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A Hatchet Way of Cropping the Chops of Rocodiles to Measure the Angle using Mathematical Concepts for the Geometrical Feature Extraction using Distance Measure Algorithm

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***Abstract*-Images are the more powerful tool for effective communication in which image processing aims to extract valid information from an image. Feature Extraction is a process of extracting and generating information to assist the image classification task. Considering the feature as a key role which works well to determine and extract the geometrical features from an image and also to measure the distance between the picture elements. Initially the conversion processes are to be carried out in order to reduce the noise from the samples. The pixel element of the particular region is partitioned in name of segmentation. Morphing technique has been used to crop the chops of the crocodile region for the angle measurement. In order to hit upon the exact picture element, binary conversion techniques have been implemented for the region which is cropped. Extracting Algorithm is used to measure the angle with the distance calculation by means of the mathematical concepts. This method is extremely suitable for measuring the angle to find the distance between the positioned regions.**

Keywords–Image Processing, Feature Extraction, Morphing Technique, Extracting Algorithm

I. INTRODUCTION

The image is more than an idea in which it is a vortex or cluster of fused ideas and is endowed with energy. The digital decade is not just about any particular aspect of computing where the key piece in the center is trustworthy systems, systems that do what you expect on an extremely reliable basis. In such aspect the area of image processing have new scenarios, new ways that visual information are manipulicated using computers. Digital image processing is a subset of the electronic domain wherein the image is converted to an array of small integers. Today, there is almost no area of technical endeavor that is not impacted in some way by digital image processing.

The areas of application of digital image processing are so varied that some form of organization is desirable in attempting to capture the breadth of this field. Conversion is one of the traditional processes in which respective methods are used for image conversion. Noise is a disturbance which causes fluctuation in the pixel values where it shows random variations. In order to remove the noise from an image filters are used. In which the wiener filter is used to remove the noise from the image which works well for the Gaussian noise.

Segmentation is the process of partitioning a digital image into multiple regions and extracting meaningful regions for further image investigation. By using the pixel information, the particular region for measurement is represented and cropped using the morphing technique. The suitable Distance algorithm is used to extract the distance and the angle is measured by applying the measuring algorithm using image acquisition and image processing techniques.

The remainder of this paper is organized as follows. Section II deals with Methodology. Section III and IV represents noise model and wiener Filter .Section V and VI represents segmentation, Extraction works.Distance Mesure Algorithm explained in section VII. Result and discussion in Section VIII. Conclusion and future work comprise in Section IX.

II. METHODOLOGY

One of the important technique in image processing is feature extraction. Here, the system architecture of our proposed work shown in the Figure 1.

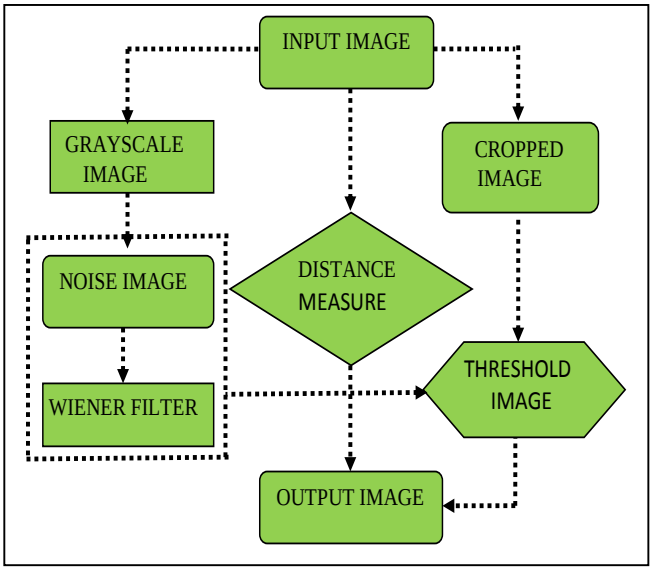

Figure 1. System Architecture

III. NOISE MODELS

Noise can be viewed in numerous ways. Some of the frequent noises that are encountered in image processing are categorized based on the criteria of distributions, correlation, nature and source. There are various types of noise in image that can corrupt images. Some of the noises are Gaussian noise, speckle noise and salt and pepper.

