

Kierunek: Sztuczna inteligencja i Data Science

Artificial Intelligence and Data Science

Specjalność: Computational Intelligence and Data Science

Stopień: drugi

Zagadnienia zakresowe

Issues for the diploma examination

1. Algorithms optimization methods based on loop transformation techniques.
2. The complexity of algorithms and their examples.
3. Examples of the evolutionary algorithms, and mode of action.
4. Applications of the evolutionary algorithms.
5. The mode of operation of the base genetic algorithm and genetic operators.
6. Explain and compare terms: sensitivity and specificity.
7. List the most popular distance measures.
8. What concept is used by the neural network approach in the classification task?
9. The von Neumann minimax theorem for zero-sum games - its significance in the game theory and an example of applications.
10. The bargaining problem; Nash bargaining axioms and theorem about the bargaining problem solution.
11. Application of the Zadeh extension principle to fuzzy sets.
12. Construction of the fuzzy logic controller.
13. Application of the rough set theory to fuzzy logic systems.
14. Application of convolution to edge detection.
15. Examples of morphological image transformations.
16. Methods of dimension reduction.
17. What is the curse of dimensionality?
18. Discuss the different types of autoencoders.
19. What is a self-organizing map?

20. What is the idea behind the LSTM neuron?
21. Convolutional layers and their applications.
22. Maximum likelihood method.
23. Tests of hypothesis about a population mean.
24. Various types of neurons.
25. SVM for classification.
26. Decision trees.
27. The Kuhn – Tucker theorem and its application.
28. The duality theory.
29. Linear vs. nonlinear filtering in computer vision
30. Object recognition methods in image processing (list known methods and describe them)