

ACT IIT Kharagpur & TechBharat Consulting

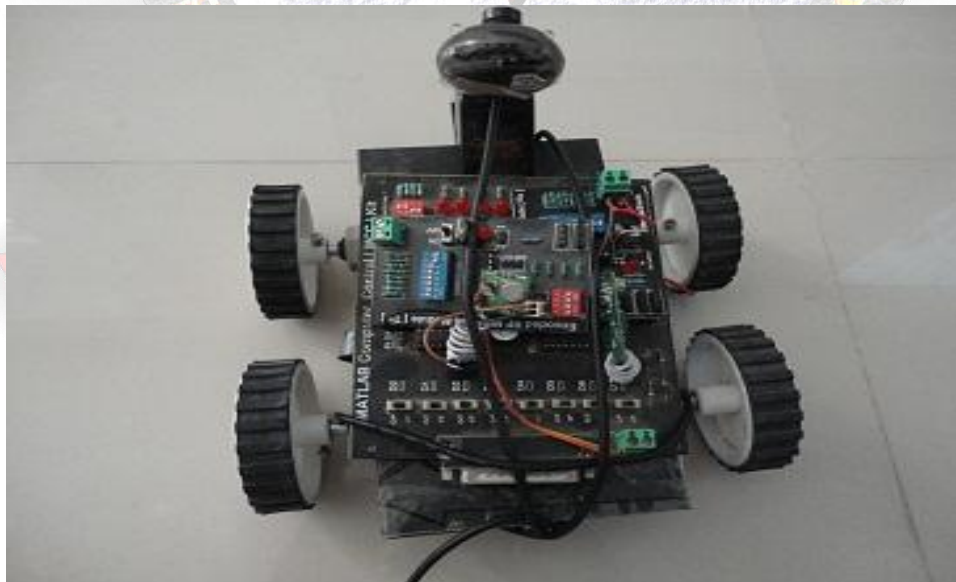
Vision Robotics

Course Title	:	Vision Robotics Workshop
Course Duration	:	2 Days/16 Hours
Certification	:	By ACT IIT Kharagpur & TechBharat Consulting
Course Fees	:	Rs.1550/- Per Person
Take Aways	:	Free Kit to a Group of 4-5 Members.

About Workshop:

This workshop basically deals with designing of robots, their physical body and their controlling Robot using MATLAB. It is best suited to beginners who are taking their first step towards MATLAB. In this workshop basically deals with designing various kinds of electronic sensors and circuits and their use in making autonomous robots using a microcontroller. After the workshop students come up with a Wired Robot, Wireless Robot, Line tracking robot, Computer Controlled Robots and many more.

MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C& C++. Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing capabilities. An additional package, Simulink, adds graphical multi-domain simulation and Model-Based Design for dynamic and embedded systems.

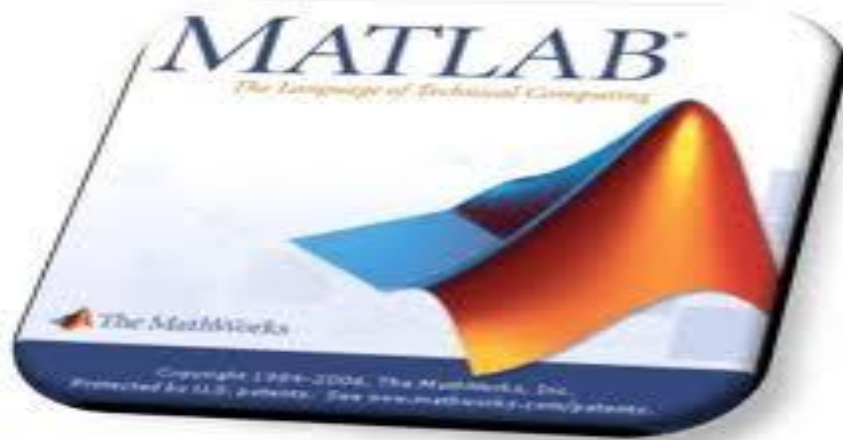


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Day 1

Session 1 : Introduction of Robotics & Basic Component

- Basic of Robotics
- Future of Robotics
- Various Robotics technologies
- Application of Robotics
- Power Supply
- Sensors used in Robotics
- Development of Logic Gates using electronics components
- Motor Drivers
- Fundamental electronics concepts.



