Image processing by Edge detection and Noise

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Abstract : *In this work will be displayed one of the areas of image processing is edge detection using Matlab program where it is equipped with players ,Sobel , Prewitt, Roberts and Canny methodMATLAB is a high-performance language for technical computing with powerful commands and syntax. It is used for many purposes like edge detection, modeling are some important and basic topics in image processing, illustrate example shown will prove it.*
Keywords-*edge detection, image processing, Matlab program, Noise, Histogram image*

I. INTRODUCTION

Image processing is a diverse and the most useful field of science, and this article gives an overview of image processing using MATLAB. There are many more topics that are useful and can be applied using MATLAB or Open CV library such as erosion, dilation, thresholding, smoothing, degradation and restoration, segmentation part like point processing, line processing and edge detection (covered here) of images, [1], [2], [3].

II. Edge Detection

To reveal the edges of an image we use one of the following methods
1. Sobel method
2. Prewitt method
3. Roberts method
4. Canny method

After the introduction of the color image to be carried out edge detection process we must identify one of the above methods first must find the block detection edge approximation of the size of the image gradient If used these methods (Sobel or Prewitt or Roberts method) will be the output of the block of two elements gradient of the image and these two elements are the result of the process of convolution.
The threshold process will be done to the mass on the gradient sizes so the result is a binary image that is known as a matrix of logical edge values defined by the pixel value if its value is 1.
If you select the last method (Canny method), the edge is revealed differently from the previous methods where the local maximum of the insertion image gradient is revealed.
Here the Gaussian filter is important in calculating the color gamut and the second variation will use two thresholds instead of a threshold to detect strong and weak edges.
If the output is connected to a strong edge, it means that the edge is weak so this method is more powerfulfor noise, [4-8].

2.1.Some important symbols
In this section the important icons used in special edge detection software will be displayed The table(1) illustrates this

Table (1): Shows the some important icons

Port	Input/Output	Supported Data Types
I	Matrix of intensity values	• Double-precision floating point
		• Single-precision floating point
		• Fixed point (not supported for the Canny method)
		• 8-, 16-, 32-bit signed integer (not supported for the Canny method)
		• 8-, 16-, 32-bit unsigned integer (not supported for the Canny method)
Th	Matrix of intensity values	Same as I port

Edge	Matrix that represents a binary image	Boolean
Gv	Matrix of gradient values in the vertical direction	Same as I port
Gh	Matrix of gradient values in the horizontal direction	Same as I port
G45	Matrix of gradient values	Same as I port
G135	Matrix of gradient values	Same as I port

To interpret the table above the input data type to port (I) is the same as output port (Gv, Gh, G45, and G135(. (Th) is the same as the input data (I).

2.1.1. Sobel method

In this method, when the output is selected and the binary image is selected, the output of a logical matrix is in the edge port where the edge pixels are aligned with non-zero elements, Zero elements correspond to background pixels, The gradient determines the horizontal edge is responded to in the horizontal edge port (Gh).

2.1.2. Prewitt method

In this method, when the output is selected and the binary image is selected, the output of a logical matrix is in the edge port where the edge pixels are aligned with non-zero elements, Zero elements correspond to background pixels, The gradient determines the vertical edge is responded to in the vertical edge port (Gv).

2.1.3. Roberts method

The output of the gradient components where compatibility with edge 45 and 135 is at the edge port G45, G135 respectively, where the color component and the binary image output of the block are determined.
The methods above is how to enter the threshold value of the program you are designing, when the dialog box appears we choose the input port (Th) to specify the threshold value.
Gradient gradients above the threshold value correspond to the edges.
The edge detection block calculates the automatic threshold by using the mean quadratic quadratic image (using the threshold scale factor the threshold can be adjusted).
To reduce the thickness of the edges in the output image (Edge thinning) is selected as this prompt requires additional processing time and memory.
When using memory and processing time, the edge detection block is most effective by selecting (Edge thinning) and using threshold commands when setting a threshold value.

2.1.4. Canny method

To determine the[low and high] threshold values by selecting the defined threshold, the Edge Detection block calculates the threshold values. Determining how to enter the threshold values for the programmer uses the threshold source parameter when the dialog box appears.
The role of the Gaussian filter is as follows when the pixel size in the gradient image is exceeded by linking the input image to the above-mentioned filter so that the image is formed in accordance with the pixel with a strong edge and any pixels of these pixels larger than the low threshold corresponds to a weak edge.
The source threshold through the input port (Th) to specify a vector of two elements of threshold values must correspond to the input.
The edge detection block is here to calculate the automatic threshold by rounding the number of weak, non-sharp pixels, The automatic threshold value is then calculated by entering the approximation of the number of weak non-sharp pixels to the approximate percentage of the weak edge and non-edge pixels, The standard deviation of the Gaussin filter parameter is used to determine the Gaussin filter where the input image is derived from it

OUTPUT

The outputs for the first and second methods are after the output is formatted and a binary image is obtained that gets a nested block matrix filled with the other. Compatibility with the edges and zeros correspond to the background.
The output of the third method, which is through the mass that determines the components of the gradient to which the horizontal and vertical edge responds with compatibility with the edges 45 and 135 degrees after which the binary image and components of the gradient are determined.

