



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3275 Type: **Poster not-in-competition (Graduate Student) / Affiche non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

(POS-57) MSCDNet: A Multi-Scale and Cross-Dimension Feature Fusion Attention Network for Alzheimer's Disease Prediction With Structural MRI

Tuesday, 7 June 2022 17:54 (2 minutes)

Alzheimer's disease (AD) is a neurological degenerative disorder, clinically characterized as a cognitive impairment type of dementia. Structural magnetic resonance imaging (sMRI) is able to observe subtle structural alterations clearly in brain tissue and is widely used in the diagnosis of neurological disorders such as AD. However, the size distribution of the pathological area is more scattered due to the variations in the person's condition. Therefore, the key challenge for AD Prediction based on sMRI is how to identify discriminative features with different scales accurately. A multi-scale and cross-dimensional feature fusion attention network (MSCDNet) was proposed to identify AD and mild cognitive impairment (MCI) from normal controls (CN). MSCDNet consists of three parts: Firstly, to enhance the identification of pathological features of different sizes, the MSFA-Net subnetwork with a spatial attention perception layer extracts multi-scale features from the brain. Secondly, to obtain richer dimensional features, features were extracted simultaneously from sagittal, coronal, and axial cross sections by CDFA-Net subnetwork with dimensional mixed attention layers. Finally, a global attention classifier is used to obtain a weighted score of the features, thus balancing the contribution of the features to the classification results. We evaluated the performance of the proposed MSCDNet model on the baseline sMRI scans from two databases. Experimental results show that the proposed model is able to efficiently identify disease-related discriminative features with better classification performance in accuracy and generalization compared to multiple current best algorithms.

Primary authors: LIU, Fei (Anhui University); ZHANG, Gong (Anhui University); WANG, Huabin (Anhui University); HUANG, Wei (Anhui University); MARTIN, Melanie (University of Winnipeg); LI, Xuejun (Anhui University); HAN, Xianjun (Anhui University); DIAO, Xianju (Sino Canada Health Engineering Research Institute); Ms CHISHOLM, Madison (University of Winnipeg)

Presenter: LIU, Fei (Anhui University)

Session Classification: DPMB Poster Session & Student Poster Competition (17) | Session d'affiches DPMB et concours d'affiches étudiantes (17)

Track Classification: Technical Sessions / Sessions techniques: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)