http://infor.seaninstitute.org/index.php/infokum/index
JURNAL INFOKUM, Volume 8 No.01 Desember 2019 E-ISSN 2302-9706

ANALYSIS OF IMPROVING DIGITAL IMAGE QUALITY USING ARITHMETIC MEAN FILTER ALGORITHM

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Abstrack

Image is a combination of points, lines, fields, and colors to create an imitation of a physical or human object. Digital imagery consists of square elements called pixels. An example of an image is an image. However, sometimes the image can also experience a decrease in quality (degradation). Images or pixels that have decreased image quality in image processing are called noise. This research discusses the enhancement of digital image quality using the Median filter technique to reduce noise. In this study using color image data (RGB) as test data and then converted into grayscale images to determine the gray degree of the image. The Grayscale image is stored in the database. Then noise is generated by using random numbers. The type of noise used is Salt & Pepper. Noise salt & pepper is a type of noise that has a value of 0 and 255 spread. To reduce noise salt & Pepper, an Arithmetic Mean Filter method or technique is used.

1. Introduction

Image is a combination of points, lines, fields, and colors to create an imitation of a physical or human object. The image can also be interpreted as an image that is similar to the original object. The development of images makes various types of image data can be processed and manipulated. An example of a computer technology that is increasingly developing is image processing technology or what is referred to as image processing (image processing). According to a source from Wikipedia, "Image processing is a branch of informatics (Computers). Image processing revolves around an attempt to transform an image or image into another image using certain techniques.

Image (image) becomes one of the fields of multimedia which is considered to play an important role in forms of visual information because images can provide perceptions about an object. Digital imagery consists of square elements called pixels. Each pixel has two axes, the x-axis and the y-axis. The x-axis is the row and the y-axis is the column. Each pixel has a value (value or number) that is used to indicate the gray intensity at that pixel. To show the intensity of the blueness of the image, each digital image is represented in a gray degree image or color code to determine the gray degree level of an image. The estimated value of an image is determined by the bit that will be used and will show the level of gray level (greyscale level).

An example of an image is an image. Images usually indicate the existence of an activity, a moment, or for other things. However, sometimes the image can also experience a decrease in quality (degradation). Images or pixels that have decreased image quality in image processing are called noise. Noise (noise) in digital images can occur due to many factors, such as lack of lighting or wrong settings when shooting, the limited pixel resolution of the camera used and also limited ability to capture moving images by surveillance cameras or closed-circuit television (CCTV) caused by limited memory and buffering, electromagnetic wave interference in image equipment, incompatible colors, blurring or even obsolescence and so on.

2. Review Literature

2.1 Image

The image is a representation of the information contained therein so that the human eye can analyze and interpret the information in accordance with the expected goals. Image is a representation (picture), similarity, or imitation of an object. Image as the output of a data recording system can be optical in the form of photos, analogous in the form of video signals such as images on television monitors, or are digital that can be directly stored on a storage medium.

Image is another term for images as a form of visual information that plays an important role and is one of the multimedia components. The image can be measured through the opinions, impressions, or responses of someone

with the aim of knowing exactly what is in each individual's mind about an object. An image can have a very rich or simple meaning. [1]-[6]

2.2 Aritmatic Mean Filter

algorithm with the mean method is a method that focuses on the average value of the total value of the entire pixel around it. In this method there are paths of how the method starts from image input, followed by calculating the dimensions of the image and obtained pixel images, after that the image will be converted from RGB into grayscale images. After the image is converted into grayscale, the image will be added or generated using convolution. The stages are as follows: [5], [7] - [9]

1. The input image is gray.
2. Do readings for each pixel contained in the image, with repetition based on height and width.
3. Initialize variables for pixel readings with a 3 × 3 mask starting from coordinates (0,0).
4. The process of calculating the median filtering that takes each kernel 3 × 3 on the image matrix The results of the median filtering process are images with reduced noise

3. Results and Discussion

To do the analysis, data is used as testing material with the following pixel data:

Pixel data obtained from the Matlab application starts from the y-axis as far as 124 and the x-axis as far as 135, with its RGB (Red, Green, Blue) values [218, 165, 134]. Each x and y is taken as many as 10 pixels. So that for y starts from 124 to 133, and for x starts from 135 to 144. In the RGB image or color image, it consists of Red, Green, and Blue components and each component has a matrix value with the following data:

