

Image Extraction Processing Methodologies

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Abstract— There are two major parts of thinking the way of Computer vision: “The extraction of image processing methodologies and their subsequent matching”. The first step is essential as the memory consuming and redundant raw image processing data as captured from cameras would be slow and complex to process by most sophisticated vision algorithm. High level feature extraction concerns finding shapes in computer images. In image processing there is a lots of features processing. It is a special form of dimensionally reduction of any images. When the input data to the algorithm is too large to be processed and is suspected to be notoriously redundant, then the input data will be transformed into a reduced set of features, is called as feature extraction. Thresholding is simple extraction technique. Thresholding is a process of converting grayscale input image to a bi-level image by using an optimal threshold. Thus the objective of binarization is to mark pixels that belong to true foreground regions with a single intensity and background regions with different intensities.

Key words: Pixel Operation, Thresholding, Differencing, Template Matching, Direct, Fourier, Wavelets, Haar Wavelets, SIFT, SURE, Histogram of Oriented Gradients, Evidence gathering, Hough Transform, Lines, Circles, Generalized Hough Transform, Invariant Hough Transform

I. INTRODUCTION

The extraction of image processing methodologies and there subsequent matching. High level feature extraction concerns finding shapes in computer image.

The study of an algorithm of any image processing contains:

- 1) Image display and printing.
- 2) Image editing and manipulation.
- 3) Image enhancement.
- 4) Feature detection.
- 5) Image compression.

Image extraction is enabled by setting the name of the output file using the parameter image set.

A. What is an Image?

Replica of any object is known as image. It is also known as virtual representation of any object.

Vector graphics and Raster graphics is used to represent an image. A bitmap is known as that term in which any image can be stored in raster form.

B. Types of an Image

- Gray-tone image.
- Binary image.

1) Gray-Tone Image

Stacked Euler Vector (SERVE) is which a new combinational feature is introduced to characterize a gray-tone image. Operation of SERVE is very simple, fast and does not involve any floating point operation.

2) Binary Image

A digital image which has only two possible values for each and every pixel is known as binary image. Basically there are two types of color which are black and white use to represent the binary image in its fore ground and back ground to.

There are 3 different types of image processing transformation methodologies

- Image-to-Image transform.
- Image-to-information transform.
- Information-to-image transform.

All these 3 methods are explained as

a) Image-To-Image Transform

In this transformation, the simple image get transferred into a different image. In other words, the quality, shape and size of that image get transformed into different quality, shape and size.

It consists of 3 types of categories

- Enhancement.
- Restoration.
- Geometry.

By using these transformation, like enhancement is used for enhancing the part of image. Restoration is used for storing the image again and again. Geometry is used for editing the image or cropping the image. Many more things can be done by using geometry transformation. So, by using these processes image to image transformation can be done easily.

b) Image-To-Information Transform

By using this transformation, we are able to find the information of that image by using some process. We can get the whole information like the quality of an image, form of image and many more. This is important form of transformation.

It consists of 4 different categories.

- Image statistics.
- Image compression.
- Image analysis.
- Computer Aided Detection and Diagnosis (CAD).

We can complete the process of image to information transformation by using these functions.

c) Information-To-Image Transform

It is the vice versa of image to information transformation.

It consists of 3 different categories.

- Decompression of compressed image data.
- Reconstruction of image slices from CT or MRI raw data.
- Computer graphics, virtual reality and animations.

C. Image Extraction Methodology

It is to be known as a term which mostly goes through the machine learning, pattern recognition and in image processing. An initial set of data which starts image

extraction in a measured data and builds derived values intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Dimensionally reduction is related to image extraction.

Image extraction consists of 4 different types which are explained below

- Image processing basics.
- Sobel edge detection.
- Canny edge detection.
- Hough transformation.

D. Image Processing Basics

It is the methodologies which are used for extracting any kind of image or information. Any image can be converted into digital form by performing some easy operations on it. In this methodology, we have to give image or video as an input for example and the output comes is the image or characteristics associated with the image.

