A Review Paper on Image Processing , Image Segmentation and Target Acquisition

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Abstract: Image processing is a technique to enhance a raw image taken by satellite, space probe, drone , aircraft, military reconnaissance flight, picture taken on normal camera in daylight. As the time is growing this technology is also getting advance day by day because of the memory present and graphics on the powerful personal computer with many tools and gadgets and image segmentation(target acquisition) emerged as most widely used in digital image processing.

Keywords: Processing, Segmentation, Fuzzy concept.Smc

I. INTRODUCTION

image processing is basically converting an image into digital form and to perform some operation to enhance the image and extracting the information from it. In other words the Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them. It includes three steps for enhancing an image

- Image acquisition tool
- Image Analysis and manipulating tool
- Output report that is based on image analysis

Image Processing in following fields

- Remote Sensing
- Medical Imaging
- Non-destructive Evaluation
- Forensic Studies
- Textiles
- Material Science.
- Military
- Film industry
- Document processing
- Graphic arts
- Printing Industry

Image segmentation is very important part as we consider the automatic target acquisition and the main goal of image segmentation is to simplify the image into more meaningful and easier to analyze. It is used to locate the object and boundaries and image. Target Recognition is carried out on imaging sensor data in order to perform operation ranging from simple human cuing of a human observance to complex object acquisition and identification.TR is processing present image annotation to the human observer to make final decision as to the importance and veracity to the information generated and action to be taken. The Imaging sensor that generate data for TR .The concept of fuzzy pattern recognition and machine

learning is combined with machine learning in digital image processing and the image techniques can be clubbed together and can be called as image engineering. A target is an entity or consider to be possible engagement or other options.

II. METHODS OF IMAGE PROCESSING

There are two methods available in Image Processing.

Analog Image Processing

Analog Image Processing refers to the alteration of image through electrical means. The most common example is the television image.

The television signal is a voltage level which varies in amplitude to represent brightness through the image. By electrically varying the signal, the displayed image appearance is altered. The brightness and contrast controls on a TV set serve to adjust the amplitude and reference of the video signal, resulting in the brightening, darkening and alteration of the brightness range of the displayed image.

Digital Image Processing

In this case, digital computers are used to process the image. The image will be converted to digital form using a scanner – digitizer and then process it. It is defined as the subjecting numerical representations of objects to a series of operations in order to obtain a desired result. It starts with one image and produces a modified version of the same. It is therefore a process that takes an image into another.

The term digital image processing generally refers to processing of a two-dimensional picture by a digital computer. In a broader context, it implies digital processing of any two-dimensional data. A digital image is an array of real numbers represented by a finite number of bits. The principle advantage of Digital Image Processing methods is its versatility, repeatability and the preservation of original data precision
.
The various Image Processing techniques are:

• Image representation
• Image preprocessing
• Image enhancement
• Image restoration
• Image analysis
• Image reconstruction
• Image data compression

Image segmentation

The goal of image segmentation is to cluster pixels into salient image regions, i.e., regions corresponding to individual surfaces, objects, or natural parts of objects.
A segmentation could be used for object recognition, occlusion boundary estimation within motion or stereo systems, image compression, image editing, or image database look-up.

Example Segmentations: Simple Scenes

Segmentations of simple gray-level images can provide useful information
About the surfaces in the scene.
Original Image Segmentation (by SMC)

Note. unlike edge images, these boundaries delimit disjoint image regions (i.e. they are closed).

There are three general approaches to segmentation, termed thresholding , edge-based method and region-based methods.

Thresholding

In thresholding, pixels are allocated to categories according to the range of values in which a pixel lies boundaries which were obtained by thresholding the muscle fibres image. Pixels with values less than 128 have been placed in one category, and the rest have been placed in the other category. The boundaries between adjacent pixels in different categories has been superimposed in white on the original image. It can be seen that the threshold has successfully segmented the image into the two predominant.

Edge based

In edge-based segmentation, an edge filter is applied to the image, pixels are classified as edge or non-edge depending on the filter output, and pixels which are not separated by
an edge are allocated to the same category. the boundaries of connected regions after applying filter and eliminating all non-

border segments containing fewer than 500 pixels.

Region based

Finally, region-based segmentation algorithms operate iteratively by grouping together pixels which are neighbours and have similar values and splitting groups of pixels which are dissimilar in value. The boundaries produced by one such algorithm, based on the concept of watersheds.

Target acquisition

Target is just simply an entity which is to be declared hostile or unwanted as per the processed data or back tracked information. Technically it may be denoted as the process of a weapon system to decide the which is to be locked on as opposed to surveillance on one and target tracking on the other side. Target acquisition has become a highly technical, robust and complex process because of the priority target types, including the targeting of individuals. The focus of Target Acquisition performance measurement and modeling has been on static imaging of military vehicles at long range using a high-end scanning or staring thermal imager. In recent years an important shift of interest has taken place to other scenes with different objects of interest and different types of sensors. For instance, terrorists using small arms form a serious threat in urban and littoral environments. To be able to identify these as a threat, small weapons such as guns, knives, machine guns or even an RPG need to be distinguished from everyday

civilian objects such as a cell phone, a video camera, a broom or a pipe.

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