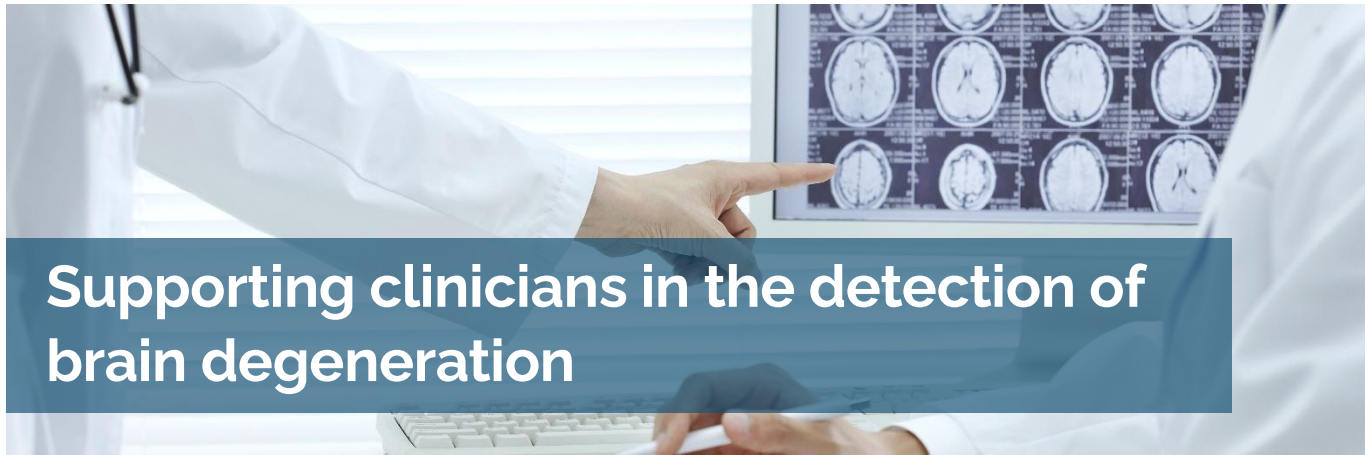


Dementia is one of the most burdensome medical conditions among persons aged 60 years and older, while the number of dementia cases is estimated to double every 20 years. An early treatment onset is crucial for the prevention of a rapid decline in memory function. DeepHealth can facilitate an early detection of brain degeneration and enable timely medical interventions.



Supporting clinicians in the detection of brain degeneration

Challenge

The choice of treatment for dementia fundamentally relies on diagnosing the underlying cause of the dementia symptoms. Among the multiple possible causes, Alzheimer's disease (AD) is the most common.

Although brain scans alone are not enough to make a diagnosis, they constitute a powerful instrument to assess the progressive loss of brain cells that is characteristic for AD. An atrophy of the hippocampus, a brain structure involved in memory processes, is one of the most commonly found neuronal degeneration markers of the disease and is visible in brain scans. However, accurate segmentation of the hippocampus and measurement of its volume can be very challenging and time consuming, even for expert neuroradiologists.

Deep learning-based brain segmentation represents a state-of-the-art approach for brain image analysis. For the development of a reliable, fully automated segmentation algorithm, a secure deep learning environment is needed that runs on a stable HPC infrastructure.

Medical specialty:
Psychiatry

Use Case:
Dementia

Site:
Magdeburg (Germany)
Velizy Villacoublay (France)

Entities:



Solution

DeepHealth provides this HPC infrastructure together with open, European deep learning and computer vision libraries optimized for clinical application. Within the project, we undertook the challenge to apply both the infrastructure and the libraries to a large and complex clinical dataset of brain scans and developed a ready-to-deploy solution to segment the hippocampus in new samples of brain images with the aim of creating a supporting diagnosis tool for clinicians.

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.

Benefits

Deep learning-based brain segmentation on an HPC infrastructure facilitates fast analysis of brain scans to support clinicians in the detection of brain degeneration. In this way, DeepHealth can contribute to an early diagnosis of the dementia type.