# Predictive and Populational Model for Alzheimer's Disease using Structural Neuroimaging

DeepHealth

Alzheimer's disease (AD) is the main cause of dementia among elder population, causing a progressive and irreversible brain impairment. AD gradually affects memory and cognition, complicating the ability to carry out the activities of daily living.

Early detection of impairments minimizes damage
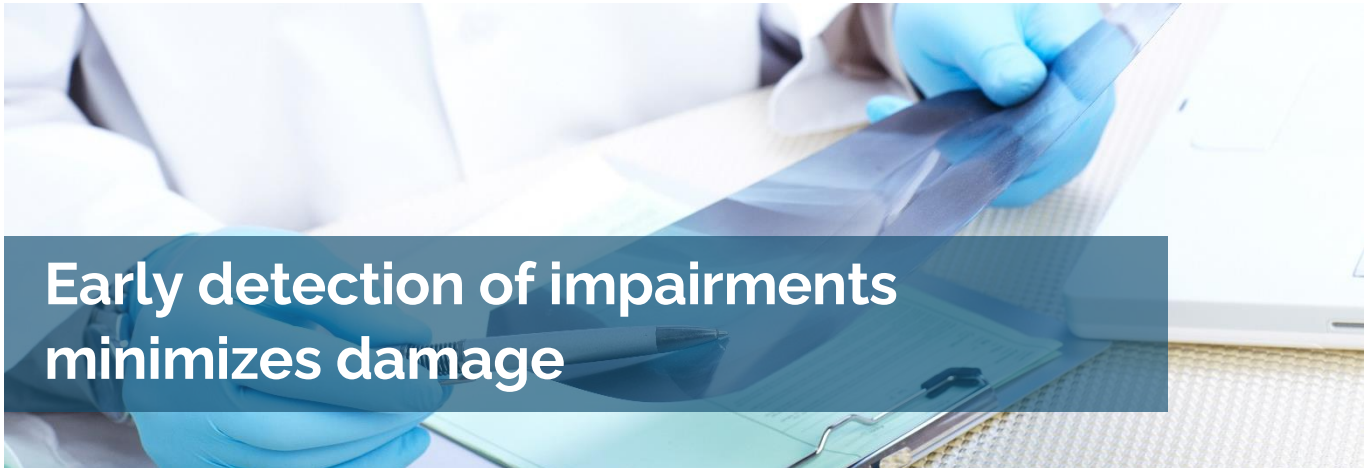
Challenge

When diagnosing AD, it is necessary to discard other possible causes that may affect the cognitive system, such as infectious processes, cerebral vascular problems, mood disorders, or even the side effects of medication, according to research, such as the Pasqual Maragall Foundation's Alfa Study. In addition, it is also essential to exclude other neurological conditions that lead to progressive cognitive deterioration, such as cerebrovascular disease, Parkinson's disease and brain tumours, among others. Diagnostic imaging provides a great tool for early detection of the disease in order to minimise damage later in life.

Deep Learning techniques can improve the early detection of cognitive impairment, achieving synergies between technology and medicine to help in advanced diagnosis.

Medical specialty:
Neurology

Use Case:
Alzheimer Disease

Site:
Valencia (Spain)

Entity:

GENERALITAT VALENCIANA   Fundació Fisabio

Solution

We are working to solve the challenge of automated detection of AD mild cognitive impairment to detect subtle brain abnormalities and provide diagnostic support to medical experts. To achieve this goal, the collection of clinical images by the BIMCV (Medical Imaging Databank of the Valencia Region) has been proposed. BIMCV provides real-world data of the same quality as the data with which radiologists work, allowing us to train more realistic models than those trained only with high-resolution images.

Benefits

We have created a neural network that detects mild cognitive impairment in order to initiate the palliative treatments required when Alzheimer's is detected. The difference of being able to carry out this treatment for an early diagnosis means that the person can improve his future quality of life.

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/

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