

A Review of Image Processing In Different Techniques

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Abstract: Image processing enhances an image's quality after extracting irrelevant image data from Images in different applications and domains. Such as Remote Sensing, Film industry, Material Science, Medical Imaging, Military & File Processing, Printing Industry, Graphic arts, etc. Essentially, all image-processing techniques (image representation, image preprocessing, image enhancement, image restoration, image reconstruction & image data compression) are studied in our research paper.

Keywords: Image processing method, Restoration, Reconstruction, Enhancement & Compression

1. INTRODUCTION

The image processing method is signal processing where i/p is an image & the image processing o/p may be an image or a set of image-related appearances or limitations. Most methods of image processing interpret the image as a 2D signal. Image processing is computer imaging where the application involves a human being in the visual loop. In other words, the image is to be examined and is acted upon by people. In the field of image processing, the main topics include image restoration, enhancement & compression, etc., and show in Figure 1. [1]

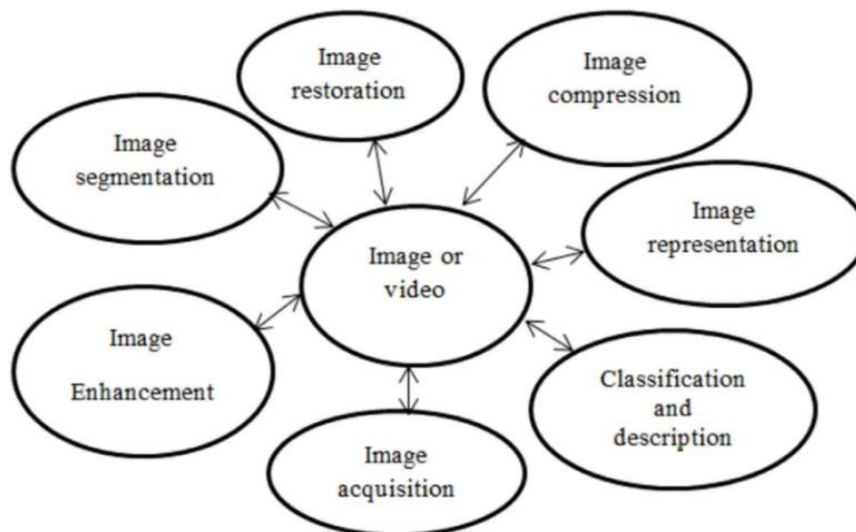


Figure 1 Image Processing Techniques

A. Digital Image Techniques

Digital Image is the use of computer programs on digital images to execute image techniques. Digital image techniques have three significant advantages: consistently better image quality, low costs, and the capability to control all aspects of the process.

The picture is saving as a computer database in digital photography. Using photographic software, this file is converted to create an actual image. The colors, shading, & nuances are all captured when the photograph is taken, & the software translates this information into an image. [2]

II. OBJECTIVE

To get an improved image or obtain any useful information from it, image processing is a method of performing any image operations. It is a type of signal processing in which i/p is an image & o/p may be an image or characteristics/features associated with that image. The main objective is to study the various image processing techniques (Image representation, image preprocessing, image enhancement, image restoration, image reconstruction & image data compression) in the research paper.



