ISBN 978-602-60736-6-2

11th ADRI

PROCEEDINGS 11TH ADRI 2017
INTERNATIONAL MULTIDISCIPLINARY CONFERENCE AND CALL FOR PAPER
NGANJUK, MARCH 18, 2017

PROCEEDING

Academic Role in Facing Asean Economic Community (AEC)

Global Challenge, Local Act

ORGANIZED BY:

Proceeding 11th ADRI 2017 International Multidisciplinary Conference and Call for Paper, Nganjuk, March 18, 2017

Published by:
Perkumpulan Ahli & Dosen Republik Indonesia (ADRI)

ISBN: 978 - 602 - 60736 - 6 - 2

Proceeding 11th ADRI 2017 International Multidisciplinary Conference and Call for Paper, Nganjuk, March 18, 2017

Publisher:
Perkumpulan Ahli & Dosen Republik Indonesia (ADRI)
Address:
Kantor Dewan Pengurus Pusat (DPP) ADRI
Jalan SMA Negeri 14, Cawang RT.01/RW.09
Jakarta Timur 13630
http://p-adri.or.id
Email: jatim@p-adri.or.id

Proceeding 11th ADRI 2017 International Multidisciplinary

Conference and Call for Paper, Nganjuk, March 18, 2017

x, 194 pages, 28 cm

ISBN: 978 − 602 − 60736 − 6 −2

Soeharto (STKIP Singkawang)

Layout:
Muh. Barid Nizarudin Wajdi (STAI Miftahul Ula Nglawak Kertosono, Nganjuk)

Published by:
Perkumpulan Ahli & Dosen Republik Indonesia (P-ADRI)

Publisher Address:
Kantor Dewan Pengurus Pusat (DPP) ADRI
Jalan SMA Negeri 14, Cawang RT.01/RW.09
Jakarta Timur 13630
http://p-adri.or.id
Email: jatim@p-adri.or.id

PREFACE

Praise being said to Allah Almighty God for all the grace and guidance that has been given to us all, so the Proceedings of the 11th ADRI 2017 International Multidisciplinary Conference and Call for Papers Nganjuk, March 18, 2017 can be realized. Proceedings contains a number of articles and research papers from lecturers, teachers, students, researchers and / or observer of the development of science and technology.
Proceedings are published in book form only contains abstract, distributed to participants in the form of compact disks (full paper) and published online at:
http://www.jatim.p-adri.or.id/2017/03/16/proceding-nganjuk-11th/
Hopefully, these proceedings may give benefit to us all, for the development of science, technology, arts, culture, and sports. In addition, is also expected to be a reference for the nation and state-building efforts so that science and technology become a strong pillar in the face of the ASEAN Economic Community.
Lastly, there is no ivory that is not cracked. We are sorry if there are things that are less pleasing. Thanks you very much.

Nganjuk, March 18, 2017.

Publisher Manager of Perkumpulan Ahli & Dosen Republik Indonesia (ADRI),

Drs. Andi Mursidi, M.Si.

ISBN 978-602-60736-6-2

11th ADRI

PROCEEDINGS 11TH ADRI 2017
INTERNATIONAL MULTIDISCIPLINARY CONFERENCE AND CALL FOR PAPER
NGANJUK, MARCH 18, 2017

PROCEEDING

Academic Role in Facing **Asean Economic Community (AEC)** Global Challenge, Local Act

ORGANIZED BY:

Table Of Contents

TWO POINTS INTERPOLATION FOR DECOMPRESSING ON COMPRESSED IMAGE

Nur Fadli H., Najiburrahman, Nur Hamid*, Miftahul Hasanah

Sekolah Tinggi Teknologi Nurul Jadid, Probolinggo,Indonesia

**Corresponding author*

E-mail: hamidelfath@gmail.com

Abstract. The storage problem is one of big problem in digital image. One way for minimizing storage used is compressing method. In other way, there are some problems when compressing method is used, especially for lossy compression method, such as missing point, changing size, etc. In this paper, we propose a simple method for decompressing image. This method utilizes two point known from compressed image to get new image that has a same size with original image. The average mean square error is used for understanding how big the error happens in this method.

Keywords**:** compression, decompression, interpolation

I. INTRODUCTION

The size of image is still to be storage problem in computers. The image can be compressed by the lossy image compression method. The lossy image compression method is one of the easiest method for compression. This method erase some pixels of image to get the lower size image. Because of erasing some pixel, it should be difficult to restore the pixel erased.

Any lossy compression technique has to achieve high compression ratios high visual quality of the decompressed image. This has been discussed in. The lossy and lossless image compression technique have been also developed in. The reference. has proposed a simple and fast lossy compression and decompression algorithm for some digital images. Different with, we consider the lossy method from another view. We do not use the interpolation to obtain the gray value in point out of points known. However, we start from linear interpolation.

In this paper, we try to discuss a very simple algorithm for compressing and decompressing images. The compression method is lossy. The decompression method utilize two points known.

II. PROCEDURE

We initiate with grayscale image. The $\square.\square, \square\square$ coordinate contains a gray value $\square$. The gray level is between 0 to 255. number 0 represents black and the number 255 represents white. Here we divide the method by compression and decompression method.

A. Compression

We proceed the following procedure to compress the image.

We start by choosing the initial point. The initial point that we use is $\square.1,1\square$.

