Neural Networks

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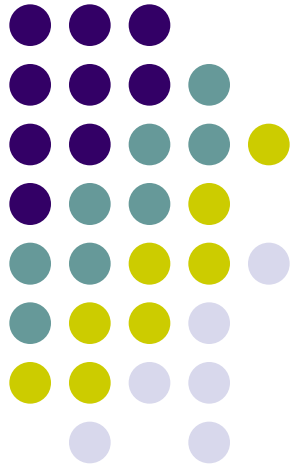
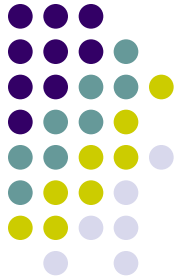
https://www.fer.unizg.hr/en/course/neunet_a



Lecturers



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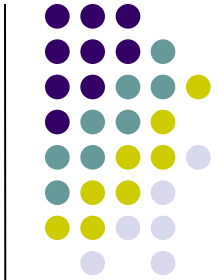
Course goals

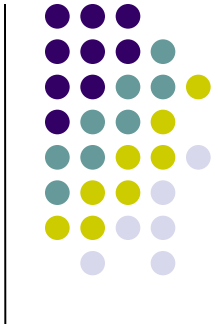
- To provide foundations in theory and applications of artificial neural networks in practical engineering problems such as pattern recognition, image and video analysis, and computer vision

Course elements



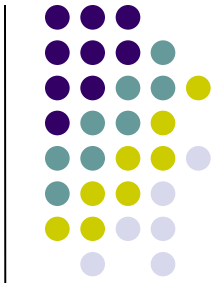
- Lectures
- Laboratory excercises
- Team project
- Midterm exam
- Final exam

Overview of topics



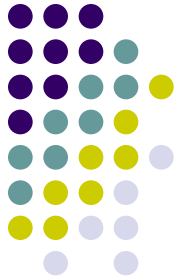
- Introduction
- Learning process
- Associative memory
- Single layer perceptron
- LMS algorithm
- Multilayer perceptron
- Radial basis function networks
- Support vector machines
- Recurrent networks
- Self-organizing networks
- Deep neural networks
- Applications

Laboratory excercises



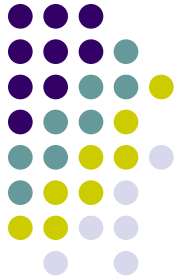
- Practical laboratory excercises provide opportunity to gain experience in problem solving using neural networks
- Four laboratory excercises

Laboratory excercises



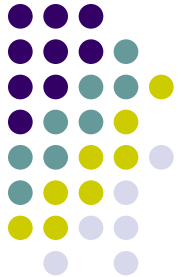
- Before the scheduled laboratory session students should:
  - Study relevant theory required to complete the excercise
  - Use their personal computers to complete the laboratory excercises
  - Prepare the report about the laboratory excercise containing experimental results
  - Electronically submit the report document in PDF format, before the given deadline

Laboratory excercises



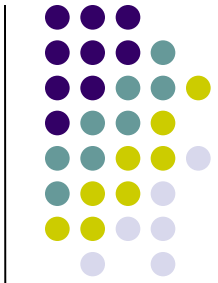
- On the date when the laboratory excercise is scheduled:
  - A short online quiz related to the laboratory excercise will be simultaneously completed by all students
  - All details and instructions will be announced on time on the course web page

Problem solving sessions



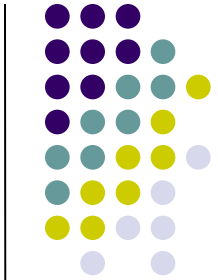
- At the end of two teaching cycles there will be problem solving sessions
  - Demonstration of exam problems

Midterm and final exam



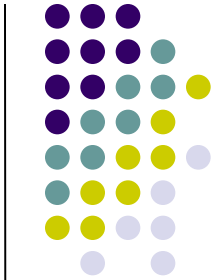
- Midterm and final exams will be organized online
- Midterm exam:
  - Covers the material from the first teaching cycle
- Final exam:
  - Covers all material
- Instructions will be announced before the exams

Team project



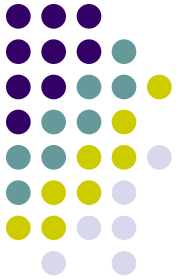
- The goal of team projects are to help students:
  - To practice how to apply gained theoretical knowledge to solutions of real problems
  - To improve technical report writing skills
  - To improve oral presentation skills

Team project



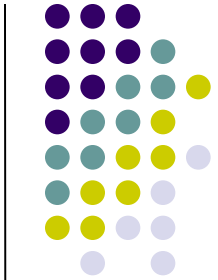
- Teams of 4-5 students
- At the beginning of semester teams prepare and submit project descriptions (half page) containing the title and goals of the project (who, what, when, why, how)
- At the end of the semester teams submit written reports and give oral presentations
  - Video presentations will be pre-recorded
- Instructions and deadlines are shown on the course web page

Grading: Continuous



- Midterm exam: 30 points
- Final exam: 30 points
- Laboratory: 20 points
- Team project: 20 points
- To pass the exam a student has to collect at least 50% of points for each activity

Grading: Exam



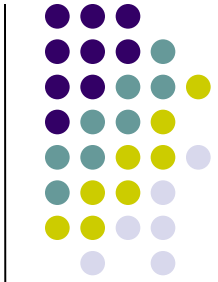
- For students who have not passed the exam through continuous grading
- Prerequisites:
  - Min. 50% points from hands-on sessions
  - Min. 50% points from team project
- Total number of points is 100
  - Written exam: at least 30 out 50 points
  - Oral exam: at least 30 out of 50 points

Grading thresholds

- Excellent (5) – min. 89 bodova
- Very good (4) – min. 79 bodova
- Good (3) – min. 70 bodova
- Satisfactory (2) – min. 61 bodova

- The maximum number of points is 100

Literature



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