

Validation Plan

Purpose

Predict the size/volume of hippocampus through MRI head images. This prediction will assist the radiologist to determine any possibilities of Alzheimer's disease. This in turn will help doctors to assist patients to get better care and treatment quickly.

Dataset

The dataset for this project is acquired from [Medical Decathlon competition \(MDC\)](#). The in-detail description of the dataset used can be found [this article](#). The training data consists of T2 MRI scans of full head. These MRI scans are conducted for patients above 30 years of age without gender bias. No prior information regarding the patient's medical history can be found for the dataset provided.

Algorithm performance

The dataset trained on hippocampus volume is in the range of ~2200 volumes in mm^3 to ~4400 volumes in mm^3 . The architecture used to incur this was U-net convolution architecture. There are four parameters with which these datasets are evaluated. The overall mean value of all these 4 parameters are shown below.

Dice coefficient	0.9043762468852891
Jaccard coefficient	0.8268509787928676
Sensitivity	0.9486882820570148
Specificity	0.9486882820570148

The above table is the result of the algorithm and can be seen in result.json file.

Further, these values when compared with the [MDC test results](#), we see that the values are almost similar. The dice coefficient in specific is 0.90 in the test results and 0.9043762468852891 from our algorithm.

Team		Rank	BRATS						Heart		Hippocampus			
			Dice			NSD			Dice	NSD	Dice		NSD	
			L1	L2	L3	L1	L2	L3	L1	L1	L1	L2	L1	L2
nnU-Net		1	0.68	0.48	0.68	0.87	0.73	0.91	0.93	0.96	0.90	0.89	0.98	0.98

Algorithm limitations.

As this algorithm is trained for the dataset above a certain age, the usage of this algorithm for children and young adults are a huge limitation. Further, as this algorithm has still not able to provide 100 accuracy, a supervision of radiologist to finalize the decision is very important.