III. VARIOUS IMAGE PROCESSING TECHNIQUES

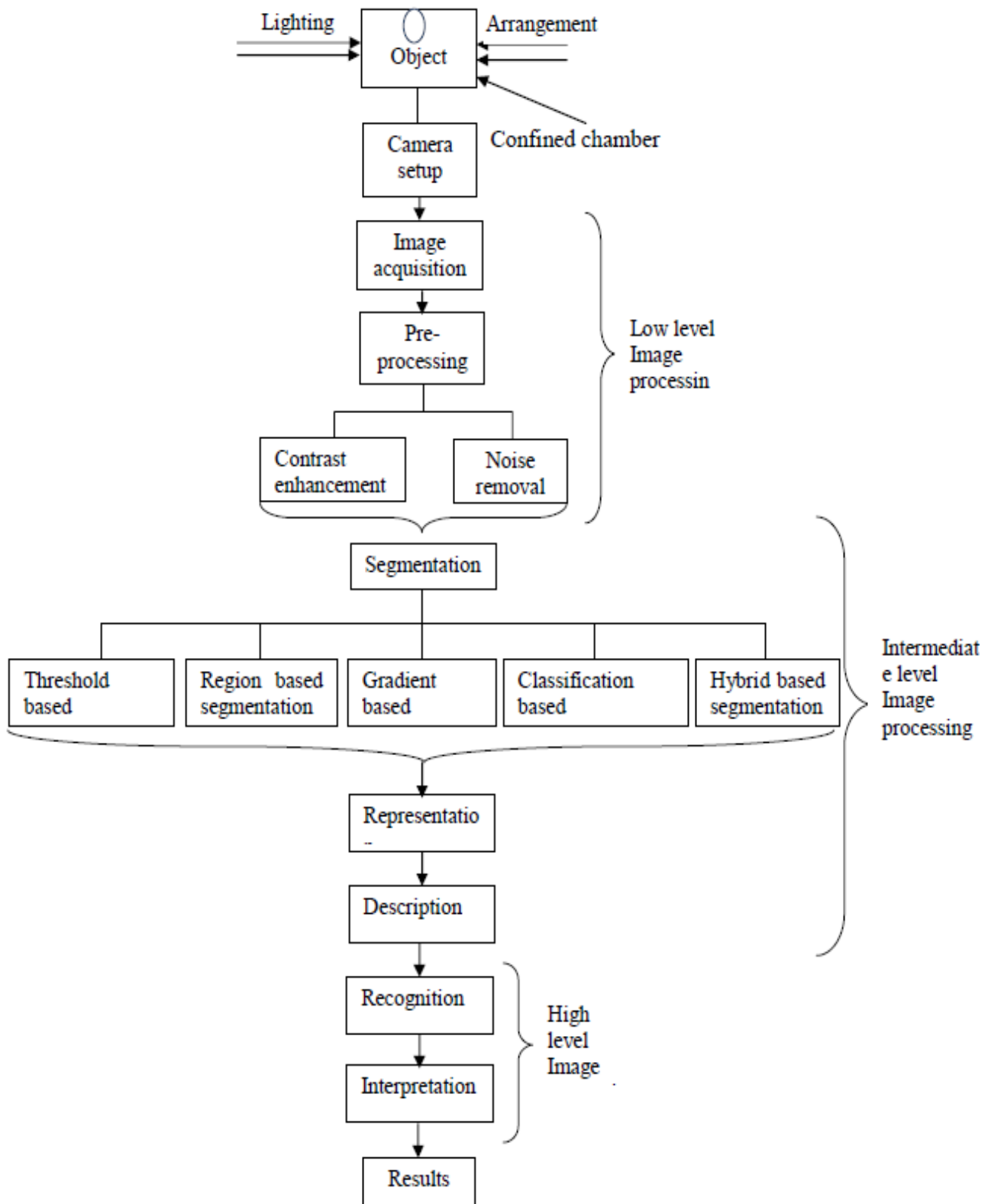


Figure 2 Various steps of low, intermediate & high-level image processing techniques

A. Image representation

In computing, all data is logically represented in binary. This is true of images as well as numbers and text. However, an important difference needs to be made b/w how image data is displayed and how it is stored. Presenting involves bitmap demonstration, whereas storage as a file includes different image formats, such as JPEG.

B. Image preprocessing

The statistics in real life are noisy, unpredictable & imperfect; preprocessing is a need. Image preprocessing is one of the Preliminary steps which are highly required to ensure high accuracy.

