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MEDICAL IMAGE COMPRESSION USING DISCRETE WAVELET TRANSFORMATION (DWT)

GAJJELA DURGA RAO [#1], **V.SARALA** [#2]

[#1] MCA Student, Master of Computer Applications,

D.N.R. College, P.G.Courses & Research Center, Bhimavaram, AP, India.

[#2] Assistant Professor, Master of Computer Applications,

D.N.R. College, P.G.Courses & Research Center, Bhimavaram, AP, India.

Abstract

Compression involves the process of transforming the image from one form to another form, which occupies less space when compared to original file. The format of source play a vital role to decide the size of output file. File types like ‘JPEG’ are already in compressed format so there is no need to again compress them. Here we try to implement compression of large format image type “BITMAP” which occupies large size. Medical images are important to store to know about the patients nature of disease. Thus large images take more disc space for the hospital to store them. Hence we need to compress those medical images for saving the disc space and also it is easier to transport those small size compressed images.

1. INTRODUCTION

Medical images are important to store to know about the patients nature of disease. Thus large images take more disc space foe the hospital to store them. Hence we need to compress those medial images for saving the disc space and also it is easier to transport those small size compressed images.Various terms, abbreviations used in the system are as follows:

a) IMAGE:

Image is a rectangular plot of pixels which determine a specific instance of internal or external view of body parts.

b) PIXEL:

A pixel is the least addressable point in an image which gives some information about the body or organ.

c) **GREY-VALUE:**

Grey-value refers to the intensity of the pixel that it generates. It gives measure of reflectance of light at that point.

d) **NORMALIZE:**

Normalizing is the method of converting the image from any grey-level to that of the prescribed grey-level,

e) **SIZE OF IMAGE:**

Size of an image is denoted as (r x c) 'r' represents no. of rows 'c' represents no. of columns

PROBLEM STATEMENT

In general the bit map images are large in size, hence compression of bitmap images plays a very vital role. In general all the existing system try to reduce the size by using either Photoshop or any other photo editing software&#39;s and then reduce the data. But by using the photo editing software the data quality will be disturbed and original data will not be visible clearly for analysis.

To compress an image we use the following technique. In this method we just divide the image into 4 partitions and subdivide them. The division is continued until no division is possible. Later by constructing a tree called Spatial Orientation Tree (SOT) we get the nodes and compare the parent and child and grand nodes with respective threshold values and obtain the nodes. It as 2 distinct sets called

1. Least Significant Pixels (LSP)
2. Least insignificant Pixels (LIP)

Then the LSP are stored for the resultant compressed image file. Thus the compressed file is generated

Here we try to implement compression of large format image type "BITMAP" which occupies large size. Medical images are important to store to know about the patients nature of disease. Thus large images take more disc space for the hospital to store them. Hence we need to compress those medical images for saving the disc space and also it is easier to transport those small size compressed images.This project would be very useful for all users who want to reduce the size of medical images without using any morphing tools.

2. LITERATURE SURVEY

Usually hospitals and patients need to store the images taken during the time of treatment. The case history is to be maintained by them for future reference. Storage of large images is a critical task for them. So they need to store them in an compressed format. There are several operations to be performed in 'Image Compression. They ate performed extract information from the images. The operations are as follows:

IMAGE LOADING:

This involves several methods of reading the image from disc and display the image on screen. The method should be implemented to read all kinds or images.

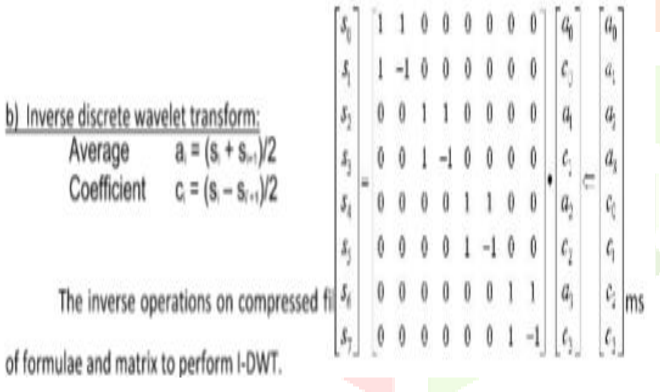
NORMALIZING:

Normalizing is the process of adjusting the range of grey values of the image. Images used to analyse the effect of filters ate of different grey ranges. We must transform them into a unique range before applying filters. This is done by the range of normalizing,

