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IMAGE SMOOTHENING AND MORPHOLOGICAL OPERATORS BASED JPEG COMPRESSION

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ABSTRACT

Over the past decades the magnitude of transmitted information through internet has amplified exponentially. The considerable way to compress an image is provided by image compression. JPEG is the core triumphant still image compression for band width conservation. So images can be accumulated and transmitted earlier. Mathematical morphology is an inventive mathematical theory which can be used to route and appraise the images. In this paper, we intend an innovative JPEG compression algorithm based on fundamental morphological operators dilation and erosion and the other morphological operations which are the amalgamation of the two basic operations. The planned JPEG algorithms shows improved results compared to standard JPEG compressed data in terms of image quality metrics like PSNR, MSE and encoded bits. The planned JPEG algorithms augments speed while lessen memory necessities by reducing the encoded bits. The reconstructed images after decompression are at par with the original image data.

Keywords: *Image Compression, Morpholoigcal operators, Smoothening, PSNR, MSE*

1. INTRODUCTION

A set of symbols are produced by the encoder once an input image f(x, y) is fed to it. An encoded image is fed to the decoder after the transmission through the channel. Decoder generates a restructured image f'(x,y). In lossless compression the output f'(x, y) is an exact reproduction of f(x, y). If not, some level of misrepresentation is in attendance in the reconstructed image.

The Joint Photographic Experts Group JPEG (the name of the committee that created the JPEG standard), is a recognizable lossy compression algorithm for images. The data in the image is represented imprecisely with lossy compression proposal, but JPEG compression uses less memory, and the data in the decompressed image appears to be very similar. The quality with JPEG compression is reduced considerably but the images will approximately look the same as the original images. The JPEG algorithm eradicates high frequency components that the human eye can't recognize. JPEG compression is the preeminent technique for the images with smooth color conversion.

1.1 JPEG Algorithm

The fairly uncomplicated algorithm behind JPEG can be elucidated through the following steps:

1. The acquired image can be divided it into 8-pixel by 8-pixel blocks. If the image size is not exactly multiplied by 8, then add zeros in empty pixels around the edges.

2. For each 8-by-8 block, get image data such that you have values to represent the color at each pixel.

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3. The Discrete Cosine Transform (DCT) of each 8-by-8 block be obtained.

4. In order to make a number of values as zero from the DCT matrix, the DCT of each 8X8 block should be multiplied by a normalized mask.

5. Normalization abandons most of the high frequency components. Next the assortment of important 2-D normalized DCT Coefficients by traversing in ZIGZAG fashion and categorizing them in a 1-D array. In 1-D array, the two types of DCT coefficients the first one is termed as direct current (DC) element, while other coefficients are called alternating current (AC) elements. Variable length Huffman coding is used to code AC components.

6. The reverse operation of compression is decompression. First calculates the normalized DCT values by decoding the compressed bit stream by Huffman codes. Then, all DCT values are organized in 2-D array by zigzag fashion explained previously. The decoded DCT values are obtained by multiplying them with normalization coefficients. Now an IDCT is executed on the denormalized DCT array. The decoding process engenders ensuing image block will not be identical as respective original image block used during encoding.

Mathematical morphology is an innovative mathematical theory which can be used to itinerary and evaluate the images. Based on the observation of set theory and not on conventional mathematical morphology theory it provides a substitute approach to image processing. The images are treated as sets and to haul out features in images Minkowski addition and subtraction are defined in the mathematical Morphology theory.

Morphological techniques prod an image with a miniature profile or outline called a structuring element. The structuring element is situated at all probable locations in the image and it is compared with the corresponding neighborhood of pixels. Structuring Elements represented in the form of matrices which includes 0's and 1's so the structuring elements is simply a binary image that allows us to exemplify slanted locality structures.

2. PLANNED NEW-FANGLED JPEG COMPRESSION ALGORITHMS

If in 8x8 blocks include lot of dissimilarity in pixel values then the number of constructive DCT coefficients will grow to be more. Otherwise only first few DCT coefficients will be more noteworthy while others are zeros. On the application of filters the image gets smoothened as a result the distinction of the pixel values of a block abridged.

