1.1.2 Fundamental Steps in Digital Image Processing, Components of an Image Processing System

Q21. What are the various fundamental steps in digital image processing? Explain.

Ans: (Model Paper-I, Q2(a) | Nov.-16, Set-3, Q2(a))

Fundamental Steps in Image Processing: The digital image processing methods are mainly described in two ways,

1. Both inputs and outputs are images.
2. Input is an image and outputs are attributes of that image.

In general, the fundamental steps in image processing can be described by an illustration shown in figure (1).

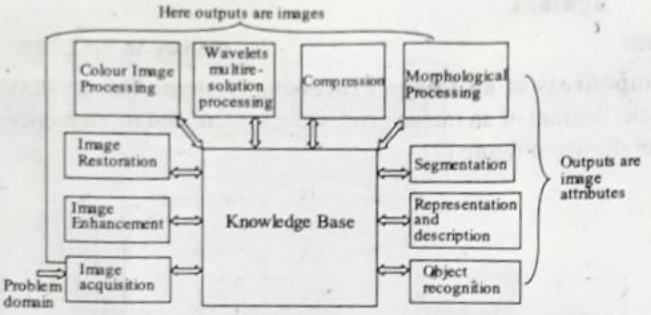

Figure (1)

Image Acquisition: Image acquisition is the process of acquiring an image using image sensor equipment. The signals which are produced by the sensors like line-scan camera, TV camera are digitized using image sensor equipment.

Image Enhancement: Image enhancement is a technique used to improve the quality of an image for better viewing purpose.

Image Restoration: Image restoration is a process of getting an original image from a unclear or blur image.

Colour Image Processing: It is a process in which the information of colour image is stored to get back the original characteristics of an image.

Wavelets and Multiresolution: In general, images are divided into subimages for a good resolution. Each image shows different degrees of resolution.

Compression: This technique is used to reduce the memory of a file without lowering the quality of an image.

Morphological Processing: It is a process in which some operations are performed to an image to get the desired shape.

Segmentation: The process of dividing an image into subimages is called segmentation. This process is mainly used for analyzing the images easily.

Representation and Description: It process the data which is not yet processed into a suitable form. Representation is of two types mainly,

(i) Boundary representation

(ii) Regional representation.

(i) **Boundary Representation:** The representation of an image by its external features like boundary is called boundary representation.

(ii) **Regional Representation:** The representation of an image by its internal features like texture is called regional representation.

Description: Description is also called feature selection. It describes about features of an object like length, size of pixels its.

Object Recognition: In order to identify the object, a label or tag is allocated to the features of an object.

Knowledge Base: The role of knowledge base is to control and manage the interactions between the processing modules.