

Masters project: Deep learning-based prediction of therapy response in PET/CT of prostate cancer patients

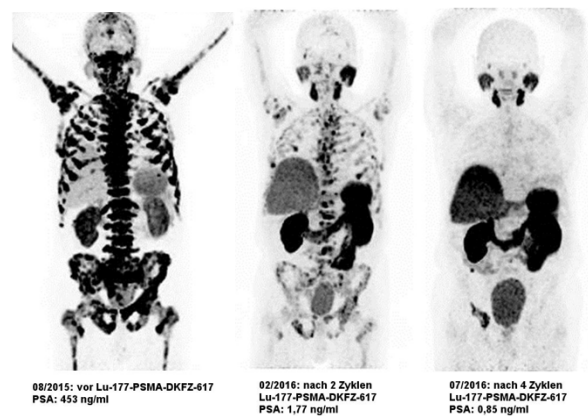
Key topics: deep learning, computer vision, medical image analysis, computed tomography, prostate cancer

Overview

Advanced prostate cancer typically presents with a multitude of metastases, which can be detected with Prostate Specific Membrane Antigen (PSMA)-specific PET/CT and subsequently treated with radioactive labeled PSMA tracer. Successful treatment is detected by a decrease in serum PSA level. This project aims at prediction and early identification of therapy responders – which patients will respond favorably to therapy?

Project outline

The goal of this project is prediction of therapy response with deep convolutional neural networks (CNNs). 3D PET/CT scans of the whole body serve as input data, the tool should be able to predict therapy response, labeled as post-therapy decrease in PSA by more than 50%. To accomplish this, a set of ~400 PET/CT scan needs to be extracted from the hospital's picture archiving system. Afterwards, a CNN suited to solve this problem needs to be designed and trained, preferably in cross validation. Finally, the entire assessment tool needs to be validated on a set of independent in-house test images.



Requirements

- Highly motivated master student in the field of data science, computer science, physics, statistics or similar
- Considerable experience with a programming language (preferably Python, R) and associated deep learning frameworks (preferably Keras or (py)Torch)
- Basic understanding of common machine learning methods (regression, random forest, CNNs, ...)
- Curiosity and an open mind

What we offer

- Excellent research environment in one of the largest university hospitals in Europe
- Interdisciplinary team of trained research experts (radiologists, physicists and data scientists)
- Challenging problem of topical issue embedded in a broad and highly active research field
- Proof-of-concept development for future clinic's therapy decision workflows

If you are interested or wish to learn more about the project, do not hesitate to contact Prof. Dr. Michael Ingrischn (michael.ingrischn@med.uni-muenchen.de).