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Early Diagnosis of Alzheimer's Disease Using a Combination of Images Processing and Brain Signals

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Abstract : Alzheimer's prevalence is on the rise, and the disease comes with problems like cessation of treatment, high cost of treatment, and the lack of early detection methods. The pathology of this disease causes the formation of protein deposits in the brain of patients called plaque amyloid. Generally, the diagnosis of this disease is done by performing tests such as a cerebrospinal fluid, CT scan, MRI, and spinal cord fluid testing, or mental testing tests and eye tracing tests. In this paper, we tried to use the Medial Temporal Atrophy (MTA) method and the Leave One Out (LOO) cycle to extract the statistical properties of the three Fz, Pz, and Cz channels of ERP signals for early diagnosis of this disease. In the process of CT scan images, the accuracy of the results is 81% for the healthy person and 88% for the severe patient. After the process of ERP signaling, the accuracy of the results for a healthy person in the delta band in the Cz channel is 81% and in the alpha band the Pz channel is 90%. In the results obtained from the signal processing, the results of the severe patient in the delta band of the Cz channel were 89% and in the alpha band Pz channel 92%.

Keywords : Alzheimer's disease, image and signal processing, LOO cycle, medial temporal atrophy
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