Study program: Artificial Intelligence
Name of the subject: Audio, Speech and Language Processing
Teacher(s): Marko Panić
Status of the subject: elective
Number of ECTS credits: 5
Conditions: none

Subject goal

- Understanding of fundamental concepts in audio, speech and natural language processing and their application in big data analytics

Outcome of the subject

- Acquired knowledge of basic algorithms in audio, speech and natural language processing and their application in big data analytics
- Ability to communicate/collaborate with engineers on practical and research problems
- Ability to implement algorithms of audio, speech and natural language processing using appropriate software tools
- Ability to solve real-world problems using the acquired knowledge

Subject content

Theory

Physics of Sound, Auditory perception fundamentals, Speech models and speech synthesis, Compression (MPEG/Audio compression), Speech recognition, Hidden Markov models and finite-state transducers in speech recognition, Statistical Language Models, POS tagging, Syntax and Grammars, Statistical Parsing, Dependency Parsing, Word Sense Disambiguation, Sound mixtures and separation, Music analysis and recognition, Content-based retrieval of large-scale archives.

Practical learning

Application examples in speech and audio coding, speech recognition and synthesis, language modelling and other relevant domains.

Literature

Selected parts of the following books:
1. Ben Gold and Nelson Morgan: Speech and Audio Signal Processing: Processing and perception of speech and music, Wiley, 2000.
2. Daniel Jurafsky and James H. Martin: Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, 2nd edition, Prentice Hall, 2009.

Number of active teaching classes	Theoretical teaching: 2	Practical teaching: 2

Method of carrying out the teaching

Lectures; revisions of the material; active students' participation in problem solving; knowledge tests – colloquia; homeworks.

Evaluation of knowledge (maximum number of points 100)

Pre-exam obligations	points	Final exam	points
Colloquia	20	Written exam	70
homeworks	10		