

Introduction to Computer Vision And Image Processing (Lecture 1)

1.1 What are images?

An image is usually a condensation or summary of the information in the object it represents. Ordinarily, an image contains less information than the original object. Therefore, an image is an incomplete, yet, in some sense adequate, representation of the Object.

1.2 Digital Images

An image may be defined as a two dimension function, $f(x, y)$, where x and y are spatial (plane) coordinates, and the amplitude of at any pair of coordinates(x, y) is called the intensity or gray level of the image at that point. When $x, y,$ and intensity value of f are all finite , discrete quantities , we call the image a digital image .The field of digital image processing refer to processing digital image by means of a digital computer. An image must be converted to numerical from before processing. This conversion process is called digitization. The image is divided into small regions called picture elements, or pixel for short. The most common subdivision scheme is the rectangular sampling grid. The image is divided into horizontal lines made up of adjacent pixels. At each pixel location, the image brightness is sampled and quantized. This step generates an integer at each pixel representing the brightness or darkness of the image at that point. When this has been done for all pixels, the image is represented by a rectangular array of integer. Each pixel has a location or address (Line or row number and sample or column number) and an integer value called gray level. This array of digital date is now a candidate for computer processing.

Definition: a digital image is a numerical representation of an object (which may itself are an image).

1.3 Computer Imaging:

Can be defined as acquisition and processing of visual information by computer. Computer representation of an image requires the equivalent of many thousands of words of data, so the massive amount of data required for image is a primary reason for the development of many sub areas with field of computer imaging, such as image compression and segmentation.

Computer imaging can be separate into two primary categories:

1. Computer Vision.

2. Image Processing.

(In computer vision application the processed images output for use by a computer, whereas in image processing applications the output images are for human consumption).

These two categories are not totally separate and distinct. The boundaries that separate the two are fuzzy, but this definition allows us to explore the differences between the two and to explore the difference between the two and to understand how they fit together.