

Quantifying Hippocampus Volume for Alzheimer's Progression

Intended use of the product

The program was created to segment and evaluate the volume of the brain structure called the hippocampus based on magnetic resonance imaging scans. This is to determine the progress of reducing the volume of this organ, which will allow early diagnosis of serious diseases such as Alzheimer's. This program should be used in cooperation with professional radiologists and it is intended only to help in determining the progress of the disease.

Training data collection and labeling

The dataset consisted of MRI acquired in 90 healthy adults and 105 adults with a non-affective psychotic disorder taken from the Psychiatric Genotype/Phenotype Project data repository at Vanderbilt University Medical Center. All patients were free from significant medical or neurological illness, head injury, and active substance use or dependence. All images were collected on a Philips Achieva scanner. Manual tracing of the head, body, and tail of the hippocampus on images was completed following protocols described in [this](#) publication.

Algorithm performance

The algorithm performance was measured with two metrics: Dice similarity coefficient (DSC) and Jaccard similarity coefficient (JSC). Both of them are a statistic used to gauge the similarity of two samples.

The mask defining the hippocampus in each of the three planes was compared to masks obtained using the process described in the publication mentioned above.

In real world assessment of the hippocampus volume can be done with the help of a team of experienced radiologists who, thanks to the tools for reading and analyzing images, can determine a given structure and, knowing the properties of the obtained scan, can calculate interesting metrics. We can call it as “silver standard” of obtaining ground truth.

Validation performance

The algorithm will cope well with scans of healthy adults as well as those suffering from known diseases like schizophreniform disorder, schizoaffective disorder and schizophrenia. Kids, old people and patients with other brain diseases than include and damages should not be considered as good population sample. All subjects should be free from significant medical or neurological illness, head injury, and active substance use or dependence. Although training dataset comes from full brain scans, volumes provided to device should be cropped to only the region around the hippocampus has been cut out. It will not perform well at full brain scans.

