

Validation Plan

Intended use

The present system allows measuring the 3D volume of the hippocampus by means of a magnetic resonance study of the patient's brain. The measurement of the hippocampus is usually the most effective method for diagnosing or quantifying the progression of brain diseases such as Alzheimer's.

Calculating the volume of the hippocampus is often a tedious task for specialists. Therefore, the system intends to assist clinicians in this task, allowing to obtain more precise and consistent calculations, although in all cases it will require the supervision and validation of an expert.

Algorithm Description

Regarding the algorithm, it is a machine learning algorithm, specifically a deep learning segmentation algorithm based on the U-Net architecture.

Training data

The training database is based on the Medical Decathlon Competition dataset. This dataset is stored as a collection of NIFTI files, with one file per volume and one file with its segmentation mask. The original images are T2 MRI scans of the whole brain. The samples have been tagged by a team of experts in the field.

Performance of algorithm

In order to evaluate the performance of the segmentation algorithm, the usual similarity metrics for this type of algorithm are used: Dice and Jaccard. The calculation of the similarity metrics is performed on a set of samples (test) not used in training. The algorithm reports an average Dice coefficient value of 0.89 and a Jaccard coefficient of 0.80, which indicates sufficient performance for the proposed use of the algorithm.

On the other hand, the dataset does not offer exhaustive information on the characteristics of the patients: age, gender, diagnosis of diseases... Therefore, it is not possible to define in which type of samples the system will offer an optimal performance.