



Intelligent Agent Development with Deep Reinforcement Learning and OpenAI Gym



Intelligent Agent Development with Deep Reinforcement Learning and OpenAI Gym

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Course Overview:

The course is an immersive, hands-on training designed for professionals who wish to build AI systems using Hands-On Intelligent OpenAI Gym and deep reinforcement learning techniques. Based on the comprehensive book, this course offers a step-by-step practical journey through developing intelligent agents Agents with OpenAI Gym that solve real-world tasks such as game playing, robotics simulation, and autonomous driving. Key topics include Q-learning, Deep Q-Learning, experience replay, actor-critic methods, and environment customisation. Covering essential platforms like PyTorch, TensorBoard, CARLA, Roboschool, Gym-Retro, and MuJoCo, participants will acquire the skills to implement agents for both discrete and continuous action spaces.

Target Audience:

- AI/ML Engineers and Developers
- Robotics Engineers
- Data Scientists interested in RL
- Software Engineers exploring AI agents
- Game Developers

Targeted Organizational Departments:

- AI Research and Development Units
- Robotics and Automation Teams
- Innovation Labs
- Software Engineering Departments
- Simulation and Gaming Divisions

Targeted Industries:

- Automotive autonomous vehicles
- Robotics and Industrial Automation
- Gaming and Simulation
- Aerospace and Defence
- Healthcare Tech for training intelligent diagnostics agents

Course Offerings:

By the end of this course, participants will be able to:

- Set up and use OpenAI Gym and custom environments
- Apply Q-learning and Deep Q-learning using PyTorch
- Train agents using experience replay and epsilon-greedy policies
- Customise gym environments, including CARLA and MuJoCo
- Visualise training progress with TensorBoard
- Understand and apply policy gradients, actor-critic, PPO, and Rainbow RL
- Build and test agents on Atari games and Gym-Retro environments
- Monitor and optimise performance with reward shaping and preprocessing techniques

Training Methodology:

This course employs an applied, project-based methodology combining theoretical foundations with real-world practice. Learners will engage in interactive tutorials, group-based agent-building exercises, live demonstrations, and guided reinforcement learning projects. Emphasis is placed on practical implementation using PyTorch, JSON config files, CUDA acceleration, and OpenAI Gym. Case studies on Mountain Car, Cart Pole, Atari games, and CARLA simulations will illustrate key learning principles. Feedback sessions, breakout discussions, and reflective reviews ensure retention and hands-on mastery.

Course Toolbox:

- OpenAI Gym Environments Library
- PyTorch Deep Learning Framework
- Conda and CUDA Setup Guides
- TensorBoard for monitoring
- JSON templates for hyperparameters
- Atari and Gym-Retro emulators
- CARLA autonomous driving simulator
- Sample agent architectures DQN, PPO, DDPG, Rainbow
- Pre-built notebooks and implementation guides

Course Agenda:

Day 1: Foundations of Intelligent Agents & Reinforcement Learning

- Introduction to Intelligent Agents and Learning Environments Topic 1:
- Exploring the Capabilities and Interface of OpenAI Gym Topic 2:
- Categories of Gym Tasks: From Classic Control to Robotics Topic 3:
- Setting Up Your Python, Conda, CUDA, and PyTorch Environments Topic 4:
- Deep Dive into Reinforcement Learning and MDPs Topic 5:
- Understanding the Policy, Value Functions, and Exploration Strategies Topic 6:
- Fundamentals of AI Agents and Environment Interaction Reflection & Review:



Day 2: Hands-On with Q-Learning and Deep Q-Learning

- Solving the Mountain Car Problem Using Q-Learning Topic 1: •
- Implementing Q-learning with NumPy and Hyperparameter Tuning Topic 2: •
- Transition to Deep Q-Learning using PyTorch Topic 3: •
- Applying Experience Replay and Epsilon-Greedy Policies Topic 4: •
- Stabilizing Learning with Target Networks Topic 5: •
- Visualizing Agent Performance Using TensorBoard Topic 6: •
- Comparing Traditional and Deep Q-Learning Approaches Reflection & Review: •

Day 3: Custom Environments and Real-World Applications

- Creating Custom Gym Environments with Templates and Registration Topic 1: •
- Building the CARLA Driving Simulator as a Gym-Compatible Environment Topic 2: •
- Implementing Reset, Step Functions, and Sensor Integration Topic 3: •
- Managing Discrete vs Continuous Action Spaces in CARLA Topic 4: •
- Real-Time Testing and Visualization of Simulation-Based Environments Topic 5: •
- Techniques for Accessing and Using Camera/Sensor Data Topic 6: •
- Environment Design for Reinforcement Learning Agents Reflection & Review: •