1) *Image Processing Basics basically include the three basic processes*

- Image can be imported by using optical scanner or digital photography.
- Data compression and image enhancement can be analyzed and manipulated which are not visible to human eyes like satellite photographs.
- In the last stage which is output, the altered image or the report that is based on image analysis is the final result.

2) *Purpose of Image Processing*

- Visualization.
- Image sharpening and restoration.
- Image retrieval.
- Measurement of pattern.
- Image recognition.

II. SOBEL EDGE DETECTION

It is a methodology of extracting an image in which the edge or boundaries of the image which contains the character can be detected. There are so many ways of performing the edge detection. The important methods are grouped into two categories which are known as Gradient and Laplacien.

In the first derivative of an image by looking for the maximum and minimum, the edge can be detected by using the method Gradient.

In the second derivative of an image the Laplacien method have to search for the zero (0) crossing.

By using these two methods, the edge of the character in the image gets highlighted.

III. CANNY EDGE DETECTION

It is another form of detecting an image. It uses a multi-stage algorithm for detecting a wide range of edge in images.

A computation theory of edge detection explaining why the techniques work is also produced by Canny Edge Detection.

The general criteria for Edge Detection include:

- Low rate error in the detection of edge shows the detection takes place correctly and the processes which are used for the detection is correct.

- The point which is detected from the operator should have to accurately localize the center of the edge.

IV. HOUGH TRANSFORMATION

This transformation is known as the image extraction technique which is used in image analysis, computer vision and digital image processing. To find the perfect instances of the objects within the certain class of shapes by a voting procedure is the main purpose of these techniques. In a parameter space this voting procedure is carried out the so-called accumulator space that is explicitly constructed by the algorithm for computing the Hough transform are obtained as a local maxima.

A. What is an Image Extraction?

For character recognition system, image extraction is always done after the processing phase. To take an input pattern and after that correctly assign it as one of the possible output classes is the primary task of the pattern recognition.

The process can be divided into two parts.

1) Image Selection and Classification

It is one of the most critical process to whole process since the classifier will not be able to recognize from poorly selected images.

2) Criteria to Choose Any Image Given by Lippman Are

“Images which should always contain information which are required for differentiating between classes, be insensitive to irrelevant variability in the input, and also be limited in number, to permit, efficient computation of discriminant functions and to limit the amount of training data which are required”.

B. The Classification of Image Extraction

Image extraction methods are classified into three different major groups

1) Statistical Image

It is a feature which is derived from statistical distribution of points. They used to provide high speed and low complexity and take care of style variations to some extent. They can also be used to use for reducing the dimensions of the feature set.

It also contains some features

a) Zoning

In the frame the character is divided into different types of overlapping or non-overlapping zones and the densities of the points and also some of the strokes in different regions are analyzed and so that it forms the images. It has an example in which bending point images bending points are points at which a stroke in the image has a strong curvature.

b) Characteristics Loci

The vertical and horizontal vectors are generated for every point in the background of the character, the number of times that the line segments intersected by these vectors are used as features.

c) Crossing and Distances

Crossing is used to counts the number of transitions from background to foreground pixels along vertical and horizontal lines through the character images. Distances used to calculate the distance of the first image pixel detected from the both upper and lower boundaries of the image along the horizontal lines.

