



DEEP REINFORCEMENT LEARNING PROFESSIONAL PROGRAM

1) Learning Methodology

- Instructor-Led Classroom Training (ILT).

2) Prerequisites:

- Basic skills with at least one programming language are desirable.

3) Training Program Description:

- In this program, you'll learn the theory and practice driving recent advances in deep reinforcement learning. This program will cover the latest techniques used to create artificially intelligent agents that can solve a variety of complex tasks, with applications ranging from gaming to finance to robotics. With the practical skills you gain in this program, you'll be able to understand the most cutting-edge research papers, and build an impressive portfolio containing your own coding implementations.
- This program is designed to enhance your existing machine learning and deep learning skills with the addition of reinforcement learning theory and programming techniques, it will grow your deep learning and reinforcement learning expertise, and give you the skills you need to understand the most recent advancements in deep reinforcement learning, and build and implement your own algorithms.
- **Length of Program:** 200 Hrs.



4) Projects

This program is comprised of many career-oriented projects. Each project you build will be an opportunity to demonstrate what you've learned in the lessons. Your completed projects will become part of a career portfolio that will demonstrate to potential employers that you have skills in data analysis and feature engineering, machine learning algorithms, and training and evaluating models.

One of our main goals at ETI is to help you create a job-ready portfolio of completed projects. Building a project is one of the best ways to test the skills you've acquired and to demonstrate your newfound abilities to future employers or colleagues. Throughout this program, you'll have the opportunity to prove your skills by building the following projects

Building a project is one of the best ways both to test the skills you've acquired and to demonstrate your newfound abilities to future employers. Throughout this program, you'll have the opportunity to prove your skills by building the following projects:

- **Project 1: Exploring the Titanic Survival Data**
- **Project 2: Predicting Housing Prices**
- **Project 3: Finding Donors for Charity**
- **Project 4: Creating Customer Segments Deep learning**
- **project 5: Dog Breed Recognition**
- **Project 6: Teach a Quad copter to Fly**
- **Project 7: Your First Neural Network**
- **Project 8: Generate Faces**
- **Project 9: Navigation**
- **Project 10: Continuous Control**
- **Project 11: Collaboration and Competition**

Capstone projects in many fields:

- 1- Self-driving cars**
- 2- Business**
- 3- Trading**
- 4- Computer vision**



5) Training Program Curriculum:

I- Python 3 Topics

- **Introduction**
 - syntax
 - data types and operations
 - I/O
 - Operators and bitwise
 - Lists
 - Tuples
 - If statements
 - For – while loops
- **Object-Oriented Programming (OOP)**
 - Special Functions
 - Strings
 - Classes
 - Inheritance
 - Regular expressions
 - Working with files
 - Python generators
 - Python Decorators
 - Exceptions
 - Regular expressions
 - Multithreading and multiprocessing Sockets and APIs
- **Introduction to Gui**
 - Gui grid
 - Gui events
 - Gui styles



- **Intro to data science**
 - Database with SQLite
 - Numpy and matrix operations
 - Pandas
 - Matplotlib
 - Building your own server
 - Data visualization
 - Git command line and GUI based
 - Web Scraping for data collecting

II- Machine Learning Topics

- **Linear algebra**
- **Calculus**
- **Statistics**
- **Introduction to ML and Business cases**
 - The difference between ML, Big data, Data analysis and Deep Learning
 - Linear Algebra and Statistics for ML
 - Data preprocessing
- **Data preprocessing**
 - Importing libraries
 - Data acquisition
 - Data cleaning
 - Handling missing data
 - Categorical data
 - Data splitting
 - Feature scaling



- **Regression problem**
 - Linear Regression
 - Multi-linear regression
 - Polynomial regression
 - K-nearest neighbour regression
 - Decision tree regression
 - Regression Evaluation Metrics
- **Classification problem**
 - Logistic Regression
 - Naive Bayes
 - K-nearest neighbour classifier
 - Support vector machine (SVM)
 - Decision tree classifier
 - Ensemble learning
 - Classification Evaluation Metrics
- **Clustering Problems**
 - Dimensionality reduction
 - K-means
 - DBSCAN
 - hierarchical clustering
 - Association Rules
- **Reinforcement learning**
 - Upper confidence bond
 - Thompson sampling
- **Model Selection and evaluation**
 - Loss functions
 - Gradient descent
 - Bias-variance tradeoff



- Cross-validation
- Hyperparameter tuning
- **Result communication and report**

III- Data Structures & Algorithms Topics

- **Introduction**
 - How to Solve Problems
 - Big O Notation
- **Data Structures**
 - Collection data structures (lists, arrays, linked lists, queues, stack)
 - Recursion
 - Trees
 - Maps and Hashing
- **Basic Algorithms**
 - Binary Search
 - Sorting Algorithms
 - Divide & Conquer Algorithms
 - Maps and Hashing
 - Practice Problems: Randomized Binary Search, K-smallest elements using Heaps, Build Red-Black Tree, bubble sort, merge sort, quick sort, sorting strings, Linear-time median finding
- **Advanced Algorithms**
 - Greedy Algorithms
 - Graph Algorithms
 - Dynamic Programming
 - Linear Programming



- Practice Problems: Graph Traversals, Dijkstra's Algorithm, Shortest Hops, A* Search, Longest Palindromic subsequence, web crawler