A. *Gaussian Noise*

Gaussian noise is statistical noise that has a probability density function of the normal distribution (also known as Gaussian distribution) [4]. In other words, the values that the noise can take on are Gaussian-distributed. It is most commonly used as additive white noise to yield additive white Gaussian noise (AWGN).This type of noise is also called the normal noise is randomly occurs as white intensity values. Gaussian distribution noise can be expressed by

$$P(x) = \frac{1}{\sigma\sqrt{2\pi}} * e^{(x-\mu)2} / 2\sigma^2 \quad (1)$$

When P(x) is the Gaussian distribution noise in image, μ and σ is the mean and standard deviation respectively.

B. *Speckle Noise*

Speckle noise is a granular noise that inherently exists in and degrades the quality of images. Speckle noise is a multiplicative noise, i.e. it is in direct proportion to the local grey level in any area. The signal and the noise are statistically independent of each other. Speckle noise is a ubiquitous that limits the interpretation of optical coherence of remote sensing image. The noise can be expressed by

$$J = I + n*I \quad (2)$$

Where J is the distributed speckle noise image, I is the input image and n is the uniform image.

C. *Salt & Pepper Noise*

It represents itself as randomly occurring white and black pixels. An effective noise reduction method for this type of noise involves the usage of a median filter. Salt and pepper noise creeps into images in situations where quick transients, such as faulty switching, take place. The image after distortion from salt and pepper noise looks like the image attached. This type of noise contains random occurrences of both black & white intensity values, and often caused by threshold of noise image. Salt & Pepper distribution noise can be expressed by

$$P(x) = \begin{Bmatrix} p1, & x = A \\ p2, & x = B \\ 0 & otherwise \end{Bmatrix} \quad (3)$$

Where P1, P2 are the Probabilities Density Function (PDF) p(x) is distribution salt and pepper noise in image and A, B are the array size image. In this paper salt & pepper noise in image is randomly occurred in white and black pixels of an image [6]. The main challenge in removing salt & pepper noise from image is due to the fact that image data as well as the noise, share the same small set of values, which complicates the process of detecting and removing the noise.

IV. WIENER FILTER

The wiener filter is an optimal filter which works well the Gaussian noise image. It not only restores the image, but also removes noise by image smoothing. Wiener filter assumed that a partial knowledge of the degradation function is available. So to design a wiener filter, an estimation of the original and the additive noise is required. Similar to the unconstrained method, wiener filter finds an estimate f(x, y) of the original image f(x, y) such that the mean square error is minimized. The minimized error is given as

$$e^2 = E\{f(x,y) - \hat{f}(x,y)^2 \quad (4)$$

Where E (.) is the expected value. To know the error, the correlation matrices of f and n are respectively. Let us assume that Rf and Rn are the correlation matrices of f and n, respectively. These correlation matrices are denoted in terms of expectation operation, as

$$R_f = E\{f.f^T\} \quad (5)$$

$$R_n = E\{n.n^T\} \quad (6)$$

A cruder version of the wiener filter often works well for the Gaussian noise image with the evaluation of the power spectra of the noise.

V. SEGMENTATION

Image segmentation is based on either discontinuity principle or similarity principle. The idea behind discontinuity principle is to extract regions that differ in properties such as intensity, color, texture, or any other image statistics. Mostly, abrupt changes in intensity among the regions result in extraction of edges.

The idea behind the principle is to group pixels based on a common property, to extract a coherent region. Edge plays a very important role in image processing application in which they provide an outline of the object. In the physical plane, edges correspond to the discontinuities in depth, surface orientation, changes in material properties, and light variations. When an edge is detected, the unnecessary details are removed, while only important structural information is retained.

A. Prewitt Edge Detection

The Prewitt operator is based on convolving the image with a small, separable, and integer valued filter in horizontal and vertical direction and is therefore relatively inexpensive in terms of computations. The Prewitt method takes the central difference of the neighboring pixels; this difference can be represented mathematically as

$$\partial f/\partial x = f(x+1) - f(x-1)/2 \quad (7)$$

The operator calculates the gradient of the image intensity at each point .Prewitt edge detection method is mainly used in the detection of the horizontal and vertical edges in an image. This method gives us a clear view of the edges in the image using which the objects in the image are clearly identified.