The planned JPEG algorithms are executed in three different ways.

1) Before partitioning the image into 8X8 blocks the image is convoluted with basic morphological operator (Dilation/ Erosion/ Opening/ Closing).
2) Previous to carve up the image into 8X8 blocks, the image is convoluted with mean filter followed by basic morphological operator.
3) Earlier than segregating the image into 8X8 blocks the image is convoluted with median filter followed by basic morphological operator.

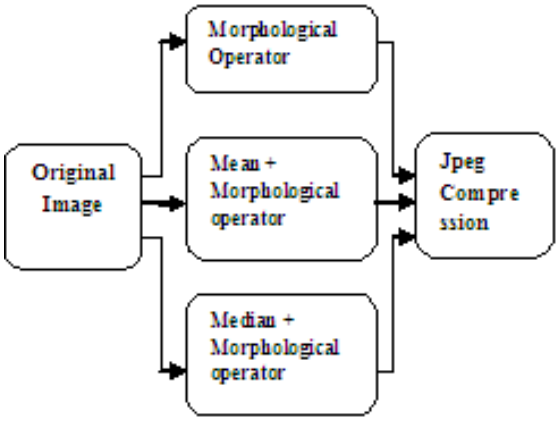

Fig1: Structure of Planned Morphological Based JPEG Algorithms.

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2.1 Dilation

Dilation is a process of sliding of structuring element B on image A and is analogous to convolution.

If white pixel in the image matches with the origin of the structuring element then there is no change, and then move to the consequent pixel.

Dilation is represented as: **A ⊕ B**

2.2 Erosion

The erosion process is analogous to dilation

At least one of the black pixels in the structuring element falls over a white pixel in the image, and then changes the 'black' pixel in the image from black to a white if the origin of the structuring element coincides with a black pixel in the image.

Erosion is represented as: **A Θ B**

2.3 Opening and Closing:

Opening and closing are the amalgamation of two obligatory operations, dilation and erosion into more fused sequences. Opening is a practice in which erosion followed by dilation, and closing is a process of Dilation followed by erosion.

The Opening process is as below: A◦B = (AΘB) ⊕ B

The Closing Process is as below: A·B = (*A* ⊕ B) Θ B

The inner part of the image is filtered by erosion while outer part of the image is filtered by dilation. Opening normally smoothens the breaks, tapered gaps and Closing tends to merge narrow breaks, eradicates small holes Therefore, the edges of the images can be noticed by morphological operations.

The fundamental mathematical morphological operators are dilation and erosion. Dilation expands the image with increase in the grey-scale value of the image. Dilation/Erosion based image compression is performed in three different ways. In the first part of morphological operator based JPEG compression the original image is dilated/ eroded/ opened/ closed with structuring element [1 1 1; 1 1 1; 1 1 1] and then the regular JPEG compression is performed.

The second part of morphological operator based Jpeg compression, the mean of the original image is calculated first then the image undergone a morphological operation with structuring element [1 1 1; 1 1 1; 1 1 1] finally JPEG compression is applied on the same image [$\sum_{k=0}^{n} Sk$ (Mean) + (Dilation/ Erosion/ Opening/ Closing) + Jpeg compression].

The third part of morphological operator based JPEG compression, the median of the original image is computed followed by morphological operation with the structuring element mentioned earlier before the application of JPEG compression [Median + (Dilation/ Erosion/ Opening/ Closing) + Jpeg compression].

3. IMPLEMENTATION OF PLANNED JPEG ALGORITHMS

In this work morphological operators based Jpeg compression is performed on images of size 256X256, 512X512 and 1024X1024. Assessment of results designates that the newly projected compression techniques are enormously an attractive alternate since they are proved to be better in terms of image quality metrics like PSNR and MSE.

N1 is the quantity of information carrying units required to signify uncompressed datasets and N2 is the number of elements in the encoded dataset. The N1 and N2 are represented with same units.

