

عنوان مقاله:

Advanced MRI Analysis for Early Detection and Improved Patient Outcomes in Alzheimer's Disease Diagnosis

محل انتشار:

بیستمین کنفرانس بین المللی فناوری اطلاعات، کامپیوتر و مخابرات (سال: 1402)

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خلاصه مقاله:

As global life expectancy continues to rise, the diagnosis of Alzheimer's disease (AD) has become increasingly crucial. Mild cognitive impairment (MCI) can lead to irreversible mental impairment and eventually to Alzheimer's disease and dementia, making early diagnosis of paramount importance. Researchers worldwide have invested tremendous efforts in diagnosing this disorder in its early stages, which can halt its progression and initiate timely treatment. While biochemical and psychological tests are common methods used to diagnose the disease, Magnetic Resonance Imaging (MRI) analysis has emerged as a promising approach to studying structural changes in the human brain. This paper presents a groundbreaking approach that preprocesses brain MRI using the SPM toolbox, segments the brain's gray matter (GM), and feeds it as input to the Convolutional Neural Network (CNN) algorithm. Leveraging the ADNI dataset, the results demonstrate unprecedented accuracy - over 99% - in classifying the three categories of normal control (NC), Alzheimer's disease (AD), and mild cognitive impairment (MCI). This study represents a significant advancement in the early diagnosis of Alzheimer's disease, offering unparalleled accuracy and efficiency compared to conventional diagnostic methods. By harnessing the power of deep learning and MRI analysis, this approach holds tremendous potential to revolutionize Alzheimer's disease diagnosis, improve patient outcomes and ultimately make a profound impact on global health.

کلمات کلیدی:

Alzheimer's Disease, Mild Cognitive Impairment (MCI), Normal Control (NC), Convolutional Neural Network (CNN),
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