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DIGITAL IMAGE PROCESSING SURVEY

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Abstract

In today's world, images plays an important role. Digital image processing is a widely used technique which is used by almost 80% of world's population. It was established in 1960's and was familiar to all after 1970's digital image processing helps to enhance the image by manipulating the image and get enhanced information form that image. Digital image processing provides us with features like image analysis including segmentation ,morphology. Digital Image Processing is used to improve pictorial information by which information can be delivered to humans for their betterment. This paper consist of information about origin of Digital Image Processing. It also consist of image formats in which images can be stored. Images can be edited by using steps like image accusation, image enhancement, image restoration, color image processing, compression, segmentation, representation and recognition, description. There are many applications of digital image processing such as application based on physics ,biology, medicines, computing and business. Image enhancement is a process by which we can edit the image and we can focus on a specific part of image.By this process, it became easier to convey the contains of the image in simpler way. If we want to change the visual properties which will make object distinguishable from the background image and from other objects, we should use the contrast technique. Digital Image Processing provides us with the facility by which we can generate a new image with a totally new version and hence can be presented with a new effect. The use of this technique is increasing day by day.

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What is digital image processing ?

Digital image processing is a technique by which ,we use computer algorithms to perform image processing on a digital image. It allows a much wider range of algorithm to be applied to the input data and can avoid problems such as

- built up noise

- signal distortions during processing

digital image processing allows the use of much more complex algorithms , and hence, can offer both more sophisticated performance at simple tasks, and the implementation of methods which would be impossible by analogue means.

1. INTRODUCTION

DIP is a technology in which an image is being manipulated and processed to form a new enhanced image to extract new information. The images which are transferred from spacecrafts are received at the ground stations in the form of a stream of binary-coded

data bits and are recorded in magnetic tapes. These images are recreated by using a process of film recording. During this process some errors like geometric and photometric distortions creates unsatisfactory conditions. These errors can be manipulated by photometric manipulation, geometric correction. Image is actually a two-dimensional light intensity function. To store an image in computers memory, we need to digitalize it. Digitalization can be done by scanner. Image processing operations are divided into major categories that are:

A) Image compression – by image compression we can reduce the amount of memory required to store the image.
B) Image enhancement and restoration – by using image enhancement we can reduce the error occurring during digitization .
C) Measurement Extraction – if the image is in good state , it can be used to get information from that image.
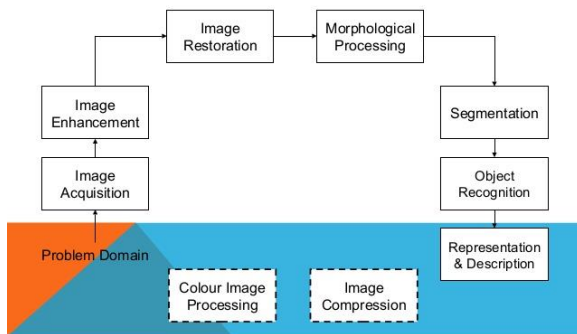
KEY STAGES IN DIGITAL IMAGE
PROCESSING

Fig 1: key stages in DIP

2. HISTORY

Digital image processing was developed in the 1960s at the Jet Propulsion Laboratory, Massachusetts Institute of Technology, Bell Laboratories, University of Maryland, but due to lack of facilities , this process was not in use. In 1970's, when the hardware's and computer systems were available easily, the use of DIP increased rapidly.[1] First DIP application i.e. digitalized newspaper pictures were sent by undersea cable from London to New York. In 1920's, Bartlane cable picture transmission system was introduced which reduced the time to transfer picture from Atlantic from more than a week to less than 3 hours. Transmissions of pictures were done by cable transmission and were reconstructed back through telegraph printers. In 1929, the capability of coding the brightness was 3 increased to fifteenth level from fifth.[2] In 2002 Raanan Fattel, introduced a new concept of Gradient domain image processing in which , the pixel differences were manipulated rather than manipulating the pixel values itself.
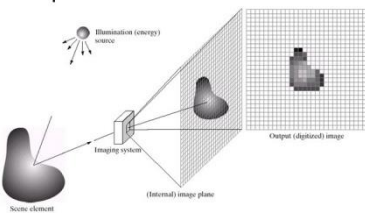

Fig 2: Digital Image Processing

3. TYPES OF IMAGE FORMATS:

3.1 Tagged Image File Format (TIFF)

TIFF stands for Tagged Image File Format. TIFF images create very large file sizes. TIFF images are uncompressed and thus contain a lot of detailed image data (which is why the files are so big) TIFFs

are also extremely flexible in terms of color (they can be greyscale, or CMYK for print, or RGB for web) and content (layers, image tags).