$C_R = N1/N2$

When the uncompressed quantity N1<< encoded data set N2, $C_R \rightarrow$ outsized value and $R_D \rightarrow 1$ designates enhanced compression.

The reconstructed image is indistinguishable to the original image with lossless compression algorithms as they not only eradicate redundancy

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present in the data but also preserves all the information present in the input image.

The decompressed image will not be the same to the original image with lossy compression algorithms. So higher compression is achievable with lossy algorithms. In order to identify the distinction between original and decompressed image, we can classify either Objective fidelity criteria or subjective fidelity criteria.Root mean square (RMS) error is a superior example for objective fidelity criteria and is used to achieve the dissimilarity between on input and output image.

Out of these proposed morphological based JPEG compressions the part in which the mean followed by morphological operator encodes the image with less number of bits as a result the image will transferred with high speed.

The essential connotation in image processing is the measurement of image quality. Estimation is obligatory for image quality in many image processing applications. The discernment of human of image quality is not ample. So we necessitate some more image quality metrics like Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR). The most recognizable image quality metric is PSNR. If PSNR value is high then the dissimilarity between the original image and restructured image will be diminutive.

4. RESULTS

This paper examines the comparision between the proposed morphological approaches with the standard JPEG compression. The planned approaches illustrate enhanced results compared to the JPEG. This paper makes use of MATLAB tools to admittance the proposed alogorithms and the images are downloaded from SIPI image database.

Table1: JPEG Compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse
Mri.tif	524288	55642	468646	3.34	37.68	11.18
Lion.tif	524288	62449	461839	5.25	33.76	27.57
7.2.01.tiff	8388608	602681	7785927	3.45	49.44	11.92
7.1.03.tiff	2097152	206069	1891083	3.80	42.58	14.47
7.1.01.tiff	2097152	209440	1887712	3.54	43.21	12.50
6.2.01.tiff	524288	68934	455354	4.17	35.77	17.35
6.1.01.tiff	524288	37036	487252	1.89	42.65	3.56
5.3.01.tiff	8388608	853840	7534768	3.51	49.31	12.29
5.2.09.tiff	2097152	320761	1776391	4.51	41.10	20.36
5.1.12.tiff	524288	45218	479070	3.05	38.48	9.30
5.1.09.tiff	524288	51803	472485	4.26	35.58	18.15
8.512.tiff	2097152	103808	1993344	1.39	51.33	1.93
Elaine.512 .tiff	2097152	177004	1920148	4.04	42.07	16.28

Table 2: Dilation based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	51240	473048	3.16	38.17	10.00	10.23
Lion.tif	524288	45311	478977	2.84	39.09	8.09	11.57
7.2.01.tiff	8388608	594093	7794515	2.18	53.45	4.74	14.12
7.1.03.tiff	2097152	150425	1946727	2.38	46.65	5.66	13.94
7.1.01.tiff	2097152	151988	1945164	2.36	46.74	5.55	13.79
6.2.01.tiff	524288	35001	489287	1.82	42.96	3.31	14.97
6.1.01.tiff	524288	56906	467382	3.36	37.65	11.27	9.21
5.3.01.tiff	8388608	786246	7602362	2.90	50.96	8.41	10.66
5.2.09.tiff	2097152	240846	1856306	3.45	43.42	11.91	8.70
5.1.12.tiff	524288	38546	485742	2.56	40.00	6.55	13.60
5.1.09.tiff	524288	45491	478797	2.96	38.73	8.77	11.52
8.512.tiff	2097152	98843	1998309	1.24	52.29	1.55	21.21
Elaine.512 .tiff	2097152	155856	1941296	2.38	46.64	5.68	13.45

