



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



19EC351 – IMAGE PROCESSING AND COMPUTER VISION



Guess Today's Topic????





What is Image Processing

Image processing is a method to perform some operations on an **image**, in order to get an enhanced **image** or to extract some useful information from it.

It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image.

Image processing basically includes the following three steps:

Importing the image via image acquisition tools;

Analysing and manipulating the image;

Output in which result can be altered image or report that is based on image analysis.





Types of Image Processing

- ❖ Analogue image processing
 - ❖ Analogue image processing can be used for the hard copies like printouts and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques
- ❖ Digital image processing
 - ❖ Digital image processing techniques help in manipulation of the digital images by using computers.





Image – Digital Image



An image is a two-dimensional function $f(x,y)$, where x and y are the **spatial** (plane) coordinates, and the amplitude of f at any pair of coordinates (x,y) is called the intensity of the image at that level.

If x,y and the **amplitude** values of f are **finite** and **discrete quantities**, we call the image a **digital image**. A digital image is composed of a finite number of elements called **pixels**, each of which has a particular location and value.





First Digital Photograph



NGEETHA/UNIT 1

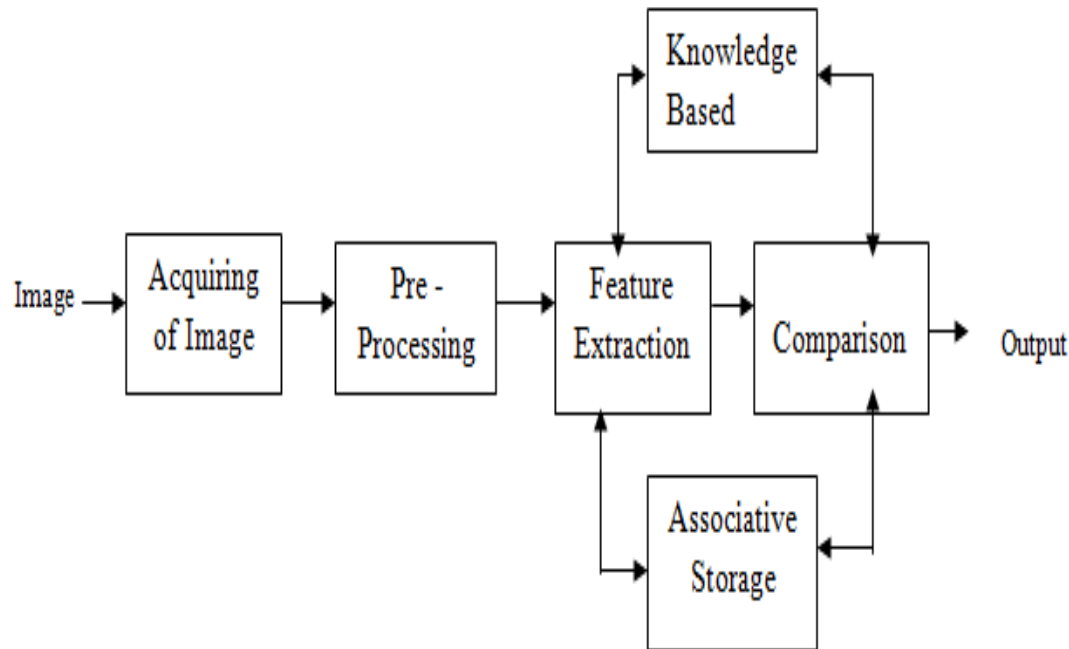
22.07.2021





Digital Image Processing System

A **digital image** is an **image** composed of **picture elements**, also known as pixels, each with finite, discrete quantities of numeric representation for its intensity or gray level that is an output from its two-dimensional functions fed as input by its spatial coordinates denoted with x, y on the x -axis and y -axis





Basic Operations of DIP

Image Sensors

It refers to sensing.

The image sensor captures incoming light, convert it into an electrical signal, measure that signal, and output it to supporting electronics.

An image sensor is a 2D array of light-sensitive elements that convert photons into electrons.

CCD (Charged Coupled Device) and CMOS (Complementary Metal-Oxide Conductor) image sensors are widely used in image-capturing devices like digital cameras.

Image sensors have two elements that are required to capture digital images.

The first is a physical device (sensor) that is sensitive to the energy radiated by the object we wish to convert to image.

The second is a digitizer that is used for converting the output of a physical sensing device into digital form.





Basic Operations of DIP

Specialized Image Processing Hardware

It consists of the digitizer and hardware that performs primitive operations, such as an Arithmetic Logic Unit (ALU), which performs arithmetic and logical operations in parallel on entire images.

Computer

The computer in an image processing system is a general-purpose computer and can range from a PC to a supercomputer.

Mass Storage

Mass storage refers to the storage of a large amount of data in persisting and machine-readable fashion.

The mass storage capability is a must in image processing applications.





Basic Operations of DIP

Image Displays

Image display is the final link in the digital image processing chain. Image displays are mainly colored TV monitors.

Hardcopy Devices

Various devices for recording images are Laser printers, film cameras, heat-sensitive devices, and digital units, such as optical and CD-ROM disks.

Networking

It is a required component to transmit image information over a networked computer.

Because of the large amount of data inherent in image processing applications, the key consideration in image transmission is bandwidth.

<https://www.asquero.com/article/components-of-an-image-processing-system/>





Applications of DIP

- ❖ Image sharpening and restoration.
- ❖ Medical field.
- ❖ Remote sensing.
- ❖ Transmission and encoding.
- ❖ Machine/Robot vision.
- ❖ Color processing.
- ❖ Pattern recognition.
- ❖ Video processing.





THANK YOU

