
Proposed novel approach for detecting Alzheimer's disease in early stages

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Abstract: Alzheimer's disease (AD), an incurable brain condition leading to memory loss, requires early detection for effective management. Utilising deep learning (DL) and computer vision (CV) in medical image analysis (MIA) shows promise, but acquiring annotated medical data is costly. Analysing 3D magnetic resonance images (MRIs) demands resource-intensive 3D convolutional neural networks (CNNs). This study introduces a 2D MRI slice-based transfer learning framework, employing a majority voting mechanism during testing. Experimentation reveals the optimal balance between data volume and accuracy is achieved with approximately 10 middle slices. The proposed approach attains a notable 93.91% accuracy, surpassing the state-of-the-art by 12.61% in distinguishing AD from cognitively normal (CN) cases.

Keywords: deep learning; machine learning; Alzheimer's disease; 3D MRI; transfer learning; 2D slices; convolutional neural networks; CNNs.