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Bachelor / Master Thesis

Deep Learning Algorithms in Kidney Histopathology & Pathomics

Background

Large-scale high-throughput digitalization of histology glass slides using slide scanners, which generate digital Whole Slide Images (WSIs), and improved software and hardware solutions, together termed digital pathology, opened new possibilities of automated, highly precise and reproducible quantification in pathology. In addition, digital pathology enables effective implementation of Artificial Intelligence (AI), i.e. computer systems able to perform tasks normally requiring human intelligence. Machine learning and particularly deep learning (DL), are research fields of AI focusing on methods, in which computer systems automatically improve through experience. These approaches will most likely advance and transform pathological diagnostics in the future, leading to precise, reproducible and personalized computational pathology. Furthermore, they may even have the potential to identify new diagnostic features and biomarkers that have not been previously recognized, such as in onco-pathology.

Tasks

- Literature review
- Reproduce the algorithm introduced in the literature
- Regular discussions with the supervisor for generating meaningful ideas
- Modify the algorithm in order to realize expected targets
- Prepare experiments and necessary materials for the thesis

Requirements

- Student of RWTH Aachen in Faculty 6
- Knowledge on machine learning / neural networks / digital image processing
- Experience in programming
- Fluent in spoken and written English

Our Offer

Thesis topics in the field of histopathology and pathomics would be offered based on the state-of-the-art DL algorithms for stain normalization, WSI translation, segmentation, classification and quantification. For more information please contact us via E-mail.

Reference

Webpage: www.lfb.rwth-aachen.de/en/research/medical/histopathology