

Artificial intelligence could speed up and improve Alzheimer's diagnosis

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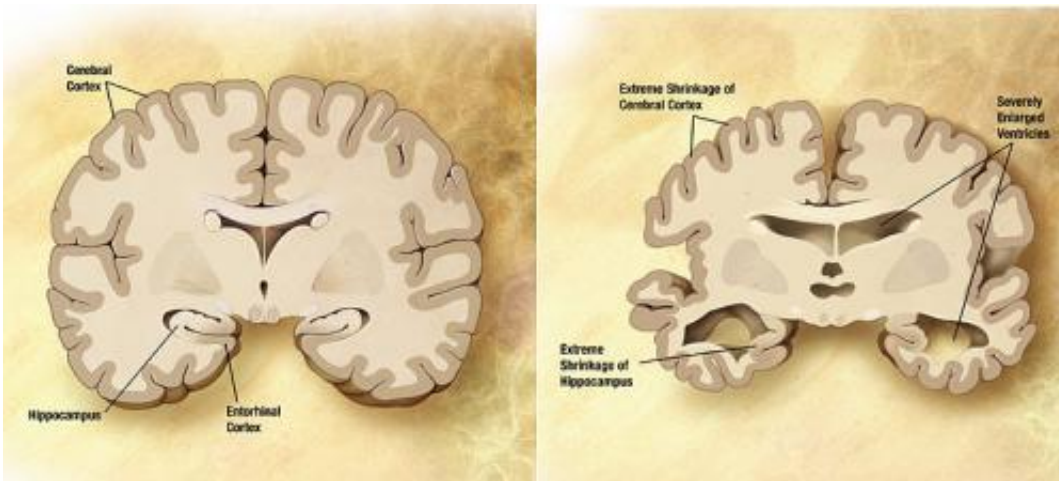


Diagram of the brain of a person with Alzheimer's Disease. Credit: Wikipedia/public domain.

Artificial intelligence (AI) could help to diagnose Alzheimer