Table 1. Data Pixel

218	220	212	210	199	199	209	204	195	196
165	167	161	159	149	149	158	153	141	142
134	136	132	130	122	122	131	124	113	116
213	218	219	212	202	199	203	201	197	194
162	167	168	161	151	148	152	150	143	138
133	138	139	134	124	121	123	121	115	111
213	216	221	213	207	203	200	197	197	192
162	165	170	162	156	152	149	146	142	136
133	136	143	135	129	123	120	115	112	109
218	216	218	214	211	209	202	193	194	196
168	166	168	164	162	160	151	143	139	139
141	139	141	137	132	130	120	110	108	110
223	217	216	218	216	214	207	192	189	199
176	170	169	169	167	163	154	139	136	143
150	142	141	139	137	132	122	107	104	116
223	221	220	217	215	214	212	201	186	183
177	177	175	170	165	161	157	146	135	129
153	150	146	140	132	129	126	116	108	105
223	222	225	218	214	213	210	201	188	182
179	181	181	173	164	159	155	146	136	130

154	153	152	140	131	125	124	116	112	108
221	222	223	218	214	211	205	197	186	182
177	178	179	173	164	158	152	143	136	131
152	151	150	142	131	124	120	115	111	110

After the data is converted then the following rounds are calculated:

Iteration I

Table 2. Data Pixel 2x3

172	174	168
170	0	175
170	172	178

$F(2,2) = \frac{1}{3x3}$ x (172+174+168+170+174+168+170+0+178)

$F(2,2) = \frac{1}{9}$ x 1374

$F(2,2) = 152{,}66 = 153$

In the same way it will generate new data in the following table:

Table 3. the calculation results

172	174	168	166	157	157
170	0	175	54	159	156
170	172	172	170	166	159
176	174	173	171	168	160
83	177	175	172	170	166
184	183	177	175	171	166
255	186	178	176	172	168

With the image histogram in the following graph

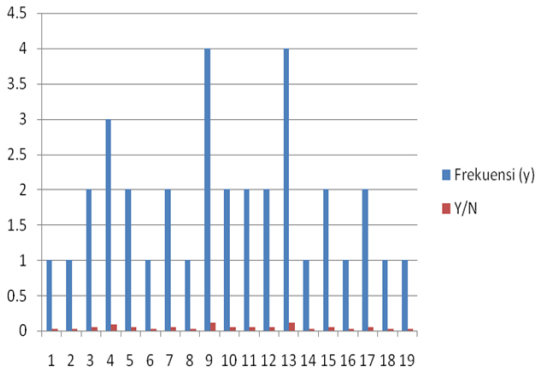

Figure. Image Repair Histogram

4. Conculation

Harmonic Mean Filter can minimize noise reduction in the type of salt & pepper in the image. To reduce noise salt & Pepper, Harmonic Mean Filter uses a kernel that is owned 3 x 3, 5 x 5, 7 x 7 and so on and Noise salt & Pepper has the intensity of random numbers with the results in the form of numbers 0 and 255 in a spread.

Reference

[1] R. D. Kusumanto and A. N. Tompunu, "PENGOLAHAN CITRA DIGITAL UNTUK MENDETEKSI OBYEK MENGGUNAKAN PENGOLAHAN WARNA MODEL NORMALISASI RGB," 2011.
[2] R. Munir, "Citra Biner," *Pengolah. Citra Digit. Dengan Pendekatan Algoritm.*, 2005.
[3] E. Budianita, J. Jasril, and L. Handayani, "Implementasi Pengolahan Citra dan Klasifikasi K-Nearest Neighbour Untuk Membangun Aplikasi Pembeda Daging Sapi dan Babi Berbasis Web," *J. Sains dan Teknol. Ind.*, 2015.
[4] A. Solichin and A. Harjoko, "Metode Background Subtraction untuk Deteksi Obyek Pejalan Kaki pada Lingkungan Statis," in *Seminar Nasional Teknologi Informasi 2013*, 2013.
[5] W. Gazali, H. Soeparno, and J. Ohliati, "DALAM PENGOLAHAN CITRA DIGITAL," *J. Mat Stat*, 2012.
[6] R. D. Kusumanto, A. N. Tompunu, and S. Pambudi, "Klasifikasi Warna Menggunakan Pengolahan Model Warna HSV Abstrak," *J. Ilm. Tek. Elektro*, 2011.
[7] A. Wedianto, H. L. Sari, and Y. S. H, "Analisa Perbandingan Metode Filter Gaussian , Mean Dan Median Terhadap Reduksi Noise," *J. Media Infotama*, 2016.
[8] B. Yuwono, "IMAGE SMOOTHING MENGGUNAKAN MEAN FILTERING, MEDIAN FILTERING, MODUS FILTERING DAN GAUSSIAN FILTERING," *Telematika*, 2015.
[9] A. Padmo A.M and M. Murinto, "SEGMENTASI CITRA BATIK BERDASARKAN FITUR TEKSTUR MENGGUNAKAN METODE FILTER GABOR DAN K-MEANS CLUSTERING," *J. Inform.*, 2016.