CS850

Not Registered this time

Internet of Things - Architecture and Design Principles

UNIT I Internet of things: An overview – Internet of things, IoT conceptual framework, IoT architectural view, Technology behind IoT, Sources of IoT, M2M communication, Examples of IoT. Key concepts, Learning Outcomes, Design Principles for Connected Devices – Introduction, IoT/M2M Systems layers and Designs Standardization, Communication Technologies, Data Enrichment, Data Consolidation and Device management at gateway, Ease of doing and Affordability. Key Concepts.

UNIT II: Design Principles for Web Connectivity – Introduction, Web Communication Protocols for Connected Devices, Message communication Protocols for Connected Devices, Web Connectivity for Connected-Devices Network using Gateway, SOAP, REST, HTTP, RESTful and WebSockets. Key Concepts, Learning Outcomes, Exercises. Internet Connectivity Principles – Introduction, Internet Connectivity, Internet-Based Communication, IP Addressing in the IoT, Media Access Control, Application Layer Protocols: HTTP, HTTPS, FPS, Telnet, etc.,

UNIT III Data Acquiring, Organizing, Processing and Analytics – Introduction, Data Acquiring and Storage, Organising the Data, Transactions, Business Processes, Integration and Enterprise Systems, Analytics, Knowledge Acquiring, Managing and Storing Processes. Key Concepts, Learning Outcomes, Exercises. Data Collection, Storage and Computing using a Cloud Platform – Introduction, Cloud Computing Paradigm for Data Collection, Storage and Computing, everything as a service and Cloud Service Models, IoT Cloud-Based Servicing using Xively, Nimbits and Other Platforms. Key Concepts, Learning Outcomes, Sensors, Participatory Sensing, RFIDs, and Wireless Sensor Networks – Introduction, Sensor Technology, Participatory Sensing, Industrial IoT and Automotive IoT, Actuator, Sensor Data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Networks Technology. Key Concepts, Learning Outcomes, Exercises. Prototyping the Embedded Devices for IoT and M2M – Introduction, Embedded Computing Basics, Embedded Platforms for Prototyping, Things Always Connected to the Internet or Cloud. Key Concepts

UNIT IV Prototyping and Designing the Software for IoT Applications – Introduction, Prototyping Embedded Device Software, Devices, Gateways, Internet and Web/Cloud Services Software Development, Prototyping Online Component APIs and Web APIs. Key Concepts, Learning Outcomes, Exercises. IoT Privacy, Security and Vulnerabilities Solutions – Introduction, Security Requirements and Threat Analysis, Use Cases and Misuse Cases, IoT Security Tomography and Layered Attacker Model, Identity Management and Establishment, Access Control and Secure Message Communication, Message Communication, Security Models, Profiles and Protocols for IoT.

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UNIT V Business Models and Processes Using IoT – Introduction, Business Models and Business Model Innovation, Value Creation in the Internet of Things, Business Model scenarios for Internet of Things. Key Concepts, Learning Outcomes, Exercises. IoT Case Studies – Introduction, Design Layers, Design Complexity and Designing Using Cloud PaaS, IoT/IIoT Applications in the Premises, Supply-Chain and Customer Monitoring, Connected Car and Its Applications And Services, IoT Applications for Smart Homes, Cities, Environment Monitoring and Agriculture, Case Study: Smart City Streetlights Control and Monitoring.

TEXTBOOKS:

1. Internet of Things: Architecture and Design Principles - Raj Kamal, McGraw Hill Publication, First Edition, 2017.
2. Internet of Things: Hands on Approach – Arshdeep Bagha, Vijay Madisetty, University Press, First Edition, 2015.

REFERENCE BOOKS:

1. The Internet of Things: Key Applications and Protocols – Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley Press, Second Edition,2015.
2. Designing the Internet of Things – Adrian Mcewen, Hakin Cassemalli, Wiley Press, Second Edition, 2015.