

Alzheimer's detection using Neural Network techniques and enhanced EEG measurements

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Abstract

Electroencephalogram measurements of three "normal" (patients diagnosed as not having Alzheimer's), and three "severe" (patients diagnosed as being in the late stages of Alzheimer's) were analyzed using matrix operations, Independent Component Analysis, probability and Neural Network techniques [1]. There are several tests that can be administered to a patient to provide an accurate diagnosis of whether the disease is present or not, however, Alzheimer's is confirmed postmortem when the brain can be analyzed in detail. Some theories state a pattern can be detected amongst Alzheimer's patients, through Electroencephalogram data or another form of neural scanning and wave reading. Our desired outcome includes finding a pattern or a set of two distinctly weighted Probability Density Functions in the Alzheimer's subjects that are considerably different than that of the normal subjects. Independent Component Analysis specifically designed for electroencephalogram distortion removal was implemented using theories and studies of Makeig et al [2-6] of brain waves and linear distortion. Our final results show visual distinction in plotted data, and small mathematical differences among some of the "severe." A definitive distinction has not been fully accomplished. Due to the small number of subjects used - there is a chance that there were misdiagnosed cases of what is considered Alzheimer's.

Keywords:

Alzheimer's, electroencephalogram (EEG), independent component analysis (ICA), Neural Networks, Infomax Algorithm