



# SPYPRO SECURITY SOLUTIONS Pvt. Ltd.,

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

## 3-Day Workshop on IoT Integrated with Machine Learning (ML)

### Day 1: Introduction to IoT and Machine Learning

#### Session 1: Fundamentals of IoT

- What is IoT? Importance and applications.
- IoT architecture: Sensors, actuators, gateways, and cloud platforms.
- IoT communication protocols (MQTT, HTTP).

#### Hands-On Activity

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

#### Session 2: Basics of Machine Learning

- Introduction to ML: Supervised, unsupervised, and reinforcement learning.
- Overview of ML algorithms (Linear Regression, Decision Trees, K-Means).
- Role of ML in IoT (predictive maintenance, anomaly detection, etc.).

#### Hands-On Activity

- Writing a basic Python program to classify data using a simple ML model (e.g., Linear Regression with sklearn).

## **Day 2: Building IoT Systems with ML**

### **Session 1: Data Collection and Preprocessing**

- IoT data pipeline: Collect, process, and store data.
- Data preprocessing techniques: Cleaning, normalization, and feature extraction.
- Understanding the importance of real-time data in ML models.

#### **Hands-On Activity**

- Collecting IoT data from sensors and storing it in a cloud platform.
- Importing the data into Python and preprocessing it using pandas and NumPy.

### **Session 2: Training and Deploying ML Models**

- Training ML models using IoT data (classification or regression).
- Introduction to popular ML frameworks (TensorFlow, scikit-learn).
- Deploying ML models on IoT devices or cloud platforms.

#### **Hands-On Activity**

- Build a regression model to predict sensor values or an anomaly detection model.
- Deploy the model on an IoT device or integrate it into a cloud-based application.

## **Day 3: Real-World Applications and Projects**

### **Session 1: Advanced Topics and Applications**

- Real-world IoT-ML use cases (e.g., smart farming, predictive maintenance, healthcare).
- Optimizing ML models for edge devices.
- Exploring AutoML and pre-trained ML models for quick deployment.

#### **Hands-On Activity**

- Using a pre-trained ML model for image recognition or sensor-based prediction.
- Example: Predicting soil moisture levels for smart irrigation.

### **Session 2: Project Implementation**

- Building a complete IoT-ML project.

## **Project**

**Task:** Smart Farming System

- Sensors: Temperature, humidity, soil moisture.
- ML Model: Predict plant water requirements based on sensor data.
- Tools: NodeMCU, Python, TensorFlow, or scikit-learn.

## **Closing Session**

- Project presentations.
- Discussion on IoT-ML integration challenges and solutions.