IV- Deep Learning Topics

- **Neural Networks**

- INTRODUCTION TO NEURAL NETWORKS
- IMPLEMENTING GRADIENT DESCENT
- TRAINING NEURAL NETWORKS
- SENTIMENT ANALYSIS
- DEEP LEARNING WITH PYTORCH

- **Convolutional Neural Networks**

- INVARIANCE, STABILITY
- CLOUD COMPUTING
- CONVOLUTIONAL NEURAL NETWORK
- CNNs IN PYTORCH
- PROPERTIES OF CNN REPRESENTATIONS: INVERTIBILITY, STABILITY, INVARIANCE.
- WEIGHT INITIALIZATION
- AUTOENCODERS
- VARIATIONAL AUTOENCODERS
- TRANSFER LEARNING IN PYTORCH
- DEEP LEARNING FOR CANCER DETECTION
- VARIABILITY MODELS (DEFORMATION MODEL, STOCHASTIC MODEL).
- SCATTERING NETWORKS
- GROUP FORMALISM
- SUPERVISED LEARNING: CLASSIFICATION.



- COVARIANCE/INVARIANCE: CAPSULES AND RELATED MODELS.
- CONNECTIONS WITH OTHER MODELS: DICTIONARY LEARNING, LISTA.
- OTHER TASKS: LOCALIZATION, REGRESSION.
- EMBEDDINGS (DRLIM), INVERSE PROBLEMS
- EXTENSIONS TO NON-EUCLIDEAN DOMAINS
- DYNAMICAL SYSTEMS: RNNs.

- **Recurrent Neural Networks**
 - RECURRENT NEURAL NETWORKS
 - LONG SHORT-TERM MEMORY NETWORK
 - IMPLEMENTATION OF RNN & LSTM
 - HYPERPARAMETERS
 - EMBEDDINGS & WORD2VEC
 - SENTIMENT PREDICTION RNN

- **Generative Adversarial Networks**
 - GENERATIVE ADVERSARIAL NETWORK
 - MAXIMUM ENTROPY DISTRIBUTIONS
 - DEEP CONVOLUTIONAL GANs
 - PIX2PIX & CYCLEGAN

- **Model Deployment**
 - INTRODUCTION TO DEPLOYMENT
 - DEPLOY A MODEL
 - CUSTOM MODELS & WEBHOSTING
 - MODEL MONITORING
 - UPDATING A MODEL



- **MISCELLANEOUS TOPICS**
 - NON-CONVEX OPTIMIZATION FOR DEEP NETWORKS
 - STOCHASTIC OPTIMIZATION
 - ATTENTION AND MEMORY MODELS
 - OPEN PROBLEMS

V- Deep Reinforcement Topics

- **Foundations of Reinforcement Learning**
 - INTRODUCTION TO RL
 - The RL FRAMEWORK: THE PROBLEM
 - THE RL FRAMEWORK: THE SOLUTION
 - DYNAMIC PROGRAMMING
 - MONTE CARLO METHODS
 - TEMPORAL-DIFFERENCE METHODS
 - SOLVE OPENAI GYM'S TAXI-V2 TASK
 - RL IN CONTINUOUS SPACES
- **Value-Based Methods**
 - DEEP LEARNING IN PYTORCH
 - DEEP Q-LEARNING
 - DEEP RL FOR ROBOTICS
- **Policy-Based Methods**
 - INTRODUCTION TO POLICY-BASED METHODS
 - IMPROVING POLICY GRADIENT METHODS
 - ACTOR-CRITIC METHODS
 - DEEP RL FOR FINANCIAL TRADING



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- **Multi-Agent Reinforcement Learning**
 - INTRODUCTION TO MULTI-AGENT RL
 - CASE STUDY: ALPHAZERO

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200 Hours



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Contact US

To get more details Regarding special discount for groups.

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CERTIFICATE

- Participants will be granted a completion certificate from Epsilon Training Institute, Delaware, USA if they attend a minimum of 80 percent of the direct contact hours of the Program and after fulfilling program requirements (passing both Final Exam and Project to obtain the Certificate)

REGISTRATION PROCEDURES

- Confirmation of registration is based on receipt of a Purchase Order or Registration Form.
- Training Program registrations will not be confirmed until registration is complete and billing information is received in full

PAYMENT TERMS AND METHODS

- Payment must be made prior to course commencement at Epsilon Training Center, Nasr City HQ
 - **In-Person**
 - In Cash to our address: Elserag shopping mall, Residential Building 1, Entrance 1, Floor 11
 - By cheque - Payable to: Epsilon Training center
 - **Bank transfer** to our ACC in:
QNB ALAHLI Acc /20318280579-69 EGP Branch code / 00078
 - **Vodafone Cash** to 01011933233



REFUND

- Any cancellation must be done three (3) weeks prior to course commencement in order to receive a full refund of paid registration fees
- A 50% Cancellation Fees will be imposed for any course cancellation received within two (2) weeks or on the date of course commencement.
 - Refund Prior 3 weeks of the training program start date, 100% Refund
 - Refund Prior 2 weeks of the training program start date, 50% Refund of training program fees
 - Refund Prior 1 week of the training program start date, No Refund
- Any refund request should be requested by a documented email or in writing.

RECAP

- Recap is available for only 1 session with the available dates
- If you need to recap a session you attended already it will be paid for 200 LE per session with the available dates

POSTPONING

- Postponing only could be before the start of the training program with minimum 10 days



Get in Touch



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