression is minimizing the size in bytes of a graphics file without degrading the quality of the original image. The decrease in file size allows more images to be stored in a given quantity of disk or memory space. The JPEG technique is more often used for photographs, while the GIF method is normally used for line art and other images in which geometric shapes are relatively simple.

Other techniques for image compression include the use of fractals and wavelets. These methods have not gained extensive acceptance for use on the Internet as of this writing.

A text file or program can be compressed without the beginning of errors, but only up to a definite level. This is called lossless compression. In image compression, a small loss in quality is usually not visible. There is no critical point up to which compression works completely, but beyond which it becomes not possible.

Compressing an image is considerably different than compressing unprocessed binary data. General purpose compression programs can be used to compress images, but the end result is less than optimal. This is because images have certain arithmetical properties which can be exploited by encoders specifically designed for them. There are two techniques in compression, lossy and lossless. In lossy compression, there will be some

loss in the original data or image. Lossless compression involves with compressing data which, when decompressed, will be an exact duplication of the original data.

1.1 Lossy Compression

As an end result, much higher compression can be achieved as compared to lossless compression.

1.2 Lossless Compression

Lossless compression also known as bit-preserving or reversible compression, the reconstructed image after compression is numerically identical to the original image on a pixel-by-pixel basis. There are a few different methods for lossless compression.

1.3 Cloud Computing

Cloud computing is a type of computing that relies on sharing computing resources quite having local servers or personal devices to handle applications. It is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.

The cloud in cloud computing can be defined as the set of hardware, networks, storage, services, and interfaces that combine to deliver aspect of computing as a service. Cloud Services include the delivery of software, infrastructure, and storage over the Internet.

This type of cloud computing deliver a single application through the browser to thousands of customers using multi tenant architecture. On the customer side, it means no direct investment in servers or software licensing; on the provider side, with just one app to maintain, costs are low compared to straight hosting. Salesforce.com is the best-known example among project applications, but SaaS is also common for HR apps and has even worked its way up the food chain to ERP, with players such as Workday.

1.4 Software as a Service in Cloud Computing

Software-as-a-Service (SaaS) is one type of cloud services, where software functionality is delivered as a service. SaaS provides benefits to service consumers; no initial cost to purchase software, free of maintenance/updates, accessibility through Internet, high availability, and pay-per-use pricing.

Software as a service (SaaS) is the ability for a consumer to use on demand software that is provided by the service provider via a thin client device e.g. a web browser over the Internet. With SaaS the consumer does not have control of the infrastructure such as the storage, servers, network, or operating systems and also no control over the application's capabilities in cloud there are many SaaS providers which provide the applications to the users. Typical architecture of the SaaS is depicted in Fig 1.4

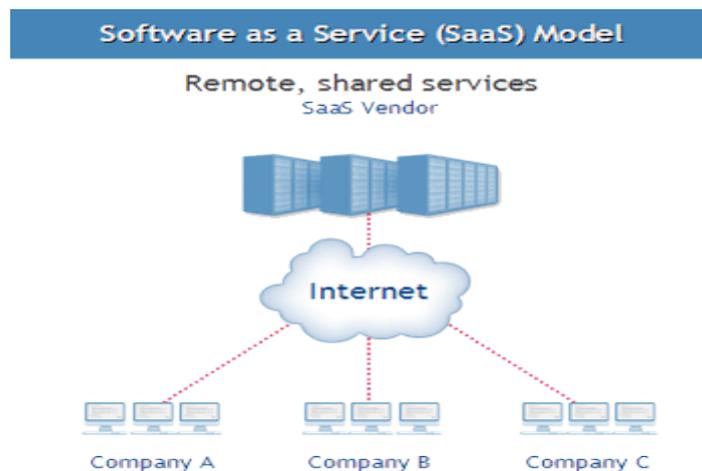


Fig 1.4 Software as Service architecture

1.5 Cloud Deployment Models

The four cloud computing deployment models are: public cloud, private cloud, hybrid cloud and community cloud.

Public Cloud

In this model, all of the physical resources are owned by a third party cloud computing provider. Services can be dynamically provisioned and are billed based usage. This model provides the highest degree of cost savings while requiring the least amount of overhead.

Private Cloud

A private cloud describes computer services delivered to a single association. This model shares many of the characteristics of traditional client-server architecture.

Hybrid Cloud

The hybrid cloud computing model employs aspect of all of the other cloud models and it is the most common method of cloud deployment within a large association.

2. Related Works

Image processing is one of the most important fields nowadays. Image compression makes the job easier which reduces the time frequency.[1]Many new compression algorithms have been developed which results in high performance. Embedded zero tree algorithm, set partitioning in hierarchical algorithms are used which achieves lowest error per compression rate and highest perceptual quality.[2]Efficient schema for calculation of 2D wavelet transformation is used.[3]The 2D discrete wavelet transform is been applied and the corresponding matrices are obtained.[4]Neural networks is used to establish the non linear relationship between the intensity and the compression ratio. The comparison between the two neural networks receiving the different image sizes is analyzed for the performances.[5] Wavelet transform is used as an advanced technique for image compression. In that modified fast haar wavelet transform reduces the calculation work.[6] Comprehensive model for evaluating quality of SaaS and it can be also evaluated by both service providers.[7] Novel optimization approach for service deployment is used to overcome deployment cost and the influence of service deployment to the cloud.

3. Proposed Work

Image compression is used for easy storing and efficient retrieval of the images which reduces the memory space. Haar Wavelet Transform is used for compressing the image in smaller size and the compression ratio is as small as the other techniques. This compression is deployed in cloud environment as a software where it can be used and shared among the multiple users.

4. Experimental Results and Analysis

Haar wavelet transform uses a method for manipulating the matrices called averaging and differencing. All the rows of the matrix is taken and averaging is done. Then the differencing process is calculated for the entire column matrix. This matrix is called semi final matrix. Then the last semifinal matrix and the original matrix are compared and the compression ratio is calculated.

5. Conclusion

Image compression is performed using haar wavelet transform which reduces the computational cost and efficiently performs the compression of the image. Memory space is reduced since the compression ratio is greatly reduced by proposed technique.

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