

Fundamentals of IoT Development for Smart Manufacturing (Industry 4.0)



Date : 15-18 May 2017
Venue: SHRDC, Shah Alam
Trainer: TK Cheng | James Lai
Course Fee:
With rental kits - RM3,710.00
With kits - RM 4,770.00
(Fee is inclusive 6% GST)
HRDF Claimable

Overview

The target audience of this workshop is for Managers, IT, Mechanical & EE engineers interested in developing IoT projects for their organisations. This workshop gives an introduction to participants on IoT, embedded systems programming & connectivity to cloud services. The workshop is hands-on, with practical exercises on both hardware & software development targeting smart manufacturing applications.

Goals

1. Increase the awareness and interest of IoT & embedded systems development
2. Teaches fundamental knowledge on full end-to-end IoT systems development
3. Build confidence among participants in using IoT development tools & integration with other IoT platforms
4. Teaches participants on full data path of a typical IoT application, from sensors to cloud & end points.
5. After the workshop, participants will be able to start prototyping & developing a full IoT application

Hands-on Hardware & Software used

1. STM32F411RE ST-Nucleo Microcontroller Development System
2. STM sensor board - X-NUCLEO-IKS01A1
3. STM BLE Connectivity Board X-NUCLEO-IDB05A1
4. Internet & Industrial bus connectivity board
5. User input & display modules: keypad + 2X16 character LCD display
6. STM PLC Industrial I/O extension board, industrial sensors
7. KEIL-MDK compiler or compatible IDE
8. Bring your own Android Smartphone/tablet and laptop

Trainers



TK Cheng has 15 Years experience in embedded software development on various microcontroller & microprocessor platforms. He is passionate about IoT & embedded systems. He founded Embedded Systems Malaysia user group to provide a platform for engineers to share & upskill their knowledge in IoT embedded systems development. During his career, TK have conducted various technical training & workshops on embedded software development. He is experienced in 8 bit – 32 bit MCU/MPU's , systems using super loop without OS, proprietary OS , Real-time Operating Systems & Linux systems. He is currently an R&D Manager in a MSC company in charge of product development for consumer & industrial market segments & applications. He graduated in B.S. in Electronics Engineering from Multimedia University Malaysia (MMU).



James Lai has 20 Years experience in Test & Measurement, software development/simulation/design tools, Industrial Automation & IoT. James held various technical roles as Applications Engineer & Field Support Engineer at National Instruments & Agilent Technologies. During his career, James have conducted various technical training & workshops & as guest speaker at conferences. He is currently the founder & principal consultant for IoT Labs (www.iot-labs.com.my), an IoT consultancy & integration services firm based in Selangor. He is also the current president of MyIoT - Malaysia Internet-of-Things Association (www.my-iot.org) setup in 2016 to drive the growth of the IoT eco-system in the region & promote IoT applications to solve everyday problems in the industry. He graduated in B.S. in Electrical Engineering from Western Michigan University, Kalamazoo, MI.

Pre-requisites

1. Basic knowledge of ANSI C programming
2. Programming experience in Arduino IDE or other embedded development IDE (not compulsory but good to have)

Course Outline: Day 1

Introduction to Internet-of-Things or IoT. Overview of IoT & IIoT/Industry 4.0 architectures, value chain & example use cases in smart manufacturing. Introduction of methods to acquire data from sensor nodes & different types of sensor technologies. Hands-on exercises will be used to show participants how to start collecting data using sensors & view data over their smartphones & web application. This section will introduce to participants what are embedded systems, the past, present and future of the industry. This session followed by introduction to MCU. Typical peripherals within a MCU will be explained to participants. Introduction to Microcontrollers Development + STM32Cube. This section will also introduce to participants the development process & tool chain

Course Outline: Day 2

Introduction to smart manufacturing applications. Developing operator interfaces in the production floor, integrating development kit with external hardware, in this case a keypad module with multiple push buttons + character LCD. Learn to display message on LCD and getting input from push button.

Extended Challenge: Design a User Operator interface

Introduction to various types of sensors, their functionality & use cases for data acquisition.

Hands on ST Sensor Expansion Board: X-NUCLEO-IKS01A1 Hands on of sensor data collection. Options available will be 3-axis accelerometer, gyroscope, magnetometer, temperature sensor.

Hands-on on a machine condition monitoring example using accelerometers for vibration measurements & predictive maintenance.

Course Outline: Day 3

Overview of TCP/IP, HTTP, JSON, IEEE 802.11b/g/n, BLE & related internet protocols for IoT. Cloud services & client-server architectures will be covered as well along with design considerations for security.

Hands on of connectivity. This session will enable your embedded system to connect to the internet through Wifi.

IoT hands on: Sensor + Edge node + IoT middleware. By combining hands on from previous session, we can enable a IoT application by sending sensor data to the cloud & display on web clients.

Course Outline: Day 4

Overview of industrial busses used in smart manufacturing like RS232/485, Modbus, CAN, DeviceNet, BacNET, DNP to communicate & acquire data from PLC's & RTU's. Signal conditioning requirements for industrial I/O's.

Hands On: Communicate over RS-485 & Modbus to send & receive data

Interfacing to Industrial I/O's

Create an IoT gateway that enables you to send data to/from factory floor to IoT middleware for analytics.

Workshop summary: Q&A

Contact Us:



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