Table3: Mean + Dilation based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	43083	481205	2.47	40.31	6.10	12.16
Lion.tif	524288	34754	489534	4.21	35.67	17.77	15.08
7.2.01.tiff	8388608	401139	7987469	2.54	52.10	6.47	20.91
7.1.03.tiff	2097152	125147	1972005	2.33	46.83	5.44	16.75
7.1.01.tiff	2097152	131450	1965702	2.01	48.11	4.05	15.95
6.2.01.tiff	524288	32064	492224	1.09	47.44	1.18	16.35
6.1.01.tiff	524288	46158	478130	2.94	38.80	8.64	11.35
5.3.01.tiff	8388608	628838	7759770	2.46	52.40	6.04	13.33
5.2.09.tiff	2097152	206604	1890548	2.90	44.93	8.42	10.15
5.1.12.tiff	524288	34329	489959	2.10	41.70	4.43	15.27
5.1.09.tiff	524288	30441	493847	2.95	38.77	8.70	17.22
8.512.tiff	2097152	90994	2006158	0.81	56.04	0.65	23.04
Elaine.512 .tiff	2097152	127316	1969836	2.59	45.91	6.73	16.47

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Table4: Median + Dilation based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	46758	477530	2.76	39.36	7.60	11.21
Lion.tif	524288	37581	486707	3.84	36.48	14.74	13.95
7.2.01.tiff	8388608	417026	7971582	1.42	57.18	2.01	20.11
7.1.03.tiff	2097152	128501	1968651	1.94	48.44	3.76	16.32
7.1.01.tiff	2097152	134702	1962450	2.01	48.12	4.04	15.56
6.2.01.tiff	524288	33617	490671	1.75	43.32	3.05	15.59
6.1.01.tiff	524288	49343	474945	2.87	38.99	8.26	10.62
5.3.01.tiff	8388608	666973	7721635	2.39	52.67	5.70	12.57
5.2.09.tiff	2097152	214774	1882378	3.02	44.57	9.15	9.76
5.1.12.tiff	524288	36124	488164	1.97	42.28	3.87	14.51
5.1.09.tiff	524288	31045	493243	2.83	39.12	8.02	16.88
8.512.tiff	2097152	94739	2002413	1.16	52.92	1.34	22.12
Elaine.512 .tiff	2097152	134028	1963124	2.46	46.35	6.07	15.64

Table5: Erosion based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	47298	476990	9.90	28.25	97.97	11.08
Lion.tif	524288	45574	478714	11.48	26.97	131.70	11.50
7.2.01.tiff	8388608	409731	7978877	8.09	42.05	65.38	20.47
7.1.03.tiff	2097152	183670	1913482	11.41	33.64	113.40	11.41
7.1.01.tiff	2097152	202341	1894811	10.57	33.70	111.80	10.36
6.2.01.tiff	524288	34561	489727	7.19	31.03	51.74	15.16
6.1.01.tiff	524288	56579	467709	11.47	26.97	131.97	9.26
5.3.01.tiff	8388608	701474	7687134	9.91	40.28	98.24	11.95
5.2.09.tiff	2097152	296406	1800746	11.76	32.77	138.40	7.07
5.1.12.tiff	524288	41012	483276	7.71	30.43	59.40	12.78
5.1.09.tiff	524288	49501	474787	11.23	27.16	126.12	10.59
8.512.tiff	2097152	97366	1999786	4.78	40.89	22.88	21.53
Elaine.512 .tiff	2097152	160362	1936790	10.59	33.69	112.12	13.07

Table6: Mean + Erosion based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	41530	482758	8.64	29.43	74.73	12.62
Lion.tif	524288	37142	487146	8.75	29.32	76.58	14.11
7.2.01.tiff	8388608	360685	8027923	5.58	45.27	31.16	23.25
7.1.03.tiff	2097152	142567	1954585	8.05	36.07	64.80	14.70
7.1.01.tiff	2097152	154928	1942224	8.45	35.64	71.46	13.53
6.2.01.tiff	524288	33319	490969	7.02	31.24	49.27	15.73
6.1.01.tiff	524288	47843	476445	9.88	28.27	97.65	10.95
5.3.01.tiff	8388608	620375	7768233	8.23	41.90	67.76	13.52
5.2.09.tiff	2097152	234950	1862202	10.50	33.76	110.18	8.92
5.1.12.tiff	524288	39275	485013	13.34	30.63	56.63	13.34
5.1.09.tiff	524288	36561	487727	8.32	29.77	69.16	14.34
8.512.tiff	2097152	103679	1993473	4.72	40.71	22.26	20.22
Elaine.512 .tiff	2097152	136723	1960429	7.84	36.29	61.53	15.33

