

Written examination

Course: TIN175/DIT411, Introduction to Artificial Intelligence

Examiner: Claes Strannegård

Tuesday 19 February 2019, 8:30–12:30

There are 10 questions worth 2 points each. The max score is 20 points. Grade 3/G: 10 points, Grade 4: 14 points, Grade 5/VG: 17points.

Question 1. What type of data is used in supervised learning?

Question 2. Construct a small network of Perceptrons that computes binary XOR.

Question 3. How do Autoencoders work? Illustrate with a picture and explain with a couple of sentences.

Question 4. What inputs does the k-Means Clustering algorithm take? What does it return?

Question 5. Explain in a couple of sentences how actions are selected in Epsilon-Greedy algorithms.

Question 6. Describe the input/output interface of the neural network used in Deep Q-Learning. What does the input layer represent? What does the output layer represent?

Question 7. Describe how the Frontier is ordered in the following special cases of the Generic Search algorithm:

- (a) Depth-First Search
- (b) A*.

Question 8.

- (a) Make a drawing illustrating how mutation works in genetic programming.
- (b) Make a drawing illustrating how mating (crossover) works in genetic programming.

Question 9. How could you explain Backtracking Search for Constraint Satisfaction Problems in a few sentences to a person who is familiar with Depth-First Search?

Question 10. What value does the Expectiminimax algorithm return when it is called with the root of the following game tree? Show your computation.

