# Algorithm Report

Alzheimer's disease is a type of dementia that causes problems with memory, thinking and behavior. Symptoms usually develop slowly and get worse over time, becoming severe enough to interfere with daily tasks.
It is not a normal part of aging. The greatest known risk factor is increasing age, and the majority of people with Alzheimer's are 65 or older. But Alzheimer's is not just a disease of old age. Approximately 200k Americans under age of 65 have younger-onset Alzheimer's disease.

The hippocampus is a critical structure of the human brain (and the brain of other vertebrates) that plays important roles in the consolidation of information from short-term memory to long-term memory. In other words, the hippocampus is thought to be responsible for memory and learning (that's why we are all here, after all!)

According to Nobis et al., 2019, the volume of hippocampus varies in a population, depending on various parameters, within certain boundaries, and it is possible to identify a "normal" range taking into account age, sex and brain hemisphere.

In the below image, you can check the mask part which highlights the hippocampal area and volume abnormalities are flagged for further inspection.
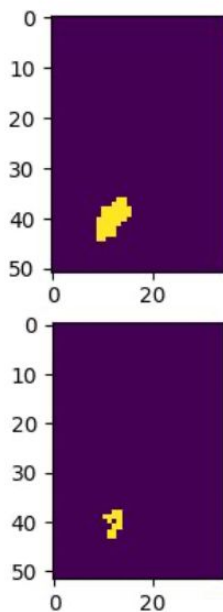


Our model takes a 3D image and slices it. The algorithm accounts for every small aspect of the image and localises the area of abnormality by classifying it as you can see in the above image.

**Jaccard Score** is defined by the ratio of area of overlap between predicted segmentation and annotated mask values by area of union between the values. Result achieved: 0.81

**Dice score** is defined by size of the overlap of the two segmentations divided by the total size of the objects. Result achieved: 0.8943

**Specificity** is the ratio of true negatives to the total rate of true negatives and false positives.

**Sensitivity** is the ratio of true positives to the total rate of true positives and false negatives.

We can optimize the dice score and jaccard score for medical image segmentation based on the suggestions [here](#)

Reference:
- https://www.alz.org/alzheimers-dementia/what-is-alzheimers