III.   APPLY THE PROPOSED METHODS

In this section, the above methods will be done using the Matlab software which provides the proposed methods operators, it contains special commands applied Fig.1 which shows the above methods are applied of cameraman.tif
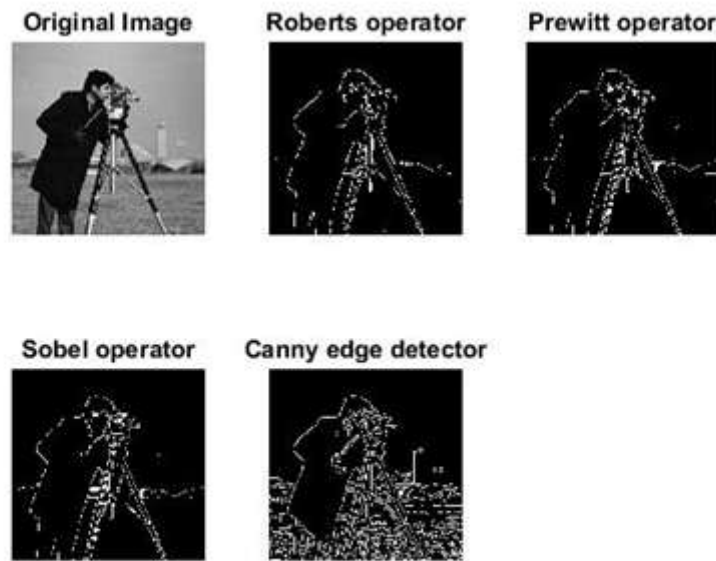
Fig. 1: Edge detection using methods

A histogram of an image of the original or equivalent image was designed by MATLAB. The image histogram provides a broad description about the image Fig.2 shows that
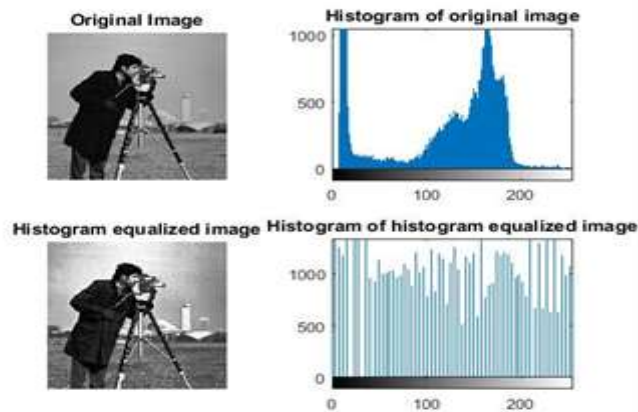

Fig. 2: Histogram modelling

IV. Types of noise

In image processing any type of noise is undesirable during transmission or during image acquisition Noise starts in digital images We can know some kinds of noise such as stains, gauss, salt, pepper and so on.UsingMatlab software, we recognize that these types of noise have a special effect on the image.

In many examples, the conversion of the color image to the digital image, then start adding noise, but in this work was added noise without converting the color image to the digital image all through the use of Matlab, the second example peppers.png or Fig.3 illustrates this
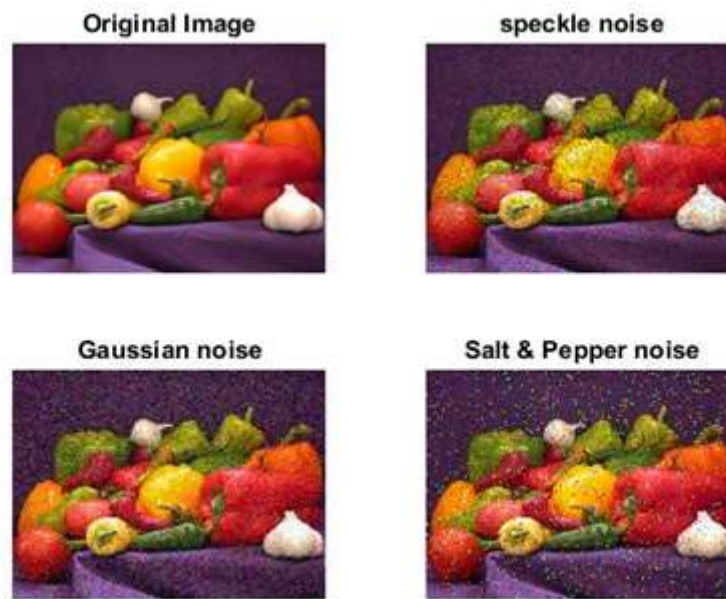
Fig. 3: Special effects in an image using different types of noise

V. CONCLUSION

In this paper we show the types of edge identification of the image and showed that this type of image processing and how to use the Matlab program in this area.

MATLAB is a high-performance language for technical computing with powerful commands and syntax. It is used for many purposes such as edge detection, modeling are some important and fundamental topics in image processing, the above example proves it.

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