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**Carnegie Mellon Robotics Academy - USA**

## **iSensobotz on ARDUINO with ROBOTC**

Introducing 1<sup>st</sup> time in India iSensobotz on ARDUINO with **ROBOTC** is a microcontroller based introductory autonomous robotics workshop by ARK Technosolutions, where you learn the art of making autonomous robots. This workshop teaches you the fundamentals of designing and building autonomous robots by integration with a microcontroller. It also focuses on conceptualization and designing of complex systems and will help clear concepts related to embedded systems, artificial intelligence and automation.

Apart from the theoretical sessions, participants would be working on autonomous robotics kit specially designed by Team ARK. This kit includes, microcontroller based board, sensors, actuators etc. Hands on sessions on this kit will help the participants to enhance their embedded C programming and PC hardware interfacing skills.

What will you learn after attending the work shop:-

- Details on microcontroller
- Programming the microcontroller using ARDUINO Interface
- Interfacing and controlling various devices like LED, motors, sensors etc with microcontroller
- Use of ADC for different interface control
- Making of various types of robots their algorithms and coding
  - Application of micro controllers in industry, military, medical, home appliances, home automation etc
- Use of sound sensors and it's application

The Robots Can be made using this kit:-

- **Line follower robot with ROBOTC**
- Timer control robot
- Obstacle Avoider Robot
- Obstacle Follower Robot
- Photo Phobic Robot
- Phototropic Robot
- Sound controlled robot.... And many other applications

The concepts to be covered are:-

- Types of Autonomous Robots
- Elements of an autonomous robot
- Microcontroller based robots
- Pre programmed robots
- Self learning robots



### Microcontroller

- Overview of available microcontrollers
- The ATMEGA series of micro controller and its core
- Its features and capabilities

### Programming of IDE

- Use of ARDUINO Software
- Writing code
- Accessing various functions of micro controller
- Implementation of various algorithms
- Implementation of artificial intelligence

### Actuators

- DC Geared motors
- Stepper Motors
- Servo Motors
- Motor Drivers
- Electromechanical: Relays
- Solid-state drivers: H-bridge, IC drivers

### Sensors

- Light: LDR, photodiodes, phototransistors
- Heat: Thermostats
- Sound mike
- Ultra-Sonics
- Mechanical touch sensors

### Power Supplies

- AC adaptor
- Different types of batteries

### \*What is Arduino?\*

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.

For processing of the images, we use a tool called as MATLAB, which is widely used in industries.

### Duration:

We conduct workshops on 2 consecutive days, each day 8 hours session so in total 16 hours properly divided into theory and hands on sessions. In the end we organize a small competition among the participants of the workshop so that the students get the real feel of competitive environment. Winner of the competition will be awarded with certificate of merit & other prizes

### Charges & Participation

- The charges include:
- Training fee of the 2 day workshop
- Take away kit
- Information & software CD



- Individual participation certificate

## *KIT Content of iSensoBotz on ARDUINO*

- ✚ **ARDUINO circuit board**
  - Micro Controller - ATMEL ATmega 8
  - Operating Voltage - 5V
  - Input voltage - 6V-20V
  - Digital I/O pins - 14 out of which 6 provide PWM
  - Analog Input Pins - 8
  - DC Current per I/O pin - 40mA.
  - Flash Memory - 16KB
  - SRAM - 1KB
  - EEPROM - 512Bytes
  - Clock Speed 16 MHz
  - USB-UART converter
  - Proper Indicator LED's
  - USB/ EXT input voltage
  - 5V output supply pins - 3
  - 3.3 V output supply pins - 1
  - Breadboard Compatibility (dimension of a 40 pin DIP IC)**
- ✚ 2 Multi Purpose Photo sensor
- ✚ 1 sound sensor
- ✚ ACRYLIC Multipurpose Robot Chassis
- ✚ Plastic Wheels
- ✚ DC Motors.
- ✚ 360° Castor Wheel
- ✚ Battery (9v)
- ✚ A to B USB Cable for Programming
- ✚ Connecting Wires
- ✚ Screws
- ✚ Screw Driver
- ✚ Battery snaps
- ✚ CD containing Course Material & **ROBOTC** software (Codes, Softwares, videos etc.)