ABSTRACT

Our workshop is all about the SIXTHSENSE ROBOTICS. Sixth Sense Technology is an interface by gesture that connects the physical world around us with digital information. It is a revolutionary technology that makes the physical world around us simpler. By using this technology, the user can control all the electronic devices in an innovative way with natural hand gestures. It involves almost all sections of modern technology. The workshop is a secure platform for students to enter the field of robotics and work on image processing. It helps them to learn and apply all the basics.
This workshop will be conducted **byTechnex'18, Indian Institute of Technology, Varanasi. (in association with Innovians technologies).**

OUTCOMES OF THIS WORKSHOP

- Understanding of the concepts of Sixth Sense Technology
- Image Processing in MATLAB
- Programming fundamentals (**C** language)
- Capturing Images in Real Time Processing
- Implementation of real time Image Processing techniques on Robotics
- Understand **Arduino** Architecture and programming
- Develop and test a Sixth Sense Robot
- **Hands on experience.**

The **duration** of this workshop will be two consecutive days with 6-7 hours session each day, in a total of 12-14 hours properly divided into theory and hand on practical sessions.
The **PRE-REQUISITE** for joining this workshop is **ZERO**. Anyone who is interested in this workshop can register it.

Topics to be Covered in Workshop

- Introduction
  - Introduction to Sixth Sense Technology
  - Advancement in Robotics & Sixth Sense Technology
  - Introduction to Computer Vision
  - Need of Computer Vision in Industries
  - Introduction to Arduino
  - AVR Microcontroller Programming
  - Arduino jargon and terms
  - Arduino Basics
  - Arduino Architecture
  - Arduino board layout. What are the resources available
  - Introduction to Basic Electronics
  - H-Bridge
  - Bluetooth Module
  - DC Geared Motors
- Programming fundamentals (C language)
- Development & Testing on Arduino Board
  - **Example 1:** Basic LED program
  - **Example 2:** LED Blinking Program

- **Example 3:** Integrating IR Sensor with Arduino
  - Robot Assembling
  - Getting Started with Computer Vision
  - MATLAB

i. Introduction to MATLAB
ii. Working with MATLAB
iii. Variables, Loops & Functions in MATLAB

  - Image Processing in MATLAB

i. Introduction to Digital Image Processing
ii. Introduction to Image Processing Toolbox
iii. Image Acquisition in MATLAB
iv. Camera Selection in MATLAB
v. Image Manipulation in MATLAB
vi. Concepts like Luminance, Hue & Intensity.
vii. Finding Pixel Value Operations

  - GUI Using Image Processing
  - Capturing Images in Real Time Processing
  - **Robot 1:** Ball Following Robot
  - **Robot 2:** Computer Controlled Robot
  - **Project:** Changing a PowerPoint Presentation with your hand.
  - **Project :** Mouse Pointer Control

Certification: During this whole event following Certificate will be provided:
Certificate of Merit to all participants from **Technex'19, IIT Varanasi** & **Innovians Technologies**.
At the end of this workshop, a small competition will be organized among the participating students and winners will be awarded with a 'Certificate of Excellence'.
Certificate of Coordination for the coordinators of the workshops from **Technex'19, IIT Varanasi** & **Innovians Technologies**.
FEE STRUCTURE:-Rs 1000 per participant (With a takeaway IoT kit in a group of 4) Or **Rs 600 per participant** (without take away kit). *In case of without takeaway kit fee module kit will be provided for hands-on (1 Kit in a Group of **4**) during the workshop but at the end of* workshop it will be taken back.
Workshop Arrangements Details:

- Seminar hall/classroom having a capacity enough to conduct hands-on-session for all participants.
- Good Quality public address system ideally two cordless mikes will be required.
- Projector/ Screen along with black/white board for teaching and presentation purposes.
- One small stereo jack cord to connect in laptop for its sound system.
- Participants need to bring their own laptop at least 1-2 laptop per team with working Wi-Fi, usb & lan port.
- One Android Smartphone will be required per team with working Internet (3G Datapack) & Bluetooth in their phone.
- Accommodation and local pick and drop for our visiting trainers.