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Digital Image Processing

Indra G.S[1], Mathumitha.R[2]

[1]UG Student Computer Science Department,Sri Krishna Arts And Science College,CBE.
[2]UG Student Computer Science Department,Sri Krishna Arts And Science College,CBE.
[1]E-MAIL: indrags21bds017@skasc.ac.in
[2]E-MAIL: mathumithar21bds025@skasc.ac.in

ABSTRACT:

Digital image processing followed by some of the basic concepts of digital image processing along with algorithms for image processing. Digital image processing is widely used in the fields of video processing, remote sensing, pattern recognition and many more technical fields.The history and generation of image processing and the advantages of digital image processing over analog image processing will be discussed here.

KEYWORDS:Digital image processing-digital image transformation-improvement of image quality-visual image processing-advantages and drawbacks of digital images.

1:INTRODUCTION:

1.2:DIGITAL IMAGE PROCESSING:

Digital image processing is the use of a digital computer to process digital images using an algorithm. As a sub-category or digital signal processing field, digital image processing has many advantages over analog image processing. It allows a very wide range of algorithms to be applied to the input data and can avoid problems such as sound formation and distortion during processing. As images are defined in two (perhaps more) sizes, digital image processing can be modeled in the form of multidimensional systems. The production and development of digital image processing is strongly influenced by three factors: first, computer development; second, mathematical development (especially the creation and development of mathematical theory); third, the need for greater use of environmental, agricultural, military, industrial and medical sciences has increased.

1.3:DIGITAL IMAGE TRANSFORMATION:

1.3.1:FILTERING:

Digital filters are used to blur and sharpen digital images. Sorting can be done by:

convolution with specially designed characters (filter list) in local domain
to hide certain frequency regions in the frequency field (Four).

FILTER TYPE:

- Original type
- Spatial lowpass
- Spatial highpass
- Fourier representation
- Fourier lowpass
- Fourier highpass

1.3.2:AFFINE TRANSFORMATION:

Affine modification enables basic image modification that includes scale, rotation, rendering, mirror and clipping as shown in the following examples:

TRANSFORMATION NAME:

- Identity
- Reflection

- Scale
- Rotate
- Shear

2:APPLICATION:

2.1:DIGITAL CAMERA IMAGES:

Digital cameras often incorporate specialized digital image processing software - either dedicated chips or additional rotation of other chips - to convert raw data from their image sensor to a color-coded image in a standard image file format. Additional post processing techniques increase edge sharpness or colour saturation to create more natural looking images.

2.2:FILM:

Westworld (1973) became the first feature film to use digital image processing to make pixellate capture to mimic the android viewing environment. Image processing is also widely used to produce a chroma key effect that replaces the background of characters with a natural or artistic space.

2.2:FACE DETECTION:

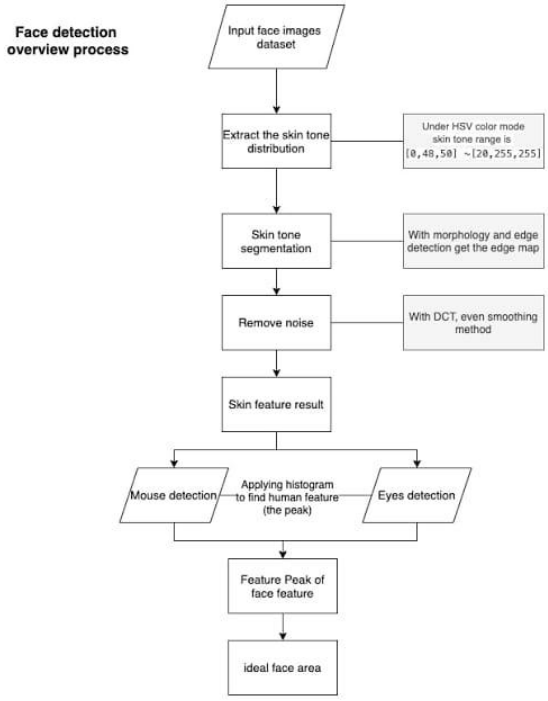

Figure:1:Face Detection Process

Face detection can be done by Mathematical morphology, Discrete cosine transform commonly called DCT, and Horizontal Projection (mathematics).

A standard method with a feature-based approach

The facial-based approach uses skin tone, edge recognition, facial expressions, and facial features (such as eyes, mouth, etc.) to achieve facial recognition. Skin tone, facial features, and all the unique elements with only a human face can be described as features

3:IMPROVEMENT OF IMAGE QUALITY METHOD:

Image quality may be affected by camera vibration, excessive exposure, medium-density gray distribution, and noise, etc. For example, an audio problem can be solved by Smoothing method while the gray matter level distribution problem can be improved with Histogram Equalization.

3.1:SMOOTHING METHOD:

painting, if there is an unsatisfactory colour, take a colour next to the unsatisfactory colour and measure it. This is an easy way to think in a

Smoothing way.

The slippery surface can be used with a mask and Convolution.

3.2:GRAY LEVEL HISTOGRAM METHOD:

Generally, a gray level histogram is provided from the image as below. Converting histogram into a uniform distribution from an image is often called Histogram equalization**.**

Since the advent of photography, the manipulation of digital images has been a hugely important part of image processing. It's also an industry that's still developing and evolving as it becomes more and more sophisticated.