Day 1

Session 2 : Introduction to Microcontrollers

- What is Microcontroller?
- Difference between microcontroller and microprocessor?
- Microcontroller Architecture and
- Microcontroller Programming in Embedded C
- Writing your First Embedded 'C' Program in AVR Studio
- UART Interfacing

Day 1

Session 3: Introduction to Computer Vision And MATLAB

- What is Computer Vision?
- What is Machine Vision?
- Basics of image processing

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- Algorithms used for image processing
- Image formats
- Complexity of Algorithms
- Colour Space requirements
- Relation between RGB and HSV

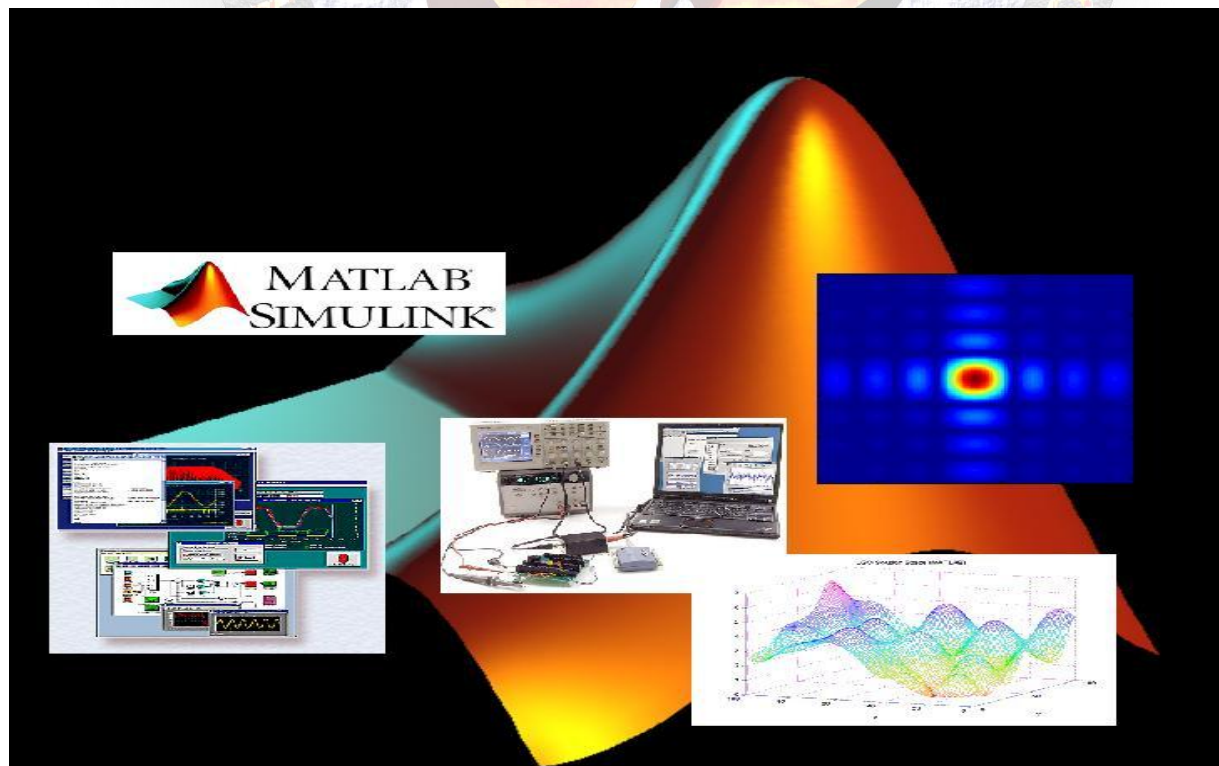
Day 2

Session 4 : 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 5 : 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



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Day 2

Session 6: Image Manipulation in MATLAB

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

Vision Robotics Kit Contains following Components

- Atmel AVR microcontroller ATmega 8/16/32 with ample of program memory (8/16/32Kb)
- 2 channels of motor controller Board, capable of driving 2 dc motors
- on board power regulator IC
- On board power supply socket
- LCD Display Socket
- Onboard program RESET switch
- Atmega8/16/32 Microcontroller

Universal Programmer:

- USB Powered
- Supports almost all At mega series microcontroller
- ISP Connector

Chassis:

- Chassis cum Motor Driver Circuit
- Driven by 2 geared motors and 2 Castor wheel

Motors:

- 2 gears motors with metal gears
- 2 Wheels with rubber
- 2 IR Sensors
- Grip
- Screw Driver

Software (Soft Copy):

- TechBharat AVR loader v1.1 Beta
- AVR Atmel Studio 4
- WINAVR
- Videos of Robots Developed by the MATLAB
- Datasheet of all the ICs used in the Workshop