

Artificial Intelligence Learning Resources for Edge Computing

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Edge Computing (EC) brings benefits such as reduced latency, improved data privacy, and enhanced security. However, the limited computing and storage capacities of edge devices introduce new problems such as computing offloading, resource allocation, and privacy and security concerns.

Traditional optimization methods, while effective, still have some shortcomings. First, the underlying model needs to be known, which is not an easy task due to the complexity and dynamics of EC itself. Second, they are easy to converge to local optima, and their efficiency is usually very low. Moreover, they lack the ability to perform deep and high dimensional data mining, automatically extract important features to make fast optimal decisions, and make predictions.

Therefore, using Artificial Intelligence (especially traditional ML, DL, reinforcement learning (RL), and deep reinforcement learning (DRL)) to optimize EC and address its challenges has become a major trend in recent research (Hua et al., 2023).

Machine Learning

- [Machine Learning Specialization](#) by Andrew Ng (Coursera)

This specialization includes three courses:

- [Supervised Machine Learning: Regression and Classification](#)
- [Advanced Learning Algorithms](#)
- [Unsupervised Learning, Recommenders, Reinforcement Learning](#)

Here are some repositories containing all course materials:

- [Link](#)
- [Link](#)
- [Link](#)
- [Unsolved Exercises](#)

Download course free from [here](#)

- [Introduction to Machine Learning](#) by Ali Sharifi Zarchi (Sharif University, 2025)
[Official repository](#) (contains slides, notebooks, exams and ...)
[Exercises](#)
- [Machine Learning](#) by Mahide Soleymani (Sharif University)
[Slides](#)

- [Machine Learning](#) course by Ali Sharifi Zarchi (Sharif University)

Deep Learning

- [Deep Learning Specialization](#) by Andrew Ng (Coursera)

This specialization includes five courses:

- [Neural Networks and Deep Learning](#)
- [Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization](#)
- [Structuring Machine Learning Projects](#)
- [Convolutional Neural Networks](#)
- [Sequence Models](#)

Here are some repositories containing all course materials:

- [Link](#)
- [Link](#)
- [Unsolved Exercises](#)

Download course free from [here](#)

- [Deep Learning](#) by Mahdie Seolymani (Sharif University)

Here is some repositories of the course materials

- [Link](#)
- [Link](#)
- [Link](#)
- [Slides](#)

Reinforcement Learning

- [Reinforcement Learning](#) by Mohammad Hossein Rohban (Sharif University, 2024)

Exercises with solutions [repository](#)

- [DeepRL](#) by Mohammad Hossein Rohban (Sharif University)

You can access to course slides from this telegram [link](#)

- Supplementary RL Resources

- Reinforcement Learning [YouTube Playlist](#)
- Medium Series on RL: A four-part series introducing RL, Q-Learning, DQN, and policy gradients, starting at [here](#).
- Double Deep Q-Networks (DDQN): [Medium article](#) and [YouTube video](#)
- [Dueling Double Deep Q Learning using Tensorflow](#)
- Implementing DDPG from this [repository](#) and this [repository](#)
- Also some YouTube videos:
 - [How Policy Gradient Reinforcement Learning Works](#)
 - [Actor Critic Methods](#)
 - [Deep Deterministic Policy Gradients \(DDPG\)](#)

- [Implement Deep Learning DDPG paper in code](#)
- This [Youtube Channel](#) seems useful. Several videos from it are listed above.
- [D4PG introduction with pseudocode](#)
- [D4PG sample implementation](#)

References

Hua, H., Li, Y., Wang, T., Dong, N., Li, W., & Cao, J. (2023). *Edge Computing with Artificial Intelligence: A Machine Learning Perspective*. ACM Computing Surveys, 55(9), 2–20.