Department Of Electronics & Communication Engineering

A Three-day Workshop

On

“Practical Aspects Of Embedded Systems & IoT”

in association with

PSCMRCET-IEEE Student Forum & Advitiya R & D labs

3rd December to 5th December 2019

Program Coordinator: Mrs. Mahitha B

Resource Persons: 1) Mr. Pavan Attavane, Director
Advitiya R & D Labs, Bangalore.
2) Mr. Abhay S Bhardwaj
Senior Embedded Engineer
Fasal.co, Bangalore.

Target Audience: B.Tech III Year Students & II Year Students

Total no of Participants: 48

Objective of the Workshop:
Train students on modern industrial technology whilst embedding a sense of inquisitiveness towards the same, bridge the gap between academics and industrial applications and instil a level 1 foundation of their respective engineering core.

Outcome of event:

- The participating candidates will have enhanced their engineering capability to design and construct a basic IoT model through sensor integration, transmitting the sensor’s data into a Graphical Web server while also working around with the data for project centred specifics. The candidates are thus trained to articulate the hands-on with the means of essential theoretical concepts to make them industry ready.
- By providing Hands-on workshop to students, they will get an idea on hardware components. By using this knowledge, they can develop simple real time projects.
- In this workshop used Embedded C and Python for microcontroller programming.
Day 1, 3rd December 2019

Inaugural function started at 10.00 AM. Dr. A Ravi, Professor & HoD, Department Of ECE & convener of the program welcomed all the participants and gave a brief idea about program and basic theme on which all the sessions would be carried out in the duration of program. Hon’ble Principle Dr.K Nageswar Rao and Treasurer K V Rao greeted all the participants and gave their valuable thoughts on importance of such programs. They congratulated and wished all the participants a good time ahead.

Post Inaugural function, session-1 of Day1 was started by Mr. Abhay, Senior Embedded Engineer, Fasal.co which was an insight to the basics of IoT

Introduction to Internet of Things (Theory)

- What is IoT and its evolution over time
- Market scenario and prospects
- Definition and Characteristic of IoT

Post lunch of Day1 Mr. Abhay, Senior Embedded Engineer, Fasal.co & Mr. Pavan, Director, Advitiya R & D Labs delivered various concepts of IoT
Overview of IoT Infrastructure (Theory)

- Things in IoT
- IoT Protocols Overview:

  - Link Layer (Ethernet, WiFi, WiMax, LR-WPAN and Mobile communication)
  - Network / Internet Layer (IPv4, Ipv6 and 6LoWPAN)
  - Transport Layer (TCP/UDP)
  - Application Layer (HTTP, CoAP, WebSocket, MQTT, XMPP, DDS, AMQP)
- Logical Design
- Functional Blocks
- Communication Models

IoT Enabling Technologies:

- Wireless Sensor Networks
- Cloud Computing
- Big Data Analysis
- Communication Protocols
- Embedded Systems
- IoT Security

Getting started with IoT(Theory & Practical) – Hardware side

- Understanding the WiFi IoT Node.

- Programming the WiFi IoT Node – Arduino C overview, basic programs execution.

- Reading Sensor Data, controlling actuators.

- Connecting to WiFi. Working with web-server.
Day 2, 4th December 2019

Day 2 started with a session by Mr. Pavan on Hardware aspects of IoT. This session is particularly aimed at covering various protocols, hardware components like sensors & nodes and Real time Interfacing.

The HTTP Protocol (Theory & Practical)
- Overview of the HTTP protocol
- Creating a web server on the WiFi IoT Node.
- Sending Sensor data to the cloud using HTTP protocol.

The MQTT Protocol (Theory & Practical)
- Overview of the MQTT protocol
- Sending WiFi IoT Node sensor data to the cloud and Receiving control data from the cloud
- MQTT client for WiFi Node
- Reading Sensor data and publishing to cloud
- Subscribing to actuator control data from the cloud

Visualizing real-time IoT Data (Practical)
- Creating Web App to visualize real Time IoT Data
- Creating cross platform mobile App to visualize real Time IoT Data
Inroduction and Basics of Python Programming (Theory & Practical)
  • Basic Python programming
  • MQTT implementation

Creating an Intelligent System (Practical)
  • Rules, better than hard coded logic.
  • Automation and Alerting by Email, Tweet, SMS*

Case Study Discussion and Conclusion (Theory)
  • Case study discussions
  • Q & A Session
  • Conclusion

Day 3, 5th December 2019

On Day 3 Mr. Abhay & Mr. Pavan provided guidance for students to identify problem statements and come up with solutions. Students Interfaced Various Sensors And under their guidance done some simple real time projects and demonstrated them.