TIFF is the most common file type used in photo software (such as Photoshop), as well as   page layout software (such as Quark and InDesign), again because a TIFF contains a lot of image data.

3.2 Joint Photographic Experts Group (JPEG)

JPEG stands for Joint Photographic Experts Group, which created this standard for this type of image formatting. JPEG files are images that have been compressed to store a lot of information in a small-size file. Most digital cameras store photos in JPEG format, because then you can take more photos on one camera card than you can with other formats.

A JPEG is compressed in a way that loses some of the image detail during the compression in order to make the file small (and thus called "lossy" compression).

3.3 Graphic Interchange Format(GIF)

GIF stands for Graphic Interchange Format. This format compresses images but, as different from JPEG, the compression is lossless (no detail is lost in the compression, but the file can't be made as small as a JPEG).

GIFs also have an extremely limited color range suitable for the web but not for printing. This format is never used for photography, because of the limited number of colors. GIFs can also be used for animations.

Fig 3: Graphic Interchange Format.

3.4 Portable Network Graphics(PNG)

PNG stands for Portable Network Graphics. It was created as an open format to replace GIF, because the patent for GIF was owned by one company and nobody else wanted to pay licensing fees. It also allows for a full range of color and better compression.

It's used almost exclusively for web images, never for print images. For photographs, PNG is not as good as JPEG, because it creates a larger file. But for images with some text, or line art, it's better, because the images look less "bitmap."

Fig 4: Portable Network Graphics

3.5 Raw Image Files

Raw image files contain data from a digital camera (usually). The files are called raw because they haven't been processed and therefore can't be edited or printed yet. There are a lot of different raw formats–each camera company often has its own proprietary format.

Raw files usually contain a vast amount of data that is uncompressed. Because of this, the size of a raw file is extremely large. Usually they are converted to TIFF before editing and color-correcting.

4.   IMAGE   ENHANCEMENT   AND RESTORATION

Image Enhancement is used to increase the usefulness of an image. The quality of an images is important for humans that is why we are using image enhancement technique. In evaluation of an image , contrast plays an important role. If we want to change the visual properties which will make object distinguishable from the background image and from other objects, we should use the contrast technique. We can define contrast in other way, it is the difference between brightness and color of object compared with another object. . Many algorithms and programs were developed   for accomplishing contrast enhancement and applied to problems in image processing.

5. APPLICATIONS

There are many applications of DIP.

- In medicine and biology they are as follows:
1. Gallium Imaging – used to detect cancer and infection by nuclear medicine method.
2. Magnetic Resonance Imaging (MRI) – used to render images of living tissues.

3. Molecular Imaging – study molecular pathways inside organism.
4. Ultrasound Imaging -   used to visualize internal organs and muscles.
5. Diffuse Optical Imaging – used to visualize images of body by usig infrared light.

- In physics they are as follows:

[1].   Bistatic Imaging – surface mapping by 2 different radar system
[2].   Neutral   atom   Imaging   –   images magnetospheric and ionospheric plasma in spacecraft
[3].   Subwavelength Imaging – visualizes features of wavelength less than wavelength of photon

- In computing and business:

Document Imaging – Provides same documents that are used in business
Imaging For Windows – Scans the paper documents
Digital Imaging – scans image and convert it in digital form.

6. CONCLUSION

This paper consist of information about how image can be processed digitally. We studied about the formats in which we can store an image digitally . This is designed for students and professionals to provide them framework of DIP.

REFERENCES

[1]. Digital Image Processing by :Miss. Poonam A. Arbat, Miss. Mrunali D. Bamnote
[2]. www.viz.tamu.edu
[3]. http://adsabs.harvard.edu/abs/1977Quest...1....2 K
[4]. www.ivanexpert.com

[5]. http://31.media.tumblr.com/af36fdb8fc6b53ff8b 3a423fde28462d/tumblr_n30qbxKIUj1rhfekio1 _r1_250.gif
[6]. https://image.slidesharecdn.com/imageprocessi ng-131106054802-phpapp01/95/digital-image-processing-23-638.jpg?cb=1383720888