

## Using Artificial intelligence technology- for diagnosing Alzheimer's disease before emerging of symptoms

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*Dear Madam,* According to the World Health Organisation, Alzheimer's disease is the most frequent cause of dementia, accounting for up to 70% of cases. Around 24 million people are afflicted worldwide, which is predicted to rise every 20 years, costing the public health system a lot of money in the coming years<sup>1</sup>.

Mild cognitive impairment (MCI), which affects between 5% and 20% of adults over the age of 65, is one of the initial indications of Alzheimer's disease. MCI is not the same as dementia, which is the initial symptom of Alzheimer's disease caused by the accumulation of beta-amyloid protein, which clumps together between neurons and interferes with their function. However, those with MCI are more likely to develop dementia later in life.<sup>2</sup> So, MCI is a stage that occurs between ordinary age-related cognitive decline and dementia and can be a precursor stage of dementia, particularly in Alzheimer's disease.<sup>2,3</sup> Patients with MCI who will develop AD Dementia ultimately already have dementia, even though their cognitive symptoms have not fully developed.<sup>3</sup> As a result, distinguishing between MCI patients who will proceed to AD dementia and those who will remain stable is critical.<sup>3</sup> Previous research has shown that Functional magnetic resonance imaging (fMRI) can be utilised to detect the brain regions associated with the onset of Alzheimer's disease<sup>1</sup>. Dementia signs have already appeared in the late stages, so diagnosing through neuroimaging techniques and cerebrospinal fluid examinations for the presence of neurofibrillary tangles, beta-amyloid, and other proteins make it much easier to confirm AD<sup>3</sup>. But the earliest stages of MCI often have almost no apparent symptoms, Despite the presence of biomarkers in magnetic resonance image (MRI) and/or positron emission tomography (PET) data, detecting MCI to AD dementia progression in clinical practice remains difficult.<sup>3</sup> To tackle this obstacle, new computer-assisted techniques such as artificial intelligence (AI) algorithms have been created.<sup>3</sup>

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Researchers can detect signs of cognitive impairment in MRI scans, genetics, and clinical data by an artificial intelligence programme. This knowledge can be used to anticipate if certain results will lead to Alzheimer's disease years before symptoms appear.<sup>4</sup> Many types of AI are being researched to see if they can track developments in Alzheimer's patients.<sup>4</sup> AI algorithms created by The Alan Turing Institute and a team led by Professor Zoe Kourtzi of the University of Cambridge can detect dementia in individuals at an early stage.<sup>2</sup> With the use of brain pictures, their machine learning algorithm could recognise anatomical alterations in the brain from patients who later developed Alzheimer's disease. This algorithm provided a prognostic score when combined with the results of standard memory tests.<sup>2</sup> If we detect the disease early enough, we can recommend lifestyle changes such as blood pressure medication, better diet and exercise, stopping smoking, and so on, which may help to delay the disease's progression.<sup>2</sup>

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### References

1. Neuroscience News. AI Can Predict Possible Alzheimer's with Nearly 100 Percent Accuracy. News release. The Neuroscience News Media Centre. [Online] 2021 [Cited 2022 July 30]. Available from URL: <https://neurosciencenews.com/ai-alzheimers-prediction-19257>
2. Brierley C. AI could detect dementia years before symptoms appear. [Online] 2021 [Cited 2022 July 30]. Available from URL: <https://www.cam.ac.uk/stories/AIdementia>
3. Grueso S, Viejo-Sobera R. Machine learning methods for predicting progression from mild cognitive impairment to Alzheimer's disease dementia: a systematic review. *Alzheimers Res Ther* 2021;13:162. doi: 10.1186/s13195-021-00900-w.
4. Pathways Home Health and Hospice. Can artificial intelligence help Diagnose Alzheimer's? [Online] 2022 [Cited 2022 July 30]. Available from URL: <https://pathwayshealth.org/hospice-topics/can-artificial-intelligence-help-diagnose-alzheimers/>