

IOT WITH RASPBERRY PI



INTERNET OF THINGS(IOT)

Introduction to IoT

- What is IOT- In Depth Explanation
- Concepts and Technologies behind Internet of Things (IOT)
- Architecture of IOT
- Applications and industry verticals
- Use Cases (IoT Development, IoT Security, IoT Analytics)

Introduction to Raspberry Pi

- Top IoT hardware platform
- Architecture, layout and comparison of different microcontroller
- Sensor, Actuator, Microcontroller
- Why Raspberry Pi.
- Different Models of Raspberry Pi
- Hardware Description
- Applications of Raspberry Pi.
- Future of Micro Computing.

Raspberry Pi Board setup

- Different Operating Systems for Raspberry pi
- Installing OS on your Raspberry Pi?
- Booting the OS

Networking Fundamentals.

- Basics of Internet and Networking
- Remote Desktop Connection
- Setup SSH connection using Putty
- Remote server access using VNC server

Introduction to LINUX

- Introduction to Linux OS
- File Structure in Linux
- EmbeddedLinux commands for Raspberry pi
- Linux File handling
- Software installation on Linux

Introduction to Python programming Language

- Python Basics and programming
- Variables, Keywords, Operators and Operands
- Data Types in Python
- Condition Statement
- Loops
- Importing Libraries
- Functions
- Classes

GPIO Interfacing

- Raspberry Pi GPIO Pins
- LED interfacing using the GPIO
- Theory of PWM Pulse width modulation
- Control light intensity using PWM
- Switch Interfacing using GPIO
- Raspberry Pi Controlled Devices

IOT sensors and Actuators, and Smart Objects

- Introduction to Sensors
- IR & PIR sensor
- Ultrasonic sensor: Distance measurement
- Soil Moisture Sensor
- Water Flow sensor
- Light Sensor
- Temperature and Humidity (DHT11)
- Interface motors and Relay Boards

Wired Communication Protocol

- SPI
- UART
- I2C

Introduction to web frames works

- What is Web Server?
- Setting up Web Server
- Build a Python Web Server with Flask
- Controlling I/O devices from local web server.
- Read Sensor Values and Display on Web

IOT Protocol (Communication protocol for IoT)

- Introduction and structure of HTTP protocol
- UNDERSTANDING OF WEBSOCKETS
- Start with HTTP protocol GET/POST Method
- Work on python Flask library design web page
- UNDERSTANDING OF MQTT
- Difference between HTTP & MQTT
- Understanding MQTT Broker
- Understanding Publish & Subscribe Methods

CoAP IoT Protocol

- CoAP Architecture
- Difference between HTTP and CoAP Protocol
- Design client and server using Python library and implement it.
- UNDERSTANDING OF AMQP

Cloud Connectivity

- Concept & Architecture of Cloud
- Different Services in cloud (IAAS / PAAS / SAAS)
- Tools, API and Platform for integration of IOT devices with Cloud
- Connecting with Think speak and UBIDOTS (Data visualization)
- weather monitoring system using Raspberry Pi and Microsoft Azure cloud
- Controlling I/O device using Cloud.

INTRODUCTION TO IOT SECURITY

- Need of IoT Security.
- What are the requirements and challenges dealing with Security.

Project 1: Health Monitoring System

Project 2: Real-Time Remote home automation system with Cam Security

Project 3: –Smart Traffic signal system for Ambulance

Project 4–Home security System with Face Recognition.

Project 5–LPG leakage Based Emergency Response System

Project 6–Efficient water Management system at household Level using IOT.

Project 7- Smart community /college Management System

Project 8 - IOT based hot cold-water Dispenser

Project 9 -Smart voice Assistance controlled home system.

Project 10–IOT based Smart irrigationsystem

Project 11– IOT based Smart Parking system

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