Day 4: Advanced Agents with Actor-Critic Algorithms

- Fundamentals of Policy Gradients and Actor-Critic Architectures Topic 1: •
- Implementing n-Step Advantage Actor-Critic Algorithms Topic 2: •
- Designing Actor and Critic Networks for Autonomous Agents Topic 3: •
- Logging, Monitoring, and Saving Model Progress Topic 4: •
- Training Actor-Critic Agents in the CARLA Simulator Topic 5: •
- Exploring Synchronous vs Asynchronous Implementations Topic 6: •
- From Theory to Practice in Actor-Critic Training Reflection & Review: •

Day 5: The Learning Landscape □ PPO, DDPG, Rainbow & Beyond

- Proximal Policy Optimization PPO □ Concepts and Use Cases Topic 1: •
- Deep Deterministic Policy Gradient DDPG and Continuous Control Topic 2: •
- The Rainbow Algorithm: Integrating Value-Based Enhancements Topic 3: •
- Implementing Prioritized Replay, Dueling Nets, and Distributional RL Topic 4: •
- Roboschool, Gym-Retro, DeepMind Lab, and StarCraft II Environments Topic 5: •
- Comparative Insights Across Algorithms and Environment Suites Topic 6: •
- Capstone Discussion on Agent Development and Deployment Reflection & Review: •

FAQ:

What specific qualifications or prerequisites are needed for participants before enrolling in the course?

A working knowledge of Python and basic understanding of machine learning principles is recommended. Familiarity with NumPy and neural networks will help but is not mandatory.

How long is each day's session, and is there a total number of hours required for the entire course?

Each day's session is generally structured to last around 4-5 hours, with breaks and interactive activities included. The total course duration spans five days, approximately 20-25 hours of instruction.

Why does Deep Q-Learning use a target network and experience replay?

Target networks stabilise learning by keeping a fixed Q-target during updates. Experience replay improves sample efficiency and breaks temporal correlations in the training data, which helps avoid divergence in Q-learning.

How This Course is Different from Other Intelligent Agent Development Courses:

Unlike generic AI courses, this program is uniquely grounded in the proven methodologies and real-world book. It emphasises practical, code-level Hands-On Intelligent Agents with OpenAI Gym examples from the implementations of OpenAI Gym tutorial-based environments like Mountain Car and Cart Pole, uses PyTorch RL agent implementation techniques, and incorporates TensorBoard for reinforcement learning progress visualisation. By covering a diverse algorithm landscape, including Rainbow RL, PPO, and DDPG, it ensures a holistic skill set.



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أمستردام - هولندا



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أثينا - اليونان



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الكويت - الكويت



القاهرة - مصر



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بانكوك - تايلاند



بالي - جمهورية إندونيسيا



باكو - أذربيجان

مدن التدريب



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جنيف - سويسرا



شهر الشيخ - مصر



سيول - كوريا الجنوبية



سان دييغو - الولايات المتحدة
الامريكية



زنجار - تنزانيا



طوكيو - اليابان



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شيكاغو - الولايات المتحدة
الامريكية

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فيينا - النمسا



عن بعد - منصة زووم



عمان - المملكة الأردنية الهاشمية



ماربيا - اسبانيا



لندن - المملكة المتحدة



لانكاوي - ماليزيا



كيب تاون - جنوب إفريقيا



ميلان - إيطاليا



مونترال - سويسرا



مسقط - سلطنة عمان



مدريد - إسبانيا



نيس - فرنسا



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WHO WE ARE

Agile Leaders is a renowned training center with a team of experienced experts in vocational training and development. With 20 years of industry experience, we are committed to helping executives and managers replace traditional practices with more effective and agile approaches.

OUR VISION

We aspire to be the top choice training provider for organizations seeking to embrace agile business practices. As we progress towards our vision, our focus becomes increasingly customer-centric and agile.

OUR MISSION

We are dedicated to developing value-adding, customer-centric agile training courses that deliver a clear return on investment. Guided by our core agile values, we ensure our training is actionable and impactful.

WHAT DO WE OFFER

At Agile Leaders, we offer agile, bite-sized training courses that provide a real-life return on investment. Our courses focus on enhancing knowledge, improving skills, and changing attitudes. We achieve this through engaging and interactive training techniques, including Q&As, live discussions, games, and puzzles.



AGILE LEADERS
Training Center

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