After initiate the initial point, we continue choosing the ratio. Let $\square$ be the ratio. Then we take another pixels whose coordinate is $\square.1 + \square\square, 1 + \square\square\square$ where $\square, \square$ are integer and $1 + \square\square$ and $1 + \square\square$ are less or equal size of image.

Let $\square$ and $\square$ be row and column size of the original image, respectively. If $\square$ or $\square$ modulo $\square$ is not equal 1, the points that are not included in the compressed image will be obeyed. So, for example in case row index equals 1, we only consider the points that is column indexed at most $1 + \square\square$ where $1 + \square\square$ is less than $\square$.

We give simple example. If we have image

$$\square\square\square = \{1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9\},$$

and if we use $\square = 3$, then the compressed image is

$$\square\square\square = \{1\ 4\ 7\}.$$

The last two numbers will not be restored. In other hand, if

$$\square\square\square = \{1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9\ 10\},$$

the compressed image is

$$\square\square\square = \{1\ 4\ 7\ 10\}.$$

and the number 8 and 9 will keep restored.

B. Decompression

For decompression, we put two points of the compressed image. We use the following steps in next paragraph.

First, we consider the row vector of compressed image. Let $\square.\square_{\square}, \square_{\square}$ and $\square.\square_{\square+\square}, \square_{\square+\square}$ be the points that we put. Note that that two points are in same row. Then, for any point $\square.\square, \square$ between them, we use the equation

$$\square_{\square} = \square_{\square} + \frac{\square_{\square+\square} - \square_{\square}}{\square.\square_{\square+\square} - \square.\square_{\square}} \left(\square.\square - \square.\square_{\square}\right).$$

As in row vector, now we consider column vector. Let $\square.\square_{\square}, \square_{\square}$ and $\square.\square_{\square+\square}, \square_{\square+\square}$ be any points in same column. Then, any points $\square.\square, \square_{\square}$ can be obtained by

$$\square_{\square} = \square_{\square} + \frac{\square_{\square+\square} - \square_{\square}}{\square.\square_{\square+\square} - \square.\square_{\square}} \left(\square.\square - \square.\square_{\square}\right).$$

III. Result and Discussion

We try to apply the explained method for the images shown in Figure 1. The original size of the images are shown in Table 1.

TABLE I
SIZE OF ORIGINAL IMAGES

No.	Image (Figure 1)	Size
1.	(a)	202 Kb
2.	(b)	208 Kb
3.	(c)	1.097 Kb

We show the results of compression of these three images. However, we only show 1 image for decompression.

A. Compression Result

By the method mentioned before, we get new images, that is the compressed images, which is shown in Figure 2. The new size of the images are shown in Table 2. On that table, it shown that we can reduce the size of the original images by method proposed. It needs to know that the ratio that we use is ó ◌ 3.

TABLE 2
SIZE OF COMPRESSED IMAGE

No.	Image (Figure 2)	Size
1.	(a)	41 Kb
2.	(b)	40 Kb
3.	(c)	200 Kb

The significantly reduction of the size shows that we can save the image and use the storage pennywise. So, we can save more many pictures.

B. Decompression Result

The decompression result by the method mentioned before can be seen in Figure 3. We only use the image ©. The dimension is 1536◌2048. Physically, we will see that there is not obvious different between the original images and the decompression images. However, we can show the error of decompression image by method namely Mean Square Error (MSE). We will use the MSE in the next part of this subsection.

The Figure 3 is the decompression result of the compression image. We note that the ratio ó ◌ 3. It means that there will be two new points between two points known.

C. Error Analysis

We call that the MSN for error estimation. The average mean square error for images of ◌ can be defined as

$$\text{MSE} = \frac{1}{m \times n} \sum_{i=1}^{m} \sum_{j=1}^{n} [I(i,j) - K(i,j)]^2$$

where $I(i,j)$ and $K(i,j)$ respectively represent the ◌ original and decompressed images.By the MSN defined above, the error is around1.7921.

(a) Fig 1 (b) fiq 2

(c)

Figure 3 The Original Image

IV. Conclusions

The compression method proposed can be used for saving the storage. By ratio ó ◌ 3, we can obtain the new image of size around 20% of original image size. The decompression method used also give good result in our opinion. Its error is around 1.7921.

Since we have not compare the compression and decompression used with another method, it is better that in other research we continue to compare the method. Some lossy, near loss, or *lessloss* method may be able to be alternative method.

References

[1] V. Caselles, *An Axiomatic Approach to Image Interpolation,* in *IEEETransactions on Image Processing,* vol. 7, no 3, pp 376-386, March 1998.

[2] A. K. Jain, *Image data compression: Areview*, in *Proceedings Of The IEEE*, Vol.69, No. 3, pp. 349-389, March 1981.

[3] S. G. Marta Marka and M. Grgic, "Picture quality measures in image compression systems," *Eurocon,* pp. 233-236, 2003.

[4] L. T. W. Alexander P. Morgan and R. A. Young, "A Gaussian derivative basen version of jpeg for image compression and decompression," in *IEEE Transaction on Image Processing,* vol. 7, no. 9, pp. 1311-1320, September 1998.

[5] S. Bhooshan and S. Sharma, "Image Compression and Decompression Using Adaptive Interpolation" in *Proceedings of the 8th WSEAS International Conference on Signal Processing, Robotics, and Automation,* pp. 154-261, 2013.