This post will look at some services you might need tobewareof when dealing with digital images. We'll talk about what theyare, how they work and why you might need one.

There are various ways images can be manipulated, but we'll look at the most common ones below.
After I've looked at these, I'll conclude by showing youhowyoucan use the same process to manipulate an image yourself, using the opensource tool ImageMagic and a free-to-usePhotoshop plugin. If you're interested in manipulating imagefor your own purposes, this will show you howto do it andprovide practical exercises to build your skills.

So, without further ado, here we go.
Image Manipulation - What Is It? How Does It Work?

You might have heard the term image manipulation usedinthenews or in conversations with your friends. It is used todescribe any changes made to an image after it was taken. Themost common alterations are those that are designedtochange the photo's appearance; often this is done for artisticeffect, but it can also be done for more commercial purposes.

In many cases, such as when applying filters or altering thecolours of an image, it's quite easy for you to do what's requested. But other changes are much more difficult.
For instance, altering a photo to remove objects fromit is almost impossible unless you have access to the original photo. Taking out details within an image can be achieved through different methods, but all are time-consuming and requireaclose examination of the image — and so they probably shouldn't be done on any but the clearest photos.

Visual learning program report -centre for visual

The centre for visual science at the university of rochester conducts research on visual cognito and its applications.Inthisoverview of their visual learning program,they provideexamples of research in visual

4:VISUAL IMAGE PROCESSING:

It is used in various fields like
4.1MEDICINE
4.2FORENSICS
4.3REMOTE SENSING
4.4COMMUNICATIONS
4.5AUTOMOTIVES

4.1:MEDICINE:

Medical imaging is the process and process of taking an internal body image for clinical analysis and medical intervention, as well as visualrepresentation of the function of other organs or tissues (physiology). Medical imaging seeks to expose the hidden structures of the skin and bones, as well as to diagnose and treat disease

4.2:FORENSICS:

Forensic imaging is one component of computer forensics, which is the use of computer investigations and analytical techniques to gather evidence to be presented in a court of law. Not all photo and copy software creates forensic images.

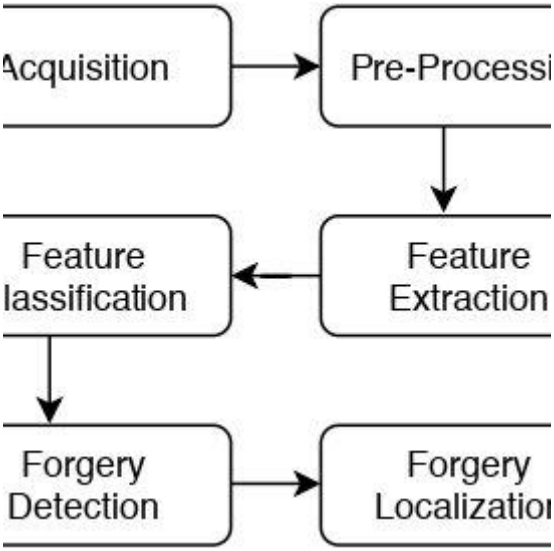

Figure:2:Forensics Visual Image Processing

4.3:REMOTE SENSING:

Visual image interpreting is the first analytical method of remote sensor imagery. Here, the size, shape, and location of objects as well as the brightness and fullness of colour are analysed. The length of the objects can be determined by the indirect visual analysis

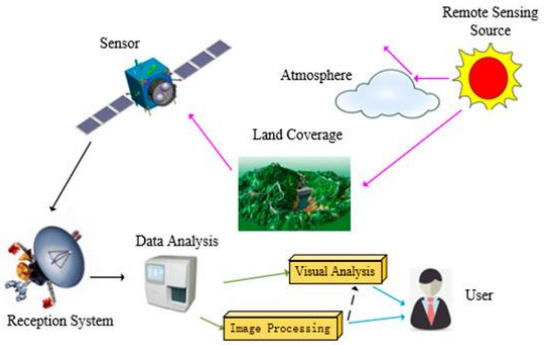

Figure:3 Remote Sensing Process

5:ADVANTAGES OF DIGITAL IMAGES:

The image can be processed fastly and it is cost effective
It can be stored and transmitted fromone place toanotherand it can be copied easily
Provides scope for versatile image manipulation

6:DRAWBACKS OF DIGITAL IMAGES:

The copyrighted image can be easily misused
The storage required for the good quality image is veryhigh
The size cannot be enlarged beyond the given size

7.CONCLUSION:

With the advent of faster and cheaper equipment, digital image processing has become a much-needed field of learning and practice. Provides solutions for a variety of real-life applications in a cost-effective way. Various strategies have been developed to develop intelligent programs; many of them are ongoing in various institutions around the world. This chapter provides introductory notes on image processing, its brief history, methods, functions, software, and applications. It will help to start a community that is interested in having some knowledge of the topic of image processing. The future of

digital photography has a great opportunity to contribute to the creation of a smart and intelligent world in terms of health, education, defense, traffic, homes, offices, cities, etc.

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