Renal and adrenal tumour diagnosis

DeepHealth

Around 3% of all cancers are forms of kidney parenchyma, with a higher incidence rate in Western countries. Meanwhile, imaging examinations have become prerequisites for an accurate diagnosis, as several radiology modalities are used. DeepHealth aims to further improve the existing methods and enhance diagnostic accuracy.

Urology diagnosis in the digital age

Challenge

Computed tomography is widely used in the field of urology. This method is accurate for predicting Renal Cell Carcinoma, but complications arise when dealing with distinguishing between benign or borderline renal tumours and malignant renal neoplasm. Furthermore, adrenal glands are also hard to diagnose, due to their small size. Thus, doctors have reported difficulties while analysing the images.

Deep Learning, and specifically convolutional neural networks, can be employed for both image segmentation and classification tasks, vital for accurate diagnosis of urological dysfunctions. Recent trends have indicated their efficacy dealing with medical cases; however, they are largely underexplored in the context of adrenal glands.

An additional challenge in medical image analysis is the relatively small size of available datasets for training purposes. DeepHealth aims to remedy the problem by creating a data library consisting of renal tumour cases, adrenal tumour cases alongside normal cases that contain no pathology.

Solution

Using the DeepHealth toolkit, SIMAVI's team will train the complex neural networks to improve and expand diagnostic imaging capabilities. The development of a web application that integrates the infrastructure of Deep Learning algorithms will give urologists, radiologists and oncologists in Prof.Dr.Theodor Burghele hospital the opportunity to better monitor the diagnostic and treatment methods. The ability of AI algorithms to handle large amounts of data can help hospital administration generate an overview of patients, which leads to better diagnostic results.

Benefits

The DeepHealth project will support physicians in the process of classification and segmentation of images to diagnose kidney tumours. This will increase the accuracy of disease prediction, especially in cases where current methods have proven insufficient.

Medical specialty:
Urology

Use Case:
Image Analysis and Prediction for Urology

Sites:
Bucharest (Romania)

Entities:

DeepHealth Project

DeepHealth is a H2020 collaborative project which develops new HPC and Deep Learning techniques applied to large and complex biomedical datasets to support new and more efficient ways of diagnosis of diseases. The technologies developed (EDDLL, ECVL, etc.) have been validated by clinicians on 14 Use Cases like this, providing 14 Success Stories ready to scale to other healthcare institutions.

https://deephealth-project.eu/