



A systematic literature review of machine learning approaches for class-wise recognition of Alzheimer's disease using neuroimaging-based brain disorder analysis

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Abstract

Particularly in the field of computer vision, Deep Learning (DL) models have demonstrated superior performance over classical Machine Learning (ML) at recognizing patterns in complicated and high-dimensional data. Recent years have seen a significant increase in interest in the use of DL for automated categorization and early diagnosis of Alzheimer's disease (AD) through 2D/3D MRI images. This paper studied different algorithms by using ML, DL models and MRI images to detect the multiple stages of AD such as "Very-Mild-Demented," "Mild-Demented," "Moderate-Demented," and "No-Demented." Even though, the DL models with pre-processing steps have outperformed with regard to performance, there are still certain difficulties to select hyper-parameters. This article presents a thorough analysis and assessment of the most recent algorithms for early AD detection and classification that exploit cutting-edge DL approaches. Moreover, it describes the up-to-date databases frequently employed for performance assessment of different AD disease. For the researcher's support, the difficulties and possible improvements of classical and deep learning methods are talked about in-depth. Last but not least, problems with research gaps are described as well as ways to fix them. In this study, we looked at how benchmarks for GPUs and CPUs affect DL algorithms. To help other professionals, the limitations and future directions are also discussed. It concludes by discussing the prospects and difficulties for systems rely on DL for classifying AD.

Keywords Deep Learning · Neuroimaging · Alzheimer's Disease (AD) · Convolution neural network · Vision Transformers

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