Image Processing for Computer Vision Session 1

What is an Image?

- An **image** is a 2D representation of a scene or object, stored as a matrix (array) of **pixel values**.

- **Pixel** (picture element) is the smallest unit in an image that holds intensity (grayscale) or color information.

- In computers, images are typically stored in digital form.
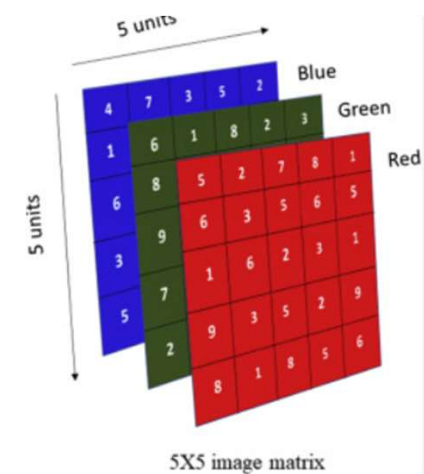
Types of Images

- **Grayscale Image**
- Only contains intensity information (0 = black, 255 = white).
- Single channel.

- **Binary Image**
- Only two pixel values: 0 and 1.
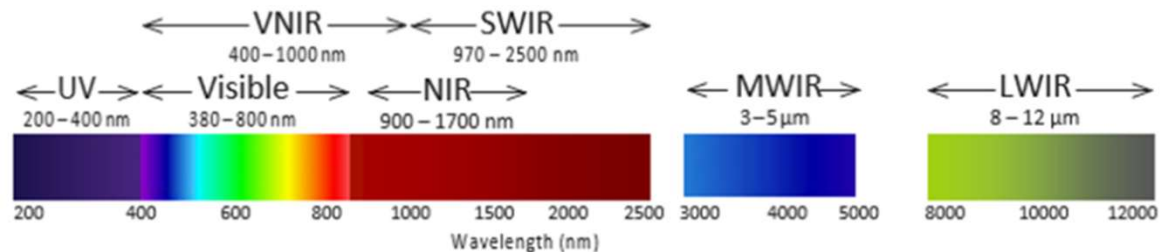- Often used in masks or thresholded images.

Types of Images

- **RGB (Color) Image**

- Uses 3 channels (Red, Green, Blue).

- Shape: (height, width, 3)

- Each pixel is a combination of these three values.

5X5 image matrix

Types of Images

- **Multispectral / Hyperspectral Image:**
- Captures data in multiple wavelengths (e.g., satellite or medical images).
- Shape: (height, width, 3)
- More than 3 channels.

Infrared

Water Vapor

Visible

IR1+PMW