

# Dual Attention Multi-Instance Deep Learning for Alzheimer's Disease Diagnosis With Structural MRI

## **METHOD:**

Dual attention multi-instance deep learning network (DA-MIDL) for the early diagnosis of Alzheimer's disease (AD) and its prodromal stage mild cognitive impairment (MCI).

## **DATASETS USED:**

**Two datasets (i.e., ADNI and AIBL)** used in our study are acquired from the public Alzheimer's Disease Neuroimaging Initiative (ADNI) database (<http://adni.loni.usc.edu>) and Aus-tralian Imaging, Biomarker and Lifestyle Flagship Study of Ageing (AIBL) database (<https://aibl.csiro.au>).

## **CONCLUSION:**

Performance improvement.

## **FUTURE WORK:**

1) The size of input patches is fixed and equivalent. However, the structural changes in the cerebrum caused by brain atrophy may occur across multiple regions with different scales. Using the fixed size could not represent various local features. It's more reasonable to use multi-scale patches as inputs, while it may increase the difficulty of constructing the networks. In addition, **ROI pooling** may be adopted for settling the inputs with non-uniform sizes.

2) The patch location proposals based on the group comparison are isolated from the subsequent network. This means that the proposed method is not strictly an end-to-end analysis procedure, which may affect the optimal performance of the model. Therefore, it is important to combine the generator of patch location proposals and the network into a unified framework.