Tárgyleírás

Tárgy neve: Principles of artificial intelligence L+Pr.

Tárgyfelelős neve: Gregorics Tibor

Tárgyfelelős tudományos fokozata: PhD

Tárgyfelelős MAB szerinti akkreditációs státusza: AT

Az oktatás célja angolul / Aim of the subject:

Knowledge

- They have a high level overview of AI and know the important concepts of both classical AI and machine learning.
- They know the most important methods of classical AI and some current methods of machine learning.
- They know the workflow and the correct execution of a machine learning project. For example, they know the role of test data in a machine learning project.
- They have a high level of fluency in the language of AI, including its professional vocabulary and its characteristic features of expression and composition.

Abilities:

- They are able to apply their AI skills in a novel way in order to solve tasks in IT research and development.
- They are able to assess the innovative value of planned or implemented AI systems, as well as their compliance with users' and social needs, and to validate completed software products.
- They are able to professionally use scientific and technical information sources to obtain knowledge necessary for solving a problem, and to critically interpret and evaluate it.
- Under professional guidance, they are able to carry out scientific research on their own, and to prepare for further studies at postgraduate level.

Attitude:

- They follow professional and technological developments in their IT field.
- They are committed to critical feedback and evaluation based on self-examination.
- They are committed to lifelong learning, and are open to acquiring new IT competencies.
- They accept and make their co-workers apply the ethical principles of work and organizational culture as well as those of IT scientific research.
- They share their knowledge and consider it important to disseminate professional IT results.

Autonomy, responsibility:

- They take responsibility for their professional decisions made in their IT-related activities.
- They undertake to meet deadlines and to have deadlines met.
- They bear responsibility for their own work as well as for the work of their colleagues they work together with in a project.

Az oktatás tartalma angolul / Major topics:

Overview. The concept, history, and applications of AI.

Modeling and search. Problem representation methods (state-space representation and constraint satisfaction problems) which make it possible to view a problem as a path-finding problem. Graph representation of a path-finding problem. General scheme of the search system. Control strategy of the search system and heuristics.

Heuristic search. Well-known irrevocable strategies: hill-climbing search, tabu search, algorithm of simulated annealing. Tentative strategies: the backtracking algorithm and graph-search algorithms (look-forward, A^*, A^C, etc.). Evolutionary algorithms.

Two-player games. Representation of the games. The winning strategy. Sub-tree evaluations: minimax algorithm and alpha-beta pruning.

Introduction to machine learning. Basic concepts (training, validation, and test sets, data preparation, Exploratory Data Analysis, etc.). Supervised learning and some examples (Support Vector Machines, feedworward neural networks, Recurrent Neural Networks). Unsupervised learning and some examples (k-means algorithm, Principal Component Analysis).

A számonkérés és értékelés rendszere angolul / Requirements and evaluation:

continuous assessment, exam

Irodalom / Literature:

Russell, S., & Norvig, P. (2021). Artificial intelligence: A modern approach, global edition 4th. Foundations, 19, 23.

Chollet, F. (2021). Deep learning with Python. Simon and Schuster.