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Using Behavioral Assessment and Neuro Images to Detect Alzheimer's Disease through Machine Learning

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Dear Editor,

Alzheimer is a neurodegenerative disease which causes a lot of cognitive disabilities. There is no certain cure, being able to treat Alzheimer's Disease (AD) [1], therefore, lots of researches are carried out to detect AD in its early stages so they can intercept the progress of AD [2-4].

Studies have shown that different machine learning algorithms can detect AD, using brain regional changes [2,3] and neuropathological changes [5]. But studies that used behavioral symptoms to create machine learning models to detect AD are lacking, however a study that showed 74 percent of AD patients had behavioral symptoms such as apathy (51%), verbal aggression (36%), hallucination (25%), delusion (20%), and physical aggression (17%), mood depression (6.6%) [6]. A recent study extracted a set of significant gait features to create a support vector machine model that approached an average classification accuracy of 78% distinguishing between three classes of mild cognitive impairment, AD, and healthy [4].

These results indicate that different kinds of behavioral symptoms such as those mentioned above and neuro images of brain regional changes can both be used to detect AD patients. We propose that a multi modal machine learning model, using both behavioral symptoms and brain images, can build effective classifiers, detecting AD patients, with a higher accuracy in early stages.

References

1. Cosacak MI, Bhattaraj P, Kizil C. Alzheimer's disease, neural stem cells and neurogenesis: cellular phase at single-cell level. *Neural Regen Res.* 2020; 15: 824-827.
2. Kishore P, Kumari U, Kumar MNV, Pavani T. Detection and analysis of Alzheimer's disease using various machine learning algorithms. *Materials Today: Proceedings.* 2020.
3. Li S, Shi F, Pu F, Li X, Ziang T, Xie S, et al. Hippocampal Shape Analysis of Alzheimer Disease Based on Machine Learning Methods. *AJNR Am J Neuroradiol.* 2007; 28: 1339-1345.
4. Ghoraani B, Boettcher LN, Hssayeni MD, Rosenfeld A, Tolea MI, Galvin JE. Detection of mild cognitive impairment and Alzheimer's disease using dual-task gait assessments and machine learning. *Biomed Signal Process Control.* 2021; 64: 102249.
5. Kautzky A, Seiger R, Hahn A, Fischer P, Krampla W, Kasper S, et al. Prediction of Autopsy Verified Neuropathological Change of Alzheimer's Disease Using Machine Learning and MRI. *Front Aging Neurosci.* 2018; 10: 406.
6. Weiner MF, Hyman LS, Bret ME, White C. Early behavioral symptoms and course of Alzheimer's disease. *Acta Psychiatr Scand.* 2005; 111: 367-371.

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