



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.