Table7: Median + Erosion based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	44166	480122	8.73	29.43	76.27	11.87
Lion.tif	524288	38216	486072	8.74	29.32	76.37	13.71
7.2.01.tiff	8388608	364463	8024145	5.86	45.27	34.39	23.01
7.1.03.tiff	2097152	143660	1953492	7.75	36.07	60.12	14.59
7.1.01.tiff	2097152	160315	1936837	8.10	35.64	65.67	13.08
6.2.01.tiff	524288	33310	490978	6.74	31.24	45.40	15.73
6.1.01.tiff	524288	50416	473872	10.39	28.27	97.02	10.39
5.3.01.tiff	8388608	641827	7746781	8.32	41.90	69.23	13.06
5.2.09.tiff	2097152	254619	1842533	10.18	33.76	103.62	8.23
5.1.12.tiff	524288	37911	486377	6.73	30.63	45.26	13.82
5.1.09.tiff	524288	34354	489934	2.14	29.77	4.56	15.26
8.512.tiff	2097152	93843	2003309	4.31	40.71	18.56	22.34
Elaine.512 .tiff	2097152	136780	1960372	7.72	36.29	59.64	15.33

Table 8: Opening based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	48534	475754	5.78	32.92	33.43	10.80
Lion.tif	524288	42962	481326	8.89	29.18	79.08	12.20
7.2.01.tiff	8388608	408580	7980028	6.25	44.29	39.06	20.53
7.1.03.tiff	2097152	166271	1930981	6.65	37.73	44.18	12.62
7.1.01.tiff	2097152	181471	1915681	5.91	38.76	34.90	11.55
6.2.01.tiff	524288	55390	468898	7.54	30.61	56.91	9.46
6.1.01.tiff	524288	34907	489381	2.88	38.99	8.27	15.01
5.3.01.tiff	8388608	696625	7691983	6.23	44.32	38.78	12.04
5.2.09.tiff	2097152	278756	1818396	7.36	36.84	54.23	7.52
5.1.12.tiff	524288	40074	484214	4.61	34.88	21.29	13.08
5.1.09.tiff	524288	40569	483719	7.30	30.90	53.27	12.92
8.512.tiff	2097152	97332	1999820	21.54	47.35	4.83	21.54
Elaine.512 .tiff	2097152	150988	1946164	7.17	37.07	51.44	13.88

Table 9: Mean + Opening based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	42294	481994	5.18	33.88	26.81	12.39
Lion.tif	524288	37482	486806	6.77	31.55	45.84	13.98
7.2.01.tiff	8388608	374161	8014447	4.28	47.59	18.28	22.41
7.1.03.tiff	2097152	141510	1955642	5.21	39.85	27.13	14.81
7.1.01.tiff	2097152	149208	1947944	5.00	40.20	25.01	14.05
6.2.01.tiff	524288	48090	476198	6.75	31.58	45.57	10.90
6.1.01.tiff	524288	34299	489989	3.43	37.46	11.75	15.28
5.3.01.tiff	8388608	626271	7762337	5.22	45.85	27.27	13.39
5.2.09.tiff	2097152	227995	1869157	7.00	37.28	49.01	9.19
5.1.12.tiff	524288	39217	485071	5.30	33.68	28.11	13.36
5.1.09.tiff	524288	35391	488897	5.66	33.11	32.03	14.81
8.512.tiff	2097152	105262	1991890	2.55	46.04	6.53	19.92
Elaine.512 .tiff	2097152	136525	1960627	4.95	40.29	24.54	15.36

