AI-IoT Integrated Training Program

Overview

The AI-IoT Integrated Training Program is designed to equip participants with the knowledge and hands-on skills to develop intelligent, connected systems that integrate data sensing, AI-based processing, and autonomous decision-making. This combination is revolutionizing industries such as smart homes, healthcare, agriculture, manufacturing, and transportation.

Objectives

Participants learn how IoT devices gather real-world data and how AI models analyze it to enable smart automation, prediction, and control. The program is ideal for students, engineers, data enthusiasts, and professionals seeking expertise in cross-disciplinary technologies.

Key Modules

- IoT architecture, components, and applications
- Microcontrollers (ESP32, Raspberry Pi) and sensor interfacing
- Wireless protocols: Wi-Fi, MQTT, Bluetooth, HTTP
- Cloud platforms: ThingSpeak , Blynk
- Introduction to AI/ML: supervised & unsupervised learning
- Data preprocessing and analysis
- Edge AI: deploying models on microcontrollers

Outcomes

1. Combine AI and IoT for smart systems
2. Build and deploy ML models on IoT data
3. Interface sensors with cloud and AI platforms
4. Enable real-time intelligent automation
5. Prepare for roles in AI IoT development and smart tech innovation

Curriculum:

1. **IoT Foundations & Hardware** – Learn IoT architecture, sensors, actuators, Arduino, ESP8266/ESP32, and build your first IoT projects.
2. **Circuit Design & Communication Protocols** – Practice UART, I2C, SPI, motor drivers, relays, and power supply design.
3. **IoT Networking & Cloud Integration** – Work with Wi-Fi, Bluetooth, MQTT, Blynk, Thingspeak, Firebase for real-time data monitoring.
4. **Data Visualization & Dashboards** – Build cloud dashboards, send alerts/notifications, and log data for analysis.
5. **Python for IoT & AI** – Learn Python (NumPy, Pandas, Matplotlib) to analyze IoT data and prepare it for machine learning.
6. **Machine Learning Algorithms**– Learn Regression, Decision Tree, Random Forest, and **KNN (K-Nearest Neighbors)** for classification and prediction.
7. **Model Training & Evaluation** – Understand accuracy, confusion matrix, cross-validation, and model optimization techniques.
8. **Edge AI & TinyML** – Deploy ML models on ESP32/Raspberry Pi using TensorFlow Lite for real-time inference on IoT devices.
9. **Computer Vision with CNN** – Learn OpenCV and **CNN (Convolutional Neural Networks)** for image recognition and object detection projects.
10. **Voice & AI Assistants** – Integrate IoT systems with Google Assistant/Alexa for voice-controlled automation.