AI Tactical Skills: IOT Hacking & Defense

Course code: AIIOTEH

This 5-day course will provide a robust foundation for integrating AI with IoT, enabling learners to create innovative and intelligent projects across various domains.

Who is the course for

- Cyber Security engineers/analysts
- Network and system administrators
- Drone, &Robotic Engineers &Developers
- Drone Operators
- Digital Forensics Investigators
- Penetration Testers
- Cloud computing personnel
- Cloud project managers
- Operations support looking for career advancement

What we teach you

- Understand the fundamentals of IoT and AI
- Set up and configure development boards for AI-enabled IoT projects
- Develop and deploy AI models for various IoT applications
- Build and integrate IoT systems for smart homes, industrial applications, and smart cities
- Analyze and visualize data from IoT devices using AI and cloud platforms
- Implement a comprehensive AI-enabled IoT solution as a capstone project

Teaching materials

Each participant will get 6 months access to Premier Private Lab-Range

Course outline

Module 1: Introduction to AI and IoT

- Basics of IoT / Artificial Intelligence
- Introduction to AI concepts and its importance in IoT
- Overview of Machine Learning (ML) and Deep Learning (DL)
- Key AI frameworks and tools for IoT (TensorFlow, PyTorch, OpenCV)

Module 2: Setting Up the Development Environment

- Introduction to IoT Development Platforms
- AI for IoT hardware device options
- IoT Communication Protocols
- Detailed look at MQTT, HTTP, CoAP, and other protocols
- Setting up a basic MQTT server
- Connecting sensors and actuators to the development board

Module 3: Handling Data

- Delta Lake and Databricks
- Data collection
- Garbage data = no ML
- Streaming data into IoT Hub
- Z-spike anomaly detection

Module 4: Machine Learning for IoT

GOPAS®

- IoT sensors with anomaly detection
- Regression with IoMT
- Classifying sensor with decision trees
- Deep learning predictive maintenance
- Face detection
- Z-spike anomaly detection

Module 5: Deep Learning
- Analyzing traffic patterns using AI
- Keras fall detection
- LSTM to predict device failure
- Deploying models

Module 6: AI Anomaly Techniques for IoT
- Z-Spikes using sense HAT on Rpi
- Use of autoencoders in labeled data
- Isolated Forest
- Anomalies on the edge

Module 7: Cloud Integration and Data Analytics
- Integrating IoT with Cloud Platforms
- Overview of cloud platforms (AWS IoT, Azure IoT, Google Cloud IoT)
- Connecting IoT devices to the cloud

Module 8: Computer Vision
- OpenCV camera deployment
- Deep neural nets and Caffe
- Object detection with NVIDIA Jetson Nano
- PyTorch on GPU's

Module 9: NLP (natural language processing)
- Speech to text
- Luis (language understanding with Microsoft)
- Deploying smart bots
- Enhancing bots with QnA

Module 10: Optimization of MCU
- ESP32 for IoT in Azure
- Streaming machine learning with Kafka and Spark
- Enriching data with Kafka

Module 11: Deploying to the edge
- OTA updates
- Offloading to the web with Tensorflow.js
- Mobile model
- Distributed machine learning using Fog computing

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