

# Deep learning for accurate diagnosis of prostate cancer

DeepHealth

Prostate cancer is the second-most common cancer worldwide. Diagnosis suffers from the pathologists' biases and subjective interpretations in reporting cancer grade, which in turn aggravate the urologists' selection of patients that need surgical treatment. Precise and consistent diagnosis is key to improving prostate cancer management and outcome.



## Precise and consistent prostate cancer diagnosis with Deep Learning

### Challenge

Last year, 375,000 men died of prostate cancer, which makes it the sixth cause of cancer death in men. Suspicion for prostate cancer generally comes from an abnormal blood test. Definitive diagnosis is set by a pathologist with a microscopic examination of small tissue samples of the prostate, where the aggressiveness of the tumor is assessed. Unfortunately, pathologists are struggling to reach agreement in doing so.

Unique to prostate cancer is that many less aggressive cases do not need active treatment, while it is of great importance that aggressive cases undergo surgical or radiation treatment. However, active treatment for prostate cancer comes with significant side effects.

Deep learning is an AI technique well-resourced for image classification tasks, offering high potential to improve precision and consistency of prostate cancer diagnosis.

### Solution

Within DeepHealth, urologists, pathologists and data scientists have developed a specialized Digital Pathology Platform based on virtual microscopy technologies, which enables the collection, annotation and processing of thousands of tissue samples.

In combination with the DeepHealth toolkit, these annotated samples have enabled the creation of new AI-based tissue image analysis tools to support the pathologist in the identification and grading of tumor tissue, that are showing promising results in the clinical research setting.

### Benefits

A robust, precise, and consistent Deep Learning-based model for prostate cancer diagnosis has the potential to provide urologists with an improved basis for treatment selection, decreasing overtreatment and rapidly accelerating the field's knowledge about prostate cancer.

DeepHealth offers a deep-learning-based tool that improves reproducibility and precision in the diagnosis of prostate cancer.

Medical specialty:

Pathology

Use Case:

Prostate cancer

Sites:

Stockholm (Sweden)

Entities:



Karolinska  
Institutet

KAROLINSKA  
UNIVERSITY HOSPITAL



### 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.*

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<https://deephealth-project.eu/>