VI. EXTRACTING ALGORITHM

Geometric operations are common in computer graphics and often used in image analysis as well. The process of extracting information from an image takes human mere milliseconds. The mathematical operation can also be extracted from an image by processing in which geometric operation is particularly focused. By using the picture value, the region which is to be measured should be pointed out with the particular boundary is traced.

Basically angle is in standard position if its initial line coincides with the positive x-axis and its vertex is at the origin. An angle is formed when two rays meet at a common endpoint or vertex. The two sides of the angle are the rays, and the point that unites them is called the vertex. Angle is measured in degrees or radians.

Initially the image is cropped by using the morphing technique and converted to the black and white for subsequent extraction of the edge coordinates using trace boundary routine. In which it requires a specific single

point on a boundary where this point is used as the starting location for the boundary tracing process. In order to extract the edge of the lower jaw, by picking a column in the image and inspecting it until a transition from a background pixel to the object pixel occurs.

The trace boundary routine is used to extract (X, Y) location of the boundary point, in order to maximize the accuracy of the angle. It is important to extract as many points belonging to the jaw edges as possible and to determine the number of points experimentally. Although (X, Y) coordinates pairs were obtained where not all the points lie exactly on a line which is used to compute the angle. By assuming all the points are equally important; fit the lines to the boundary pixel location. The equation of line can be defined as

$$y = [x\ 1]*[a; b] \quad (8)$$

Where the parameters a and b can be solved in the sense of least-square. Mathematically the equation of a line can be given as

$$Y = mx + b \quad (9)$$

Where m is the slope and b is the y intercept in which the line crosses the Y axis. Same can be considered in the process of two lines which co-ordinates each other. Then the dot product is used to measure the angle by creating the vector based on the line equation. Finally the larger angle of intersection in degrees is obtained for the jaws of crocodile.

VII. DISTANCE MEASURE ALGORITHM

The generalization concept of the physical distance deals with the process of distance measure in the mathematical concept. More over it is a scalar vector which is particularly deals with the coordinate points for the measurement.

The required region which is to be measured is pointed out with the points (x1, y1) and (x2, y2). In the geometrical operation the distance between the two points of the same plane can be obtained using the distance formula

$$d1 = \text{sqrt}((x2-x1)\ ^2 + (y2-y1)\ ^2) \quad (10)$$

Where (x1, y1) and (x2, y2) are the coordinate points. Where the distance of the jaws of the crocodile is 144.4 which is obtained using this algorithm. In which the points are obtained by the mouse click from the image in order to measure the distance of the particular region.

VIII. RESULT

The following figure 2 shows the experimental results of the proposed work. The digital image is taken as the input image. This proposed work is done using MATLAB 2010 version.

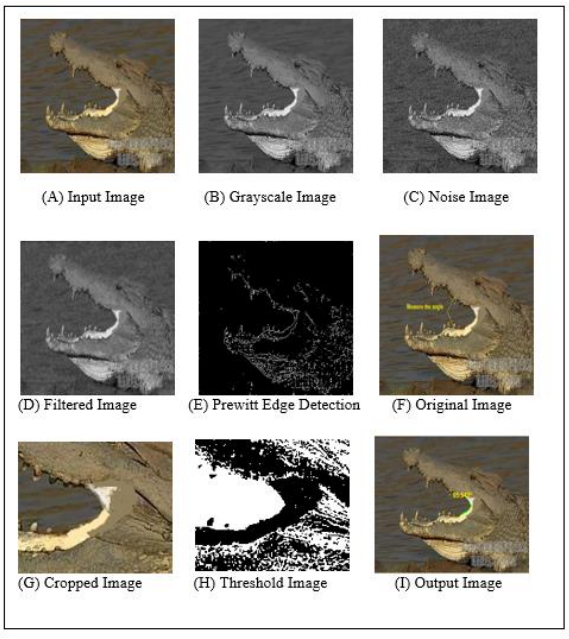

Figure 2. Experimental Result

IX. CONCLUSION

Mathematical operations play a crucial role in an image in which the geometric information are Extracted from the samples. The Feature Extraction processed to examine the angle measurement and distance measure under the note of mathematical operation. In this work the crocodile sample is considered in which the angle extraction algorithm and distance measure algorithm works well for Extracting the angle and distance of the upper and lower chops of the crocodile. It tends to take the credential note on the valid Extracted information from the image.

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