2) Global Transformation and Series Expansion Images

These images are different to global deformations like translation and rotations. For the purpose of classification, a continuous signal generally contains more informations that needs to be represent. There is a way to represent a signal is by linear combination of a series of simpler well defined functions. The coefficients of linear combinations are used to provide a compact encoding known as series expansion. The most common transform and series expansion images are

a) Fourier Transform

There is a general procedure which is used to choose magnitude spectrum of the measurement vector as the features in an n dimensional Euclidean space. There is one of the most attractive properties of the Fourier Transform is the ability to recognize the position shifted characters when it observes the magnitude spectrum and ignores the phase. It can be applied to OCR in many ways.

b) Walsh Hadamard Transform

This is an image which is more suitable in high speed processing since the arithmetic computation involves only addition and subtraction. There is major drawback of this transform is that its performance depends completely on the positions of the characters.

c) Rapid Transform

This transform is almost same as Walsh Hadamard Transform. The difference is that the operation which can be credited with the elimination of the position shifting problem for its absolute value.

d) Hough Transformation

For baseline detection in document there is a technique used which is known as Hough Transform. It is also used to applied on characterize parameter curve of characters.

e) Gabor Transform

It is a transform which creates variations of the windowed Fourier Transform. This is a case in which window used is not a discrete size but is defined by Gaussian Transform.

f) Wavelets

It is a transform in which a series technique that allows us to represent the signal at different levels of resolutions.

g) Karhunen Loeve Expansion

It is a transform in which Eigen Vector is used to analysis the attempts to reduce the dimensions of the feature set by creating new features that are linear combinations of the original images.

h) Moments

It is a transform in which normalization strives to make the process of recognizing an object in an image size translation and rotation independent.

3) Geometrical and Topological Images

These images are used to represent global and local properties of characters and have high tolerances to distortions and style variations.

It has different transformations like

a) Strokes

It is defined as a primitive element which makes up a character. It can be as simple as lines l and arcs c which is the main stroke of the latin characters and can be as complex as curves and splines making up Arabic characters. Stroke is defined as a line segment from pen up to pen down on line recognition character.

b) Stroke directions and Bays

Pen motion during the writing of a character is used as an image in the sequences of directions.

c) Chain Codes

By mapping the strokes of a character into a dimensional parameter, the image can be obtained.

d) End points intersections of line segments and loops.

e) Strokes relations and angular properties.

V. LITERATURE SURVEY

The paper known as 'Easy and Fast Design Implementation of post grey SQL Based Image Handling Application' is referred by me which explains the technique of image handling. Also the paper 'An image Encryption Approach using multilayer Crossover and Mutation Procedures' is referred by me for extra knowledge of image extraction processing methodologies.

The other four papers tells the different methodologies of extracting the image. Image Enhancement by local Operators, Study of Geometric Image Operations, a review of image in painting Techniques and A Review on Image compression using different Techniques are the four different papers which helps me in the study of this topic which is Image Extraction Processing Methodologies.

At the present there are very few accepted technologies for carrying out the work of image in-painting. This is still in the beginning stage and a lots of researches are being carried out to explore the area. All these papers help me to study the process of extracting any kind of images. It helps me to learning the basic concepts of cropping, zooming, editing and many more new technologies of the images. These papers are very useful for understanding the exact and basics point related to the extraction process of any image.

VI. OTHER AREAS OF APPLICATIONS

Image Extraction Methodologies have so much different areas of Applications. Some of the areas of application are given below

- 1) Traffic control System.
- 2) Content-based Image Retrieval.
- 3) Video surveillance.
- 4) In sport scenes.

VII. ADVANTAGES

- 1) Accuracy.
- 2) Quality.
- 3) Any picture can be converted to any other format.
- 4) Easy to convert.

VIII. DISADVANTAGES

- 1) It needs so much algorithm.
- 2) A real image can be destroyed completely by changing its format.
- 3) Time consuming.

IX. CONCLUSION

I have seen few of the features of the image processing program. There are many more complex modifications that

can be made to the images. For ex- Apply variety of filters to the image. The filters use mathematical algorithm to modify the image. Some of the filters are easy to use while others require a Great deal of technical knowledge. The software will also calculate the re, dec and magnitude of all the objects in the field if there is a star catalog such as the Hubble Guide Star Catalog.

In that way I have learn so much methodologies through which any images can be extracted by using some of these methods which I have learn.

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