



## Matlab Workshop

### **SESSION 1: Introduction to Basic Electronics**

- Electronics Components related to mobile robotics
- How Transistors are used in practical Circuit?
- How Capacitors are used in Filter circuits?
- How can someone choose the value of Resistors and their practical use?
- What are Integrated Circuits?
- Which ICs are commonly used and How?
- Development of Logic Gates
- Explanation of Motor Driver H-Bridge Circuit
- Working of H-Bridge IC L293D
- What are Photo sensors?

### **SESSION 2: Introduction to Computer Vision and MATLAB**

- What is Computer Vision?
- What is Machine Vision?
- Basics of image processing
- Algorithms used for image processing
- Image formats
- Complexity of Algorithms
- Color Space requirements
- Relation between RGB and HSV

### **SESSION 3: Digital Image Processing in MATLAB**

- Introducing MATLAB
- Image acquisition Toolbox in MATLAB
- Image Processing Toolbox in MATLAB
- Tools of Image processing in MATLAB
- Programming paradigms in MATLAB
- Image acquisition in MATLAB
- Camera Selection
- Algorithm Designing



#### **SESSION 4: Image Acquisition and Processing**

- Functions for Image acquisition
- Camera Adapter
- Functions and Keywords for image processing in MATLAB
- Hardware interfacing
- Accessing Parallel PORT using MATLAB

#### **SESSION 5: Image Manipulation in MATLAB**

- Image Manipulation
- Threshold adjustment
- Template matching
- Shape Detection
- Object Detection
- Motion Detection

#### **SESSION 6: Introduction to Microcontroller**

- Microcontroller Pin Diagram
- IO of the Microcontroller
- Register
- Serial Communication
- USART
- USART Register
- Coding for UART
- Interfacing of the microcontroller with System

#### **SESSION 7: Practical**

- Motion detection
- Serial communication with PC to Microcontroller
- Color Detection robot
- Keyboard Control Robot
- GUI Based robot