GUESTURE CONTROLLED ROBOTICS

2-DAY WORKSHOP(16 HOURS)
COST – 1100/-

Workshop Overview

Robo-Gravity is a Robotics Workshop on Hand gesture controlled Robot. Hand Gesture controlled robots means robots which can be controlled by different Hand Gestures. In order to detect Hand Gestures, one needs to wear a simple circuit of the accelerometer sensor on hand. An accelerometer is a type of sensor which provides an analog data while moving in X-Y-Z direction or just in X-Y direction depending on the sensor & as per our requirements. The Robotics Workshop mainly focuses on conceptualization and designing of Hand Gesture based robots which will help the students to clear the fundamental concepts on "How to build a Hand Gestures controlled robot??". The Robotics Workshop includes a detailed study structure, delivered & demonstrated live by our experts in the field of Robotics. Hand Gesture control is an easier approach to control robots instead of buttons or switches. Once the student acquires knowledge about its basic operations, they can further develop & implement it according to their requirements. It can be employed for wide range of application including Home Appliance Control, Motor Control, Wheel Chair Control, Surveillance Robots, etc. We at ABLab Solutions would get you closer to the basic robotics domain right from the fundamentals to its implementation to successfully control robots by Hand Gestures using accelerometer sensor.

Learning Outcomes

- How to use different Embedded software tools
- How to write program for ATmega16
- How to interface LED with AT mega 16
- How to generate different patterns in LED array
- How to decode Hand Gestures using Accelerometer
- How to drive a motor using DC Motor Driver
- How to add password protection to the designed Robot

- How to control Robot using Hand Gestures

Program Benefits

- Clear your fundamentals of Robotics
- Build & develop your own Hand Gesture Controlled Robot
- Gain conceptual knowledge on Robotics, Embedded C, ATmega16, Accelerometer, Hand Gestures, etc.
- Get trained by experts
- Awarded certificate on "ROBO-Gravity"
- Live Demos and Interactive Question & Answer sessions
- Get useful Materials

Course Outline

- Introduction to Robotics
- Different types of Robots
- Manual and Autonomous Robots
- Overview of Basic Electronics
- Overview of Digital electronics
- Different types of Sensors
- Different types of Actuators
- AVR Software Tools-AVR Studio, WinAVR, SinaProg
- Introduction to ATmega16
- Features of ATmega16
- I/O Ports of ATmega16
- LED Interfacing with ATmega16
- Different LED Pattern Generation
- 16X2 Alphanumeric LCD
- 16X2 Alphanumeric LCD Interfacing with ATmega16
- Horizontal Scrolling in 16X2 Alphanumeric LCD with ATmega16
- Vertical Scrolling in 16X2 Alphanumeric LCD with ATmega16
- H-Bridge Driver
- DC Motor Driver
- L293D based DC Motor Driver Interfacing with ATmega16 in 5V MODE

L293D based DC Motor Driver Interfacing with ATmega16 in PWM Mode

- Analog to Digital Converter(ADC)
- Analog to Digital Converter of ATmega16 with LCD Display
- 3-axis Accelerometer Sensor
- 3-axis Accelerometer Sensor Interfacing with ATmega16
- Accelerometer based Hand Gesture Controlled Robot with ATmega16
- Password Protected Accelerometer based Hand Gesture Controlled Robot with ATmega16

Practicals

- LED Interfacing with ATmega16
- LED Blinking with ATmega16
- LED Pattern 1 with ATmega16
- LED Pattern 2 with ATmega16
- LED Pattern 3 with ATmega16
- LED Pattern 4 with ATmega16
- LED Pattern 5 with ATmega16
- LED Pattern 6 with ATmega16
- LED Pattern 7 with ATmega16
- LED Pattern 8 with ATmega16
- LED Dancing with ATmega16
- 16X2 Alphanumeric LCD Interfacing with ATmega16
- Horizontal Scrolling in 16X2 Alphanumeric LCD with ATmega16
- Vertical Scrolling in 16X2 Alphanumeric LCD with ATmega16
- L293D based DC Motor Driver Interfacing with ATmega16 in 5V Mode
- L293D based DC Motor Driver Interfacing with ATmega16 in PWM Mode
- Analog to Digital Converter of ATmega16 with LCD Display
- 3-axis Accelerometer Sensor Interfacing with ATmega16
- Accelerometer based Hand Gesture Controlled Robot with ATmega16
- Password Protected Accelerometer based Hand Gesture Controlled Robot with ATmega16

Kits Detail

- AVR Trainer Board-100 - 1pc

- AVR USB Programmer - 1pc
- 16X2 Alphanumeric LCD - 1pc
- 3-axis Accelerometer Sensor - 1pc
- Robot - 1pc
- DC Motor Driver - 1pc
- 9V Transistor Battery - 2pcs
- Required Connectors

Materials

Sample Codes & Project PDFs

- LED Interfacing with ATmega16
- LED Blinking with ATmega16
- LED Pattern 1 with ATmega16
- LED Pattern 2 with ATmega16
- LED Pattern 3 with ATmega16
- LED Pattern 4 with ATmega16
- LED Pattern 5 with ATmega16
- LED Pattern 6 with ATmega16
- LED Pattern 7 with ATmega16
- LED Pattern 8 with ATmega16
- LED Dancing with ATmega16
- Buzzer Interfacing with ATmega16
- 16X2 alphanumeric LCD Interfacing with ATmega16
- Horizontal Scrolling in 16X2 Alphanumeric LCD with ATmega16
- Vertical Scrolling in 16X2 Alphanumeric LCD with ATmega16
- L293D based DC Motor Driver Interfacing with ATmega16 in 5V Mode
- L293D based DC Motor Driver Interfacing with ATmega16 in PWM Mode
- Robot Driving with ATmega16
- Speed Control of Robot with ATmega16
- Analog to Digital Converter of ATmega16 with LED Display
- Analog to Digital Converter of ATmega16 with LCD Display
- 3-axis Accelerometer Sensor Interfacing with ATmega16
- Accelerometer based Hand Gesture Controlled Robot with ATmega16

- Password Protected Accelerometer based Hand Gesture Controlled Robot with ATmega16

Softwares, Installation Guides, User Guides

- AVR Studio 4
- WinAVR 2010
- SinaProg
- USBasp driver(for Window XP, Vista, 7 & 8)

Header Files

- LCD
- ADC
- ADXL335
- TIMERCOUNTER0
- TIMERCOUNTER1

Datasheet

- ATmega16
- JHD162A
- ADXL335
- L293D

User Manuals

- AVR Trainer Board-100 User Manual
- AVR USB Programmer User Manual
- DC Motor Driver User Manual
- 3-axis Accelerometer Sensor User Manual