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Analysis Of Raw 3D Images Of Stages Of Alzheimer's Disease Using Deep Learning

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Abstract:

Alzheimer's disease is defined as a brain ailment that progressively impairs thinking, cognitive skills, and the capacity to complete most basic tasks. Memory loss, cognitive changes, and other neuronal brain disorders are all symptoms of AD, a degenerative condition. Since risk awareness encourages patients to take preventative measures even before the onset of irreversible brain damage, an absolute diagnosis of Alzheimer's disease is vital. Total brain atrophy and hippocampal atrophy are considered to be the main diagnostic tests for the condition. For this condition, early identification is important, and automatic system design is required. Computer-assisted methods are implemented for the analysis of AD in several types of research and the outcomes are constrained due to the congenital findings. Early stages of AD can be diagnosed but not predicted because prediction is only useful before the disease manifests itself. Deep learning (DL) techniques are used to analyze the raw MRI 3D images to identify AD and its progressive stages. The efficiency of the deep learning networks is defined to be less, which is indefinite for diagnosing AD stages. Therefore, processing of the images is necessary for the detection and to predict the progression of AD.

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☰ Contents

I. Introduction

Alzheimer's disease (AD) is a disorder in the brain that develops a decline in cognitive activities [1]. This neuronal disorder worsens over time affecting the functions of the brain. AD is becoming a predominant cause of dementia in the aged population, affecting more than 30 million people worldwide. Commonly, 65 years of age or older population may have AD and the ratio is even higher in developing countries [2]. The early symptoms begin with the knowledge of recollecting the newly learned information because this disorder continually affects the learning phase of the brain. As the disease advances in stage, the symptoms increase and affect regions related to disorientation, language, mood swings, loss of motivation, not managing self-care, and behavior. The primary symptoms formed in this disorder are always co-related with stress and age factor. With the decline in the patient's condition, they detach from social and emotional contacts and slowly leading to a gradual decrease in their physiological functions.

Authors



Figures



References



Keywords



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Three-Dimensional Display from Cross-Sectional Tomographic Images: An Application to Magnetic Resonance Imaging

IEEE Transactions on Medical Imaging

Published: 1987

Deep Learning Approaches for Early Detection of Alzheimer's Disease using MRI Neuroimaging

2022 International Conference on Connected Systems & Intelligence (CSI)

Published: 2022

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