



## Machine Learning Practical Applications Training

**Duration 3 Days**

### Objective of Training course:

This hands-on training course is designed to provide participants with practical skills in applying powerful machine learning frameworks, including XGBoost, Scikit-Learn, and OpenAI Gym for reinforcement learning. Through real-world use cases, participants will develop the ability to implement ML techniques across various domains such as time series forecasting, clustering, text classification, and agent-based learning.

This course emphasizes practical exercises and project-based learning to ensure participants can confidently transfer these skills to their own industry-specific challenges. With a focus on interactive learning, this course offers personalized feedback and support throughout the training.

For the practical exercises, we will be using Google Colab. It's a cloud-based platform that allows us to run Python code in an environment that supports GPU and TPU acceleration. This way, participants will be able to access all the necessary computational resources directly through their browsers without needing access to a separate server.

I'll provide detailed instructions on how to access and use Google Colab for the exercises, ensuring a smooth setup process for everyone involved.

## Content of the Training:

### Session 1: Introduction to Machine Learning Frameworks (3 hours)

- Overview of XGBoost, Scikit-Learn, and OpenAI Gym.
- Setting up the environment and exploring key concepts.
- Practical introduction to framework workflows (training and inference).

### Session 2: Time Series Prediction with XGBoost (3 hours)

- Introduction to time series forecasting using XGBoost.
- Step-by-step exercise: Training a predictive model for a time series dataset.
- Discussion on hyperparameter tuning and model evaluation.
- Hands-on activity: Forecasting with a different time series.

### Session 3: Unsupervised Clustering with Scikit-Learn (3 hours)

- Introduction to clustering techniques (e.g., K-means, DBSCAN).
- Case study: Grouping similar data points for insights.
- Exercise: Building and evaluating a clustering model on real-world data.

### Session 4: Text Classification with Scikit-Learn (3 hours)

- Introduction to text-based classification using NLP techniques.
- Practical walkthrough: Building a model to classify text inputs.
- Exercise: Apply the model to new datasets and measure accuracy.

### Session 5: Reinforcement Learning with OpenAI Gym (3 hours)

- Introduction to reinforcement learning concepts and agents.
- Guided example: Training an agent using OpenAI Gym.
- Hands-on activity: Modify and design your own RL agent.

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## Exercises & Projects

Each session will include practical, hands-on exercises, focusing on both training and inference phases. Participants will be required to work on guided exercises aligned with the following use cases:

- Time series prediction
- Unsupervised clustering
- Text input-based classification
- Reinforcement learning agent design

The aim is to ensure participants can apply their learnings to other similar problems independently.