

# Hippocampal Volume Quantification in Alzheimer's Progression

AI for Healthcare Nanodegree

Project 2: Validation plan

## **Intended use Statement:**

This algorithm is intended for use in assisting a radiologist with the quantification of the hippocampal volume from MRI scans in patients with Alzheimer's disease.

## **Device Limitations:**

This algorithm is not appropriate to be used in emergency settings because of its performance-based limitations. This algorithm needs a GPU to perform well.

## **Training data:**

The "Hippocampus" dataset was acquired from the Medical Decathlon competition. This dataset is stored as a collection of NIFTI files, with one file per volume, and one file per corresponding segmentation mask. The original images here are T2 MRI scans of the full brain. The labels used for training the model are segmentation masks of the right hippocampus.

## **Algorithm performance:**

Algorithm Performance Standard is Dice score and Jaccard index as metrics for semantic segmentation. Our algorithm's mean Dice score is 0.874, and mean Jaccard score is 0.777. Real-world performance is estimated by comparing the results to the ground truth. As a silver standard for validating hippocampal volumes, we need at least 3 independent practicing radiologists to create the labels for segmentation. The final label is then determined by a voting system across all of the radiologists' labels for each volume.

The algorithm will perform well in data similar to the ones that it has been trained on, and it might not perform well on volumes that are different than the training set, such as scans of infants or patients with head injuries.