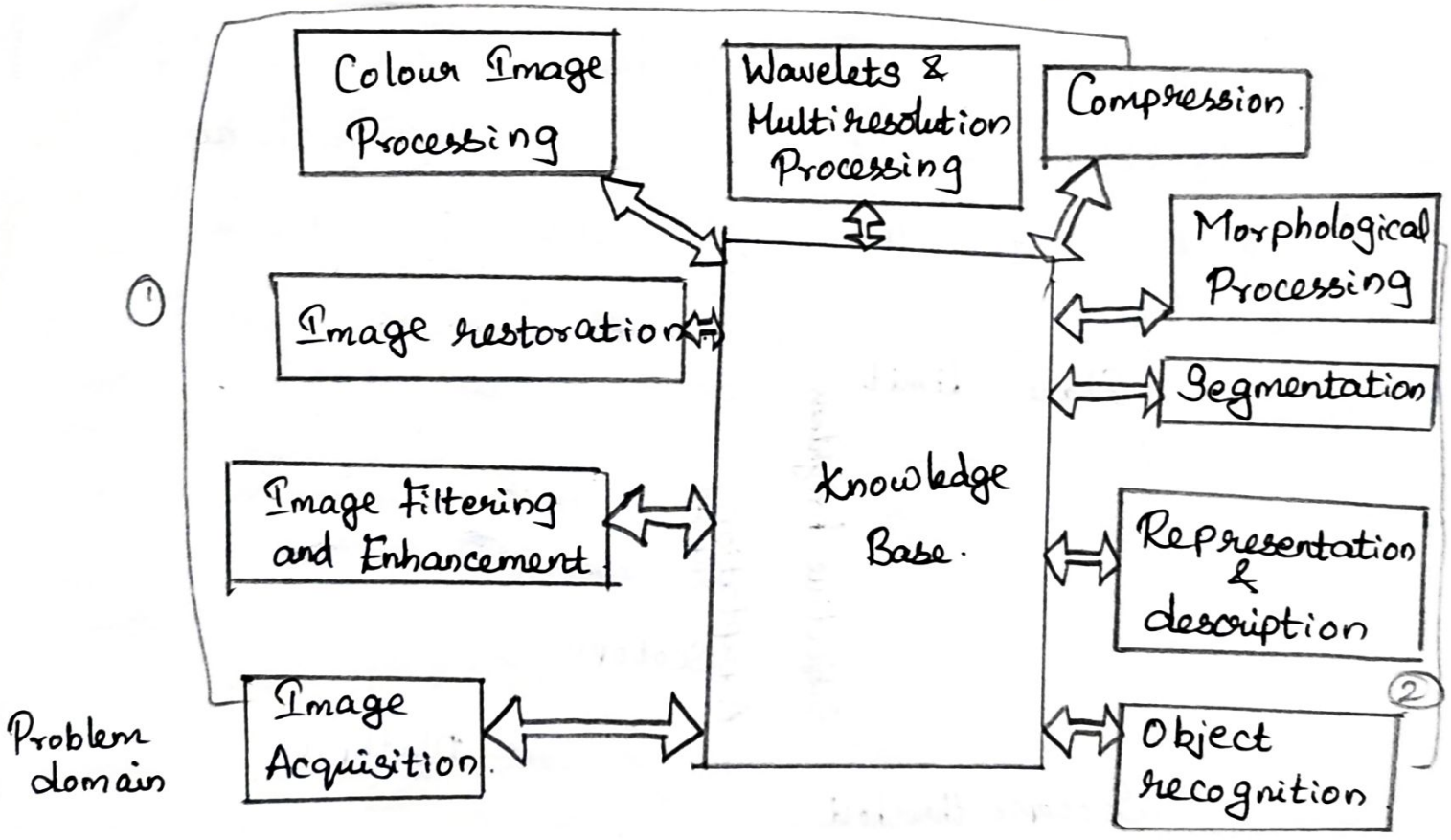
## 1.2. Image Representation:-

### Fundamental Steps in Digital Image Processing:-

There are two Categories of the Steps involved in the image Processing.

(1) Methods whose Outputs are input are images.

(2) Methods whose outputs are attributes extracted from those images.



There are some fundamental steps but as they are fundamental, all these steps may have sub-steps.

① Image Acquistion :-

→ This is the first step or process of the fundamental steps of digital image Processing.

→ Image acquistion could be as simple as being given an image that is already in digital form.

→ Image acquistion stage involves Preprocessing, such as scaling etc.

② Image Enhancement :-

→ Image enhancement is among the simplest and most appealing areas of digital image Processing.

→ Basically, the idea behind enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interest in an image.

→ Such as changing brightness & Contrast etc.

## ③ Image Restoration:-

* It is an area that also deals with improving the appearance of an image.

* Which is Subjective, image restoration is objective, in the Sense that restoration techniques tend to be based on Mathematical or Probabilistic models of image degradation.

## ④ Color Image Processing:-

* It is an area that has been gaining its importance because of the Significant increase in the use of digital images over the Internet.

* It include Color modeling and Processing in a digital domain.

## ⑤ Wavelets and Multi resolution Processing:-

* Wavelets are the foundation for representing images in various degrees of resolution.

* Images Subdivision Sucessively into Smaller regions for data Compression and for Pyramidal representation.

## ⑥ Compression:-

* It deals with techniques for reducing the Storage required to Save an image or

the bandwidth to transmit it.

* Particularly in the uses of internet it is very much necessary to Compress data.

* It has two Major approaches.

(1) Lossless Compression.

(2) Lossy Compression.

⑦ Morphological Processing:-

* It deals with tools for extracting image Components that are useful in the representation and description of shape.

⑧ Segmentation:-

* It is a Procedure to partition an image into its Constituent parts or objects.

* Autonomous Segmentation is one of the most difficult tasks in digital image Processing.

* Rugged Segmentation Procedure brings the Process a long way toward Successful Solution of imaging Problems.

⑨ Representation and Description:-

→ It always follow the Output of a Segmentation Stage. which usually is raw Pixel data.

* Choosing a representation is only Part of the Solution for transforming raw data into a Suitable form for Subsequent Computer Processing.

* Descriptions deals with extracting attributes that result in Some quantitative information of interest.

* Basic for differentiating one class of objects from another.

## (10) Object Recognition:-

* It is the Process that assigns a label, Such as "Vehicle" to an object based on its descriptions.

## (11) Knowledge Base:-

* It may be Simple as detailing regions of an image where the information of interest is known to be located.

* Image database Containing high-resolution Satellite images of a region in Connection with Change-detection applications.