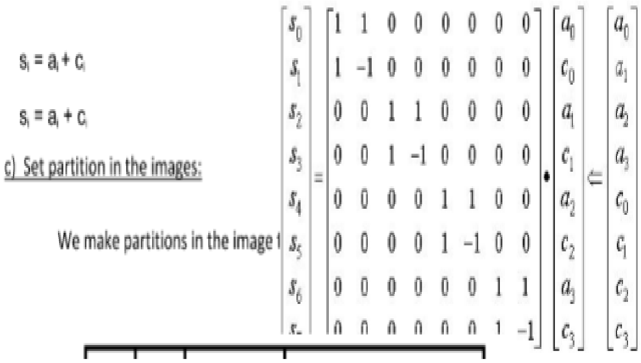
Customers of the system are 'DOCTORS' that take decisions on the results obtained from past treatments so need to know the results of the old. This needs to store them in the form of images, which takes less space with help of the system. Users of the system are 'PATIENTS' who come for treatment with reports given in the form of images, x-rays etc. need to store them for their future reference. Medical images are important to store to know about the patients nature of disease. Thus large images take more disc space foe the hospital to store them. Hence we need to compress those medial images for saving the disc space and also it is easier to transport those small size compressed images.System should read an image that is selected by user.System should be able to provide information about image like grey-levels present.System should normalize given image before doing any operation.System should be able to transform the image into a wavelet form which is easy to encode or compress.

A) DISCRETE WAVELET TRANSFORM:

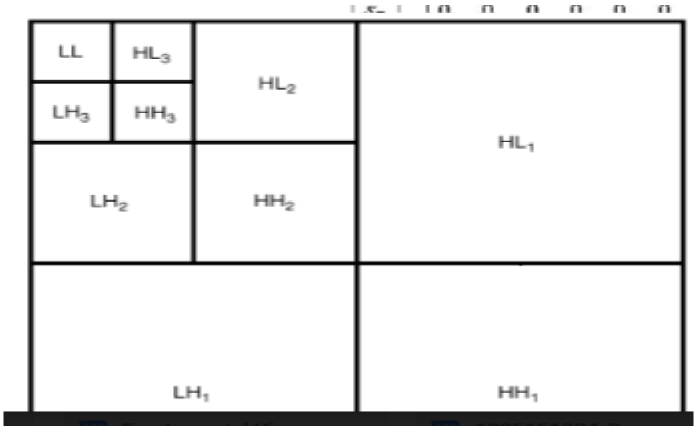
The Haar equations to calculate an average and a wavelet coefficient from an odd and even element in the data set are shown below. These are the forms of formulae and matrix to perform DWT.


b) Inverse discrete wavelet transform:
Average a = (s + s)/2
Coefficient c = (s – s)/2
The inverse operations on compressed fi
ms
of formulae and matrix to perform I-DWT.

$$\begin{bmatrix} s_0\\ s_1\\ s_2\\ s_3\\ s_4\\ s_5\\ s_6\\ s_7 \end{bmatrix} = \begin{bmatrix} 1&1&0&0&0&0&0&0\\ 1&-1&0&0&0&0&0&0\\ 0&0&1&1&0&0&0&0\\ 0&0&1&-1&0&0&0&0\\ 0&0&0&0&1&1&0&0\\ 0&0&0&0&1&-1&0&0\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&1&-1 \end{bmatrix} \bullet \begin{bmatrix} a_0\\ c_0\\ a_1\\ c_1\\ a_2\\ c_2\\ a_3\\ c_3 \end{bmatrix} \Leftarrow \begin{bmatrix} a_0\\ a_1\\ a_2\\ a_3\\ c_0\\ c_1\\ c_2\\ c_3 \end{bmatrix}$$


s = a + c
s = a + c
c) Set partition in the images:
We make partitions in the image t

$$\begin{bmatrix} s_0\\ s_1\\ s_2\\ s_3\\ s_4\\ s_5\\ s_6\\ s_7 \end{bmatrix} = \begin{bmatrix} 1&1&0&0&0&0&0&0\\ 1&-1&0&0&0&0&0&0\\ 0&0&1&1&0&0&0&0\\ 0&0&1&-1&0&0&0&0\\ 0&0&0&0&1&1&0&0\\ 0&0&0&0&1&-1&0&0\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&1&-1 \end{bmatrix} \bullet \begin{bmatrix} a_0\\ c_0\\ a_1\\ c_1\\ a_2\\ c_2\\ a_3\\ c_3 \end{bmatrix} \Leftarrow \begin{bmatrix} a_0\\ a_1\\ a_2\\ a_3\\ c_0\\ c_1\\ c_2\\ c_3 \end{bmatrix}$$



3. EXISTING SYSTEM

In general the bit map images are large in size, hence compression of bitmap images plays a very vital role. In general all the existing system try to reduce the size by using either Photoshop or any other photo editing software&#39;s and then reduce the data. But by using the photo editing software the data quality will be disturbed and original data will not be visible clearly for analysis.

