



# IMAGE PROCESSING

## 01CE0507

### Unit – 1

## Introduction to Digital Image Processing

Prof. Urvi Y. Bhatt  
Department of Computer Engineering



# Outline

- Pixel
- Bitmap
- Image file formats
  - Raster Graphics / Raster Image
  - Vector Graphics / vector Image

- In Computer graphics a pixel, dots, or picture element is a physical point in a picture.
- A pixel is simply the smallest addressable element of a picture represented on a screen.

# Bitmap

- In computer graphics, a bitmap is a mapping from some domain (for example, a range of integers) to bits, that is, values which are zero or one.
- It is also called a bit array or bitmap index.
- The more general term pixmap refers to a map of pixels, where each one may store more than two colors, thus using more than one bit per pixel. Often bitmap is used for this as well.

# Image file formats

- Raster Graphics / Raster Image
- Vector Graphics / vector Image

# Raster Graphics VS Vector Graphics

Raster	Vector
Raster images are also known as Bitmap images and are made up of small dots known as pixels.	Vector images are made up of lines, fills, and curves.
In Raster, pixels of the same colour or different colour are placed close to each other so that the human eye perceives them as pictures but not as dots.	Vector images are collections of elements such as lines, rectangles, circles, and square. Each vector element has its own coordinates and can be resized.
Raster image knows the colour of each pixel.	The vector consists of instructions on where to place its components.
Raster has only two colours, black or white. With an increase in complexity, it can contain more colours.	Vectors use mathematical formulas in describing colours, shapes, and placement.
Raster images have a wide range of colour gradations and less scalable than Vector images.	Vector images are much more scalable than Raster images.

# Raster Graphics VS Vector Graphics

Raster	Vector
File formats extension for raster: XBM, TIFF, PCX, and bitmap fonts .tif .tiff: Tagged Image File Format .jpg .jpeg: Joint Photographic Experts Group .psd: Photoshop Document .gif: Graphics Interchange Format .bmp: Bitmap image file .png: Portable Network Graphics XBM: X Bitmap Graphic file PCX: PiCture eXchange	File format extension for Vector:, PICT, WMF, PostScript, TrueType .eps: Encapsulated PostScript .ai: Adobe Illustrator Artwork .cdr: CorelDraw .svg: Scalable Vector Graphics .pdf: Portable Document Format
The conversion of raster to vector is time-consuming and based on complexity.	A vector image can be easily converted to a bitmap image.
Some of the raster programs include photo editing, Photoshop, GIMP, paint shop.	Vector programs include Illustrator, Inkscape, CorelDraw.
A kind of Raster file can be easily converted to another and high processing speed	Vectors are difficult to modify or display if not opened in programs that understand vector and having low processing Speed



# Raster Graphics VS Vector Graphics

Raster	Vector
When the user paints a raster image, it looks similar to dipping brush in paint and painting images.	When the user paints a vector image, only the outline of the shape is painted. Similar to creating an image with different tiles of different shapes and sizes.
On enlarging a raster image without a change in pixel count, the image looks blurry. Enlarging file with increasing in pixel count, which may produce better results comparatively.	On enlarging a vector image, mathematical formulas remain the same, scalable to any size.
Raster programs are best suitable for photo editing, the creation of a continuous toned image with soft colour.	Vectors are best suitable for drawings, creating logos, illustrations, and technical drawings
A huge dimension and fair detailed image produce a large size of the image.	Vectors are resolution dependent, can be printed at any size or resolution.
Difficult to print raster images using limited spot colours.	In vector, the numbers of colours can be increased or decreased for printing.

**Digital Image is Raster Graphics or  
Vector Graphics ?**

# Digital Image

- A digital image is a numeric representation (normally binary) of a two-dimensional image. Depending on whether the image resolution is fixed.
- The term "digital image" usually refers to raster images or bitmapped images

*Thank  
you*

