080926S Introduction to Artificial Intelligence for Medical Imaging, 3-5 ECTS

Contact: aleksei.tiulpin@oulu.fi

Course content:

- Basics of Machine Learning
- Machine Learning Experiments Design
- Simple parametric and Non-parametric Models
- Deep Convolutional Neural Networks
- (Medical) Image Recognition
- (Medical) Image Segmentation
- Interpretation of Deep Neural Nets
- Practical use cases (live demonstrations / tutorials)

Upon completion of this course, the students will be able to:

- Formalize image analysis / predictive modeling problems and solutions to them in terms of machine learning
- Understand common issues related to medical data analysis and predictive modelling as well as the ways to mitigate them
- Analyze medical AI scientific literature
- Design machine learning experiments and assess their results
- Use basic computer vision techniques to solve image recognition and segmentation problems in various medical domains
- Use computer vision and machine Llearning techniques in case of limited or poorly labelled data

RESEARCH UNIT OF MEDICAL IMAGING, PHYSICS AND TECHNOLOGY

OYS OULU UNIVERSITY HOSPITAL

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By whom:

- Industrial and academic Machine Learning experts

For whom:

- Biomedical Eng., / Computer Science MSc students (5 ECTS track)
- Medical students (3 ECTS track)
- BSc students can also take the course if they have a basic understanding of mathematics and programming

Course tracks:

- 3 ECTS: Lectures 18 h, Project 34 h, Self-study 29 h, Exam 3 h.
- 5 ECTS: Lectures 18 h, Exercises 16 h, Project 34 h, Self-study 44 h, Home Programming Exercises 20h, Exam 3 h.

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RESEARCH UNIT OF MEDICAL IMAGING, PHYSICS AND TECHNOLOGY

Lecturer: Dr. Aleksei Tiulpin, PhD

- Dr. Tiulpin is a leading national expert in medical AI. He currently works at the at the University of Oulu as a post-doctoral fellow (part time), Oulu University Hospital, and he is also a CTO at Ailean Technologies Oy. Prior to his current company, he co-founded Inmodi Oy, and also acted there as a CTO. He has published over 16 articles and holds 1 patent. In addition to the publications, he holds a rank of Kaggle Competitions Master, which he earned by participating and scoring top positions in worldwide Machine Learning competitions.

Teaching Assistants:

- Egor Panfilov, MSc. Previously: Senior Innovation Engineer at Electrolux. Now: Doctoral Researcher
- Huy Hoang Nguyen, MSc. Previously: Technical Lead at FPT Technology Solutions. Now: Doctoral Researcher
- Abu Mohammed Raisuddin, MSc. Previously: Lead Software Engineer at Samsung. Now: Doctoral Researcher
- Santeri Rytky, MSc. Now: Doctoral Student