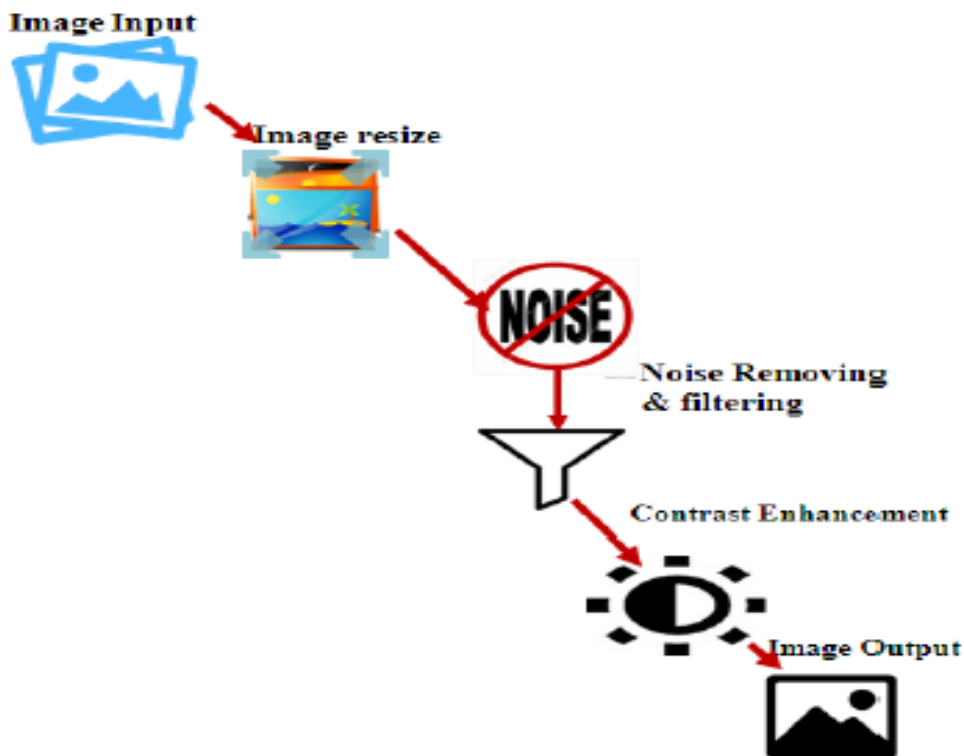


Figure 3 Enhancement processing

D. Image restoration

The problem of image restoration is the elimination or limitation of degradation that occurs during image acquisition. e.g., Noise, pixel value errors, out of focus blurring, or camera motion blurring using prior information of the degradation phenomenon. This means it contracts with the modeling of the degradation & applying it (inverse) to reconstruct the image. The image restoration has got a wide scope of usage. An example of Image restoration is represented in Figure 4. [6]



Figure 4 Image restoration

It is using to eliminate noise & remove unnecessary information that is visually unnecessary. Noise is unnecessary information that can result from the process of acquiring images. [3]

C. Image enhancement

The technique of image enhancement is a method of image processing so that the output is far more acceptable for a particular application than the original image. This improvement of the stored digital image is done with the help of MATLAB software. The proposed approach is depicted in Figure 3. [4]

E. Image reconstruction

C.T. image reconstruction is a scientific method that produces tomographic images obtained at several various angles around the patient from X-ray source images. Image reconstruction has fundamental effects on the consistency of the image and thus on the dose of radiation. It is ideal to restructure images with the least potential noise for a given dose of radiation without reducing image quality & spatial resolution. As images of the same quality can be reconstructed at a lower dose, reconstructions that increase image quality can be converted into reducing radiation dose.

There are two major categories of approaches for reconstruction: empirical reconstruction & iterative reconstruction (I.R.). Initially, let us concentrate on the techniques of analytical reconstruction. There are several kinds of strategies for analytic reconstruction. In professional C.T. scanners, the most extensively used analytical reconstruction strategies are all in filtered back

projection (FBP), which uses a 1D filtering on the projection data before the data is projected back (2D or 3D) into the image space. The success of the method FBP-type is primarily due to its computational effectiveness & numerical stability. [6]

F. Image data compression

Image compression encoding consists of storing the picture as compact as possible in the bitstream & showing the decoded image as accurately as possible on

the monitor. Now consider an encoder & a decoder, as shown in Figure 4. The image file will be transferred to a binary information sequence, called the bitstream, when the encoder receives the original file format. Then the encoded bitstream is received by the decoder & decoded to form the decoded image. If the bitstream total file size quantity is reduced, then the creative image's overall file size quantity is called image compression. The full compression flow is as exposed in Figure 5. [8]

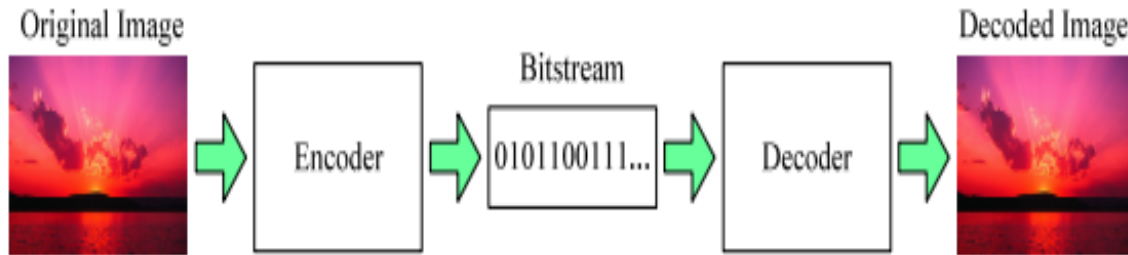


Figure 5 Image compression coding

IV. CONCLUSION

Image processing is used to improve the quality of the picture that is taken from various resources. This paper discusses various image processing methods like image representation, image pre processing, Image enhancement, Image restoration, Image reconstruction & Image data compression. These techniques are used in numerous areas. The method that we are choosing depends upon the application area.

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