IoT in Agriculture Training Program

Overview

The IoT in Agriculture Training Program is designed to equip participants with the skills and knowledge to implement Internet of Things (IoT) technologies in modern farming. It focuses on integrating sensors, connectivity, data analytics, and automation to enhance productivity, efficiency, and sustainability in agriculture.

Objectives

Participants gain hands-on experience in building smart systems to monitor and control agricultural parameters such as soil moisture, temperature, humidity, light, and crop health in real time.

Key Modules

- Introduction to IoT architecture: sensors, microcontrollers, communication modules, and cloud platforms
- Programming microcontrollers like Arduino and ESP32 using Embedded C
- Interfacing agricultural sensors (soil moisture, temperature, pH, etc.) and actuators (irrigation pumps)
- Wireless communication protocols: Wi-Fi, RFID, Bluetooth.
- Cloud integration with platforms like ThingSpeak ,Blynk, Telegram app.
- Data visualization, alerts, and automation setup

Outcomes

1. Build smart farming systems
2. Interface sensors and microcontrollers
3. Implement wireless communication
4. Set up cloud-based data monitoring
5. Develop complete IoT-based agricultural solutions

Curriculum:

1) Introduction to C.
2) Introduction to Embedded system
3) Embedded C.
Working on Different microcontroller such as 8Mega8, Pic microcontroller.
4) Fundamentals of Embedded Systems in Agriculture.
5) Hardware Interfacing:
Analog to Digital Converter (ADC) interfacing

Interfacing with actuators (LED, motors, relays)
Types of Sensors in Agriculture: Soil moisture sensors, pH sensors, weather stations (temperature, humidity), light sensors.

Actuators in Agriculture: Relays for controlling water pumps, motors for automation (e.g., automatic irrigation).

PWM for Motor Control: Using Pulse Width Modulation to control motors and pumps for irrigation.

Sensor Calibration and Accuracy: Calibration of analog sensors for accurate readings.

Assignments:

Interface a soil moisture sensor and a relay to control a water pump and creating Cloud.

6)Serial communication protocols (UART, SPI, I2C)
7)wireless communication protocols (RFID,Bluetooth,Wifi)
8)Introduction to ESP32,Esp82,RTOS and etc. For agriculture.
9)Setting IoT Network For agriculture.
10) Working on Arduino for agriculture.
11) Working on raspberry pi for agriculture.
12)Project work