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Table 10: Median + Opening based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	45599	478689	4.99	34.20	24.94	11.49
Lion.tif	524288	38043	486245	6.63	31.73	43.97	13.78
7.2.01.tiff	8388608	378625	8009983	4.52	47.11	20.39	22.15
7.1.03.tiff	2097152	140050	1957102	4.78	40.59	22.89	14.97
7.1.01.tiff	2097152	152398	1944754	4.38	41.35	19.20	13.76
6.2.01.tiff	524288	33811	490477	2.72	39.49	7.37	15.50
6.1.01.tiff	524288	50506	473782	6.40	32.04	40.96	10.38
5.3.01.tiff	8388608	649409	7739199	5.11	46.03	26.13	12.91
5.2.09.tiff	2097152	244729	1852423	6.20	38.33	38.48	8.56
5.1.12.tiff	524288	37218	487070	4.02	36.07	16.19	14.08
5.1.09.tiff	524288	32613	491675	5.14	33.95	26.41	16.07
8.512.tiff	2097152	94984	2002168	1.95	48.38	3.80	22.07
Elaine.512 .tiff	2097152	136388	1960764	4.71	40.73	22.16	15.37

Table 11: Closing based Jpeg compression.

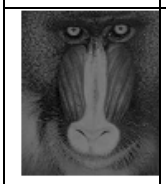
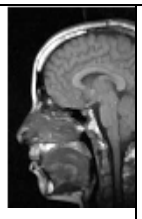
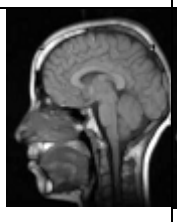
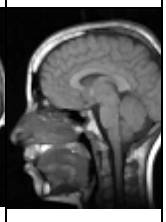
Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	49352	474936	2.46	40.34	6.05	10.62
Lion.tif	524288	43963	480365	2.40	40.56	5.76	11.93
7.2.01.tiff	8388608	496492	7892112	1.82	55.01	3.31	16.89
7.1.03.tiff	2097152	147272	1949880	2.04	47.99	4.16	14.24
7.1.01.tiff	2097152	153729	1943423	2.00	48.16	4.00	13.64
6.2.01.tiff	524288	34526	489762	1.54	44.42	2.37	15.18
6.1.01.tiff	524288	55197	469091	2.72	39.49	7.37	9.49
5.3.01.tiff	8388608	741867	7646741	2.39	52.66	5.69	11.30
5.2.09.tiff	2097152	246983	1850169	2.83	45.15	8.01	8.49
5.1.12.tiff	524288	38569	485719	2.09	41.76	4.37	13.59
5.1.09.tiff	524288	37834	486454	2.40	40.55	5.77	13.85
8.512.tiff	2097152	97771	1999381	1.06	53.72	1.11	21.44
Elaine.512 .tiff	2097152	146950	1950202	2.06	47.90	4.25	14.27

Table 12: Mean + Closing based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	42409	481879	4.22	35.66	17.82	12.36
Lion.tif	524288	34842	489446	5.55	33.21	31.28	15.04
7.2.01.tiff	8388608	383073	8005535	2.54	52.10	6.47	21.89
7.1.03.tiff	2097152	128824	1968328	3.98	42.18	15.88	15.84
7.1.01.tiff	2097152	137601	1959551	3.78	42.64	14.28	14.77
6.2.01.tiff	524288	31937	492351	2.49	40.25	6.19	16.41
6.1.01.tiff	524288	46150	478138	5.06	34.08	25.63	11.36
5.3.01.tiff	8388608	623955	7764653	2.46	52.40	6.04	9.32
5.2.09.tiff	2097152	213746	1883406	5.48	39.41	30.04	9.81
5.1.12.tiff	524288	34795	489493	4.15	35.79	17.26	15.06
5.1.09.tiff	524288	30593	493695	4.24	35.62	17.98	17.13
8.512.tiff	2097152	90954	2006198	1.67	49.75	2.78	23.05
Elaine.512 .tiff	2097152	127297	1969855	4.14	41.84	17.17	16.47

Table 13: Median + Closing based Jpeg compression.

