SPYPRO SECURITY SOLUTIONS Pvt. Ltd.,

C Y B E R S E C U R I T Y

5-Day Workshop on IoT Integrated with Artificial Intelligence (AI)

Day 1: Fundamentals of IoT and AI

Session 1: Introduction to IoT

- What is IoT? Importance and real-world applications
- IoT architecture: Devices, communication protocols, and cloud platforms
- Sensors, actuators, and data collection

Hands-On

- Setting up an IoT device (e.g., ESP8266/NodeMCU)
- Reading sensor data (temperature, humidity) and uploading to a cloud platform (ThingSpeak, Blynk)

Session 2: Introduction to Artificial Intelligence

- AI, ML, and DL overview in IoT
- Tools for AI development: Python, TensorFlow, OpenCV
- Difference between AI, ML, and IoT

Hands-On

- Writing a simple AI algorithm in Python
- Exploring cloud AI services (IBM Watson, Google AI)

Day 2: IoT Data and AI Foundations

Session 1: Data Collection and Preprocessing

- IoT data pipeline: collection, storage, preprocessing
- Cleaning, feature selection, normalization
- Real-time data handling

Hands-On

- Collect IoT data and preprocess in Python (pandas, NumPy)

Session 2: AI Model Development Basics

- Overview of supervised learning (classification & regression)
- Model training on IoT data

Hands-On

- Train a predictive model (e.g., anomaly detection or temperature prediction)

Day 3: Integration of IoT with AI

Session 1: Model Deployment on IoT Systems

- Edge vs. Cloud deployment
- AI frameworks for IoT devices

Hands-On

- Deploy AI model on an IoT device or integrate with a cloud service

Session 2: IoT Communication & Security

- IoT protocols: MQTT, CoAP, HTTP
- Security challenges in AI+IoT (data privacy, authentication)

Hands-On

- Secure IoT data transfer demo

Day 4: Advanced AI-IoT Applications

Session 1: Use Cases

- Smart cities, healthcare, smart homes, industrial IoT

- Edge AI concepts: running AI on microcontrollers
- Exploring AutoML for IoT

Hands-On

- Use a pre-trained AI model for face/voice recognition
- Example: Smart door lock system with IoT + AI

Session 2: Mini Project Kickoff

- Students select an application idea (health monitoring, smart agriculture, automation)
- Project planning and team formation

Day 5: Project Development & Future Trends

Session 1: Project Development

- Teams develop their chosen IoT-AI projects
- Integration of sensors, AI model, and cloud/edge deployment

Session 2: Presentation & Future Directions

- Project presentations and live demos
- Ethical considerations in AI-IoT
- Future trends: 5G, Digital Twins, Metaverse + IoT

Closing Session

- Feedback & certificate distribution

Capstone Project Example:
Smart Home Automation with AI

- Sensors: motion, light, temperature, voice
- AI Component: Predict preferences (auto-adjust lights/AC)
- Tools: NodeMCU, TensorFlow, OpenCV