LIMITATION OF EXISTING SYSTEM

The following are the main limitations of the existing system. They are as follows:

1) Not Accurate

2) It is not efficient for reducing the size manually through photo editing software&#39;s

3) The data quality will be disturbed if we compress the image with normal editing software’s.

4. PROPOSED SYSTEM

To compress an image we use the following technique. In this method we just divide the image into 4 partitions and subdivide them. The division is continued until no division is possible. Later by constructing a tree called Spatial Orientation Tree (SOT) we get the nodes and compare the parent and child and grand nodes with respective threshold values and obtain the nodes. It as 2 distinct sets called

1. Least Significant Pixels (LSP)

2. Least insignificant Pixels (LIP)

Then the LSP are stored for the resultant compressed image file.

Thus the compressed file is generated

ADVANTAGES OF THE PROPOSED SYSTEM

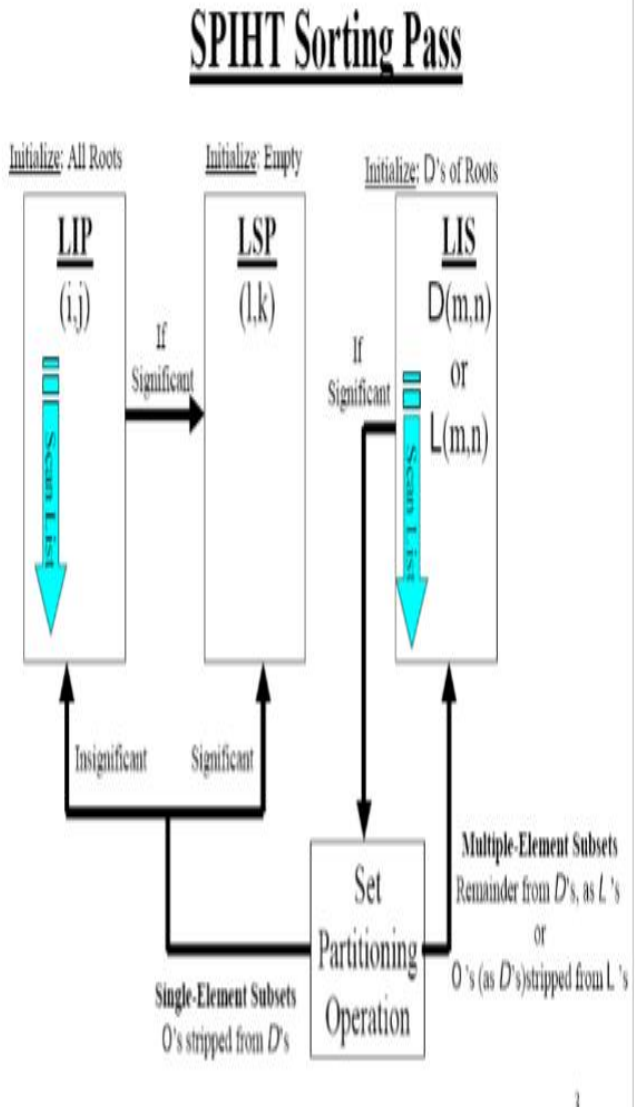
The following are the advantages of the proposed system. They are as follows:

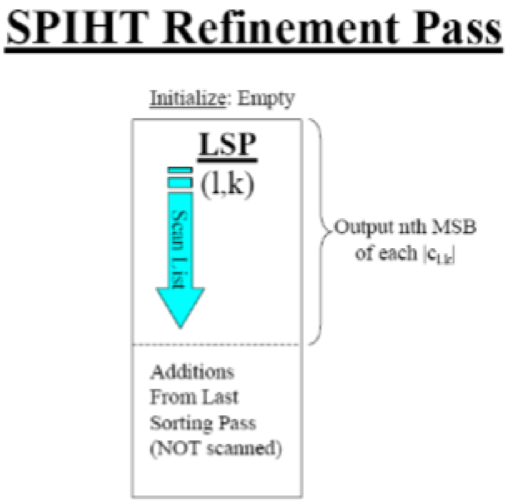
1) This is going to generate images into compressed manner without any morphing.

2) Here the images quality is not going to be disturbed or altered.

3) Here only un-used memory space is compressed rather than useful pizels.

5. ARCHITECTURE



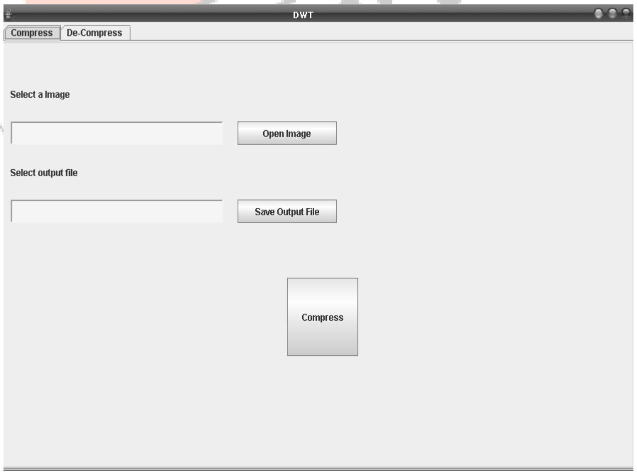

SPIHT Refinement Pass
Initialize: Empty
LSP
(l,k)
Scan List
Output nth MSB of each $|c_{l,k}|$
Additions From Last Sorting Pass (NOT scanned)

6. RESULTS

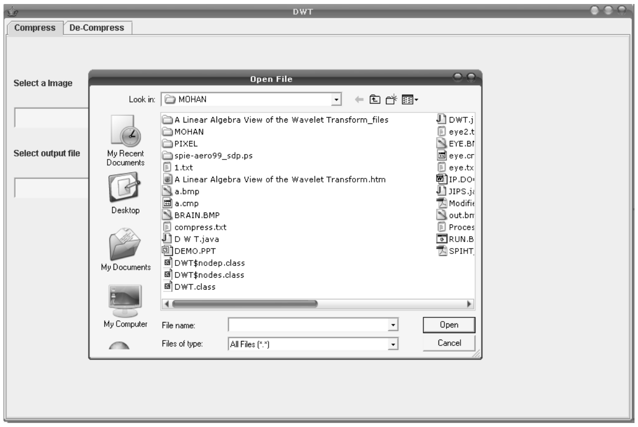
The output of the project can be explained with the help of the sample run of the project to get the clear view for the user or client to understand the work of the project. The complete run of project will be noted and submitted in the form of a report to the client.

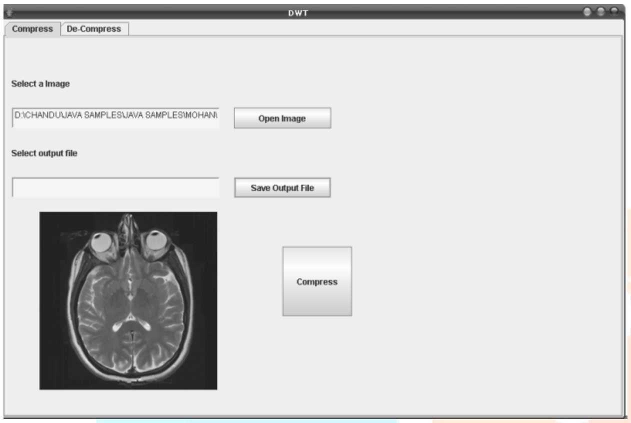
The various activities performed in this step are

- ✓ Compression of image
- ✓ De-compression of file



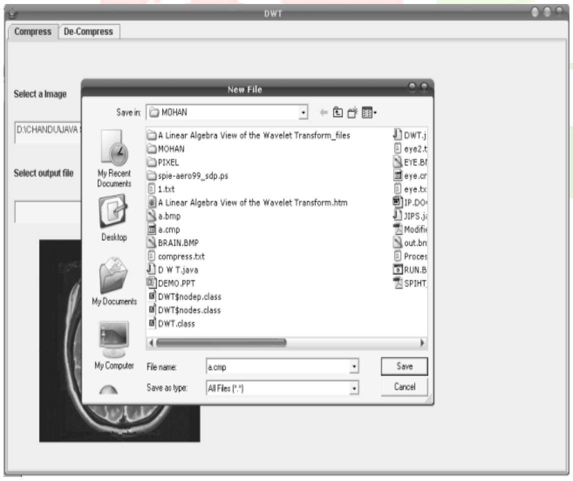
SELECT A INPUT IMAGE





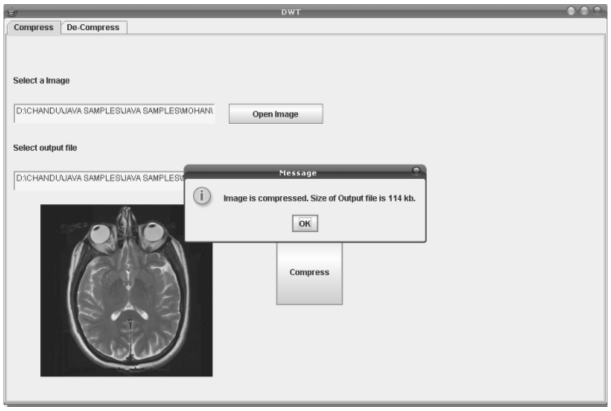
Select a Image: D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\

SELECTION OF OUTPUT FILE:



File name: a.cmp

SELECTION OF COMPRESS FUNCTION:

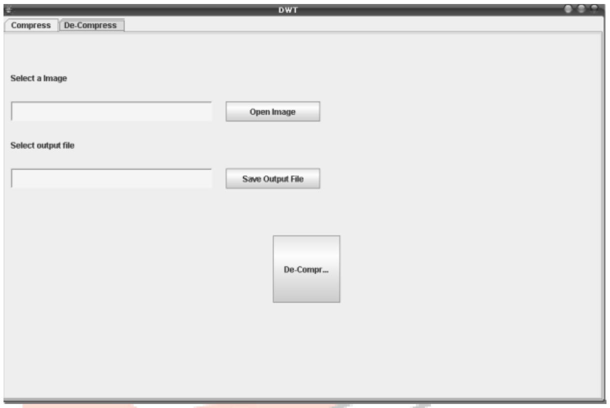


D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\

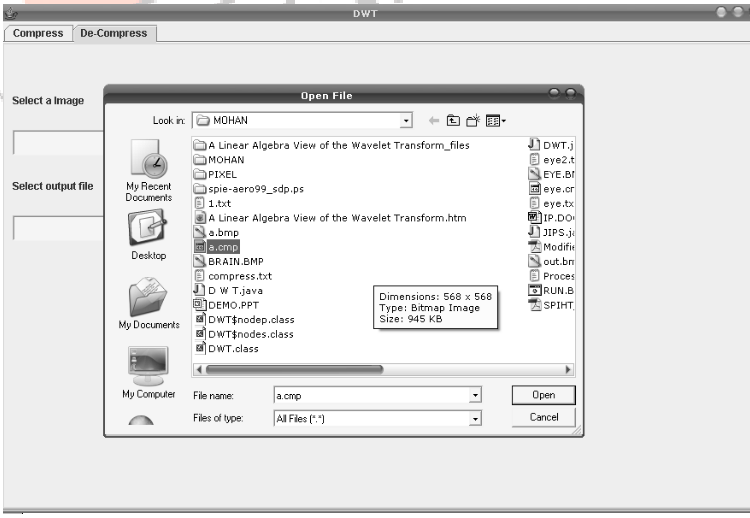
D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES

Image is compressed. Size of Output file is 114 kb.

FOR SELECTION OF DECOMPRESSION, SELECT THE TAB



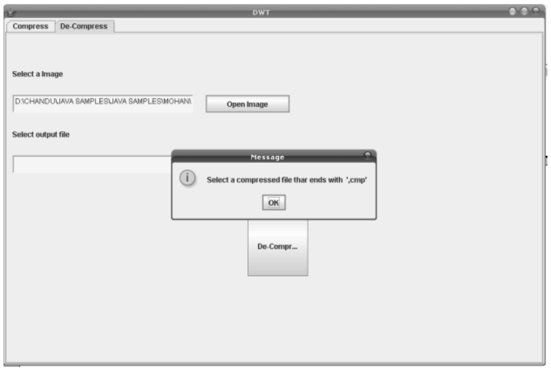
SELECT THE COMPRESSED FILE AND SELECT THE IMAGE FILE:



Dimensions: 568 x 568
Type: Bitmap Image
Size: 945 KB

File name: a.cmp

SELECTED OF WRONG FILE

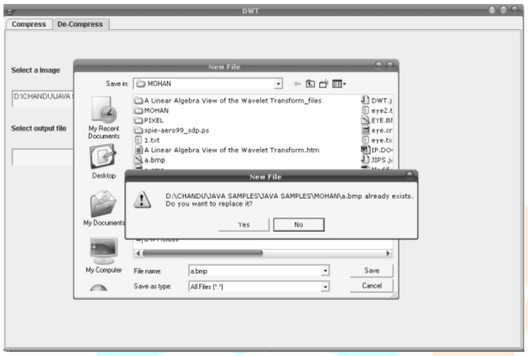


Select a Image

D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\

Select output file

Select a compressed file thar ends with ',cmp'



Select a Image

D:\CHANDU\JAVA

Select output file

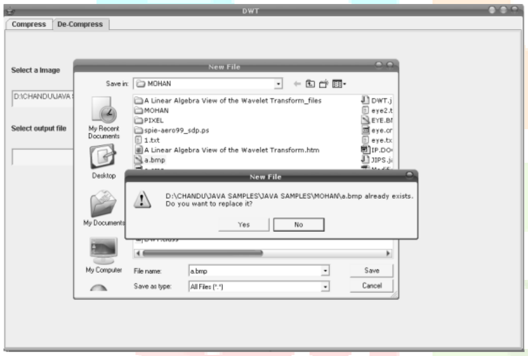
Save in: MOHAN

A Linear Algebra View of the Wavelet Transform_files
MOHAN
PIXEL
spie-aero99_sdp.ps
1.txt
A Linear Algebra View of the Wavelet Transform.htm
a.bmp
DWT.j
eye2.t
EYE.BI
eye.cr
eye.tx
IP.DO
JIPS.j

D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\a.bmp already exists.
Do you want to replace it?

File name: a.bmp

Save as type: All Files (*.*)



Select a Image

D:\CHANDU\JAVA

Select output file

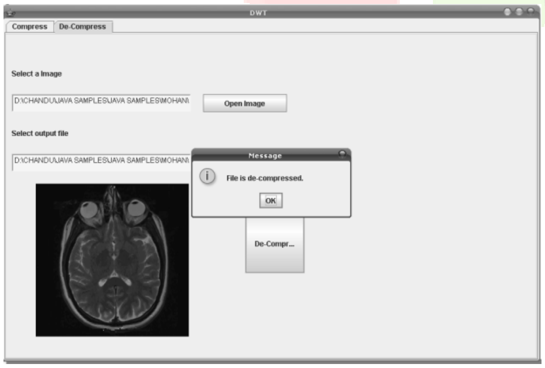
Save in: MOHAN

A Linear Algebra View of the Wavelet Transform_files
MOHAN
PIXEL
spie-aero99_sdp.ps
1.txt
A Linear Algebra View of the Wavelet Transform.htm
a.bmp
DWT.j
eye2.t
EYE.BI
eye.cr
eye.tx
IP.DO
JIPS.j

D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\a.bmp already exists.
Do you want to replace it?

File name: a.bmp

Save as type: All Files (*.*)



Select a Image

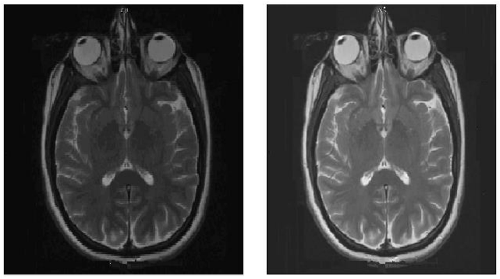
D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\

Select output file

D:\CHANDU\JAVA SAMPLES\JAVA SAMPLES\MOHAN\

File is de-compressed.

Complete comparative screen will be as follows:



7. CONCLUSION

The compression processed implemented here is applied to **'BITMAP'** images since they occupy a vary large space. Most of the Bio-Informatics software's use BITMAP'S as a output file.

8. REFERENCES

1. The Complete Reference, by Patrick Naughton, and Herbert Schildt
2. JAVA Swings Matthew Robinson
3. O'reillys JAVA Swings by Robert Eckstein, Mare Loy & Dave Wood
4. Referred to http://www.tropsoft.com/strongenc/rijndael.htm
5. Referred to http://www.bitpipe.com/tlist/Password-Authentication-Protocol.html
6. Object-Oriented Software Engineering by Jacobson, Rambaugh, Booch
7. Digital Watermarking and Stegnography, Second Edition; Cox, Miller, Bloom, Fridrich, and Kalker. Morgan Kaufmann. 2008
8. A Handbook of Applied Cryptography by Alfred J. Menezes,Paul C.
9. A Course in Number Theory and Cryptograph Neal Koblitz, Springer 1987