Image	Input image	Required Encoded bits	Saved Bits	Rms error	Psnr	Mse	CR
Mri.tif	524288	45850	478438	3.75	36.68	14.08	11.43
Lion.tif	524288	38069	486219	5.33	33.63	28.41	13.77
7.2.01.tiff	8388608	397393	7991215	2.58	51.97	6.66	21.10
7.1.03.tiff	2097152	132367	1964785	2.14	47.59	4.57	15.84
7.1.01.tiff	2097152	141985	1955167	1.82	49.01	3.30	14.77
6.2.01.tiff	524288	33370	490918	2.01	42.08	4.06	15.71
6.1.01.tiff	524288	49391	474894	4.53	35.04	20.53	10.61
5.3.01.tiff	8388608	663831	7724777	2.39	52.64	5.71	12.63
5.2.09.tiff	2097152	224992	1872160	2.62	45.82	6.86	9.32
5.1.12.tiff	524288	36429	487859	3.25	37.93	10.54	14.39
5.1.09.tiff	524288	31008	493280	4.09	35.93	16.72	16.90
8.512.tiff	2097152	94520	2002632	0.80	56.10	0.64	22.18
Elaine.512 .tiff	2097152	135061	1962091	2.46	46.85	6.07	15.52

JPEG Compressed Image	Morphological Operator Based JPEG	Mean and Dilation/ Erosion/ Opening/ Closing	Median and Dilation/ Erosion/ Opening/ Closing
	DILATION		
			
	EROSION		
			

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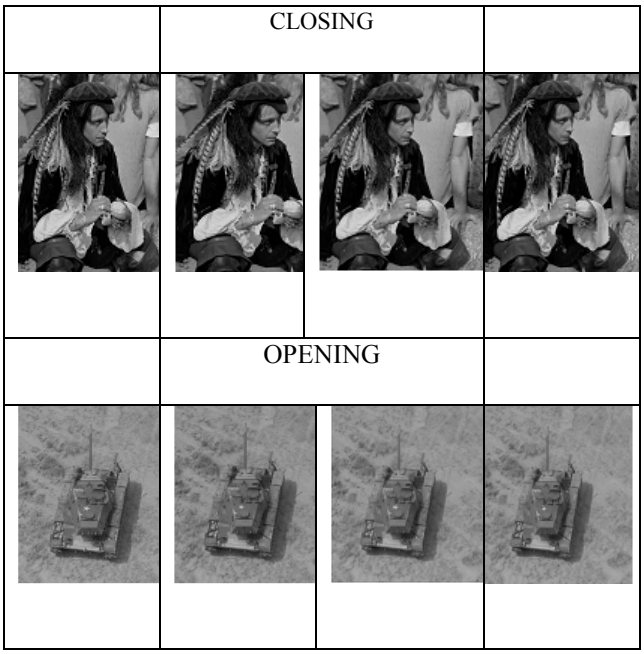

Fig2: Comparison Between Jpeg Compression And Proposed Algorithm.

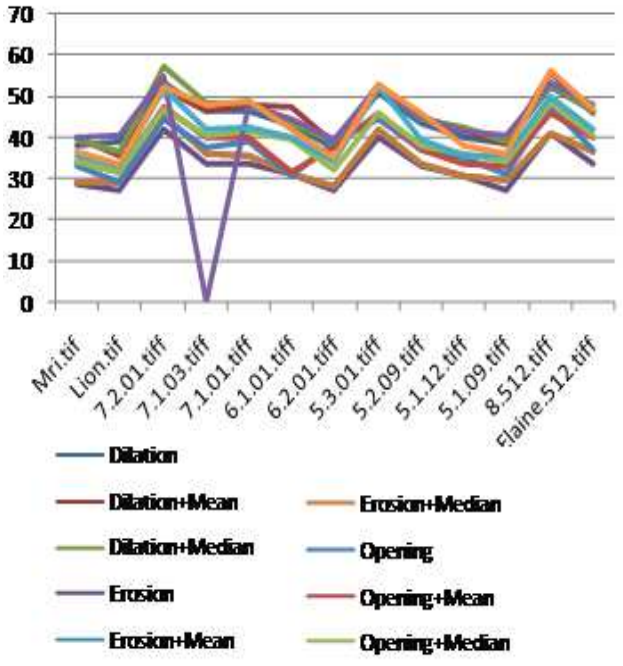

Fig3: Comparison Between The Planned Algorithms In Terms Of PSNR.

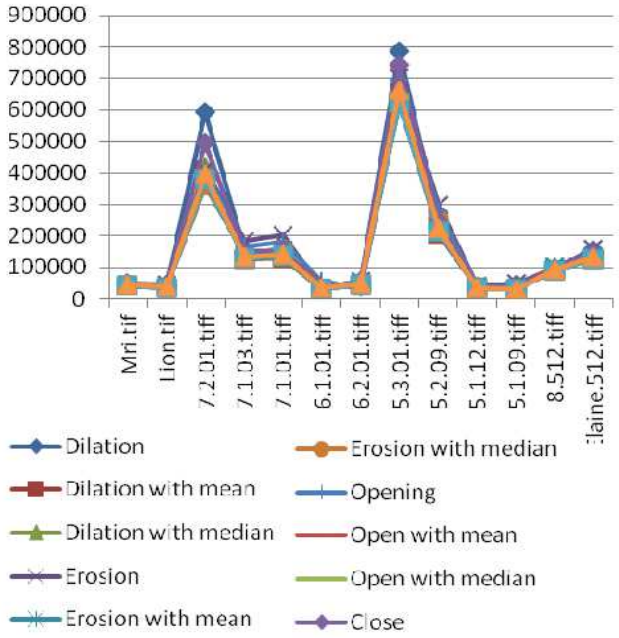

Fig4: Comparison Between The Planned Algorithms In Terms Of Encoded Bits.

5. CONCLUSION

In this paper morphological operator based JPEG compression algorithm is anticipated, and the newly planned algorithms are appraised with the standard JPEG algorithm. The loading and storing of images takes less time with the proposed approaches as they compress the image with less encoded bits. The Classification exactness increased with the proposed approach because of the PSNR with the proposed Dilation and Closing based algorithms is more and MSE is low compared to JPEG. The experimental results show that a high compression ratio can be realized with good revitalization image quality with planned algorithms evaluated to JPEG compression. The number of encoded bits reqired to represent the compressed image is less with the planned approach (Mean + Morphological Operator) results high compression ratio than the other two planned algorithms and the standard JPEG compression algorithm.

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REFERENCES

[1]. Olivier Egger and Wei Li, "VERY LOW BIT RATE IMAGE CODING USING MORPHOLOGICAL OPERATORS AND ADAPTIVE DECOMPOSITIONS" IEEE International Conference on Image Processing Vol-3, Nov-1994, PP No.326-330.

[2]. Ricardo L. de Queiroz, Member IEEE, "Processing JPEG-Compressed Images and Documents" IEEE TRANSACTIONS ON IMAGE
PROCESSING, VOL. 7, NO. 12, DECEMBER 1998, PPNo: 1661-1672.

[3]. Ravi Prakash, IEEE Member, Joan L. Mitchell, IEEE Fellow, and David A. Stepneski, "Enhanced JPEG Compression of Documents" IEEE International Conference on Image Processing Vol-3, Oct-2001, PP No: 494-497.

[4]. Bai Xiangzhi, Zhou Fugen, "Edge Detection Based on Mathematical Morphology and Iterative Thresholding" IEEE International Conference on Image Processing Vol-2, Nov-2006, PP No: 1849-1852.

[5]. Sreelekha G and P.S.Sathidevi, "An Improved JPEG Compression Scheme Using Human Visual System Model" IEEE, June 2007, PP No: 98-101.

[6]. Ch. Ramesh, N.B.Venkateswarlu and J.V.R Murthy, "Filter Augmented JPEG Compressions" IJCA, Vol-60, No-17, Dec-2012. PP No: 1-5.