

Introduction to Machine Learning  
Exam C  
2024.01.08.

1. (15 points) What is the reinforcement learning method? Draw a figure to introduce the mechanism of the method.
2. (15 points) We have an autoencoder. Let  $g()$  denote the decoder function. How can  $g()$  be used for generative AI?
3. (15 points) What are the four possibilities to update the elements of a particle in Simplified Swarm Optimization?
4. (30 points) A two-input Perceptron tries to learn the OR logic function. In one phase of learning, the two weights of the Perceptron are as follows:  $w_1 = 0.1$ ,  $w_2 = -0.3$ . The threshold is:  $\theta = 0.25$ . The learning rate is:  $\eta = 0.1$ . Illustrate the learning process through 1 epoch.
5. (15 points) In the Ant Foraging model, what will be the probability of the agent choosing the STRAIGHT\_AHEAD direction, if the amount of pheromone it senses in each of the three directions is the following:

LEFT	STRAIGHT_AHEAD	RIGHT
20	20	60

6. (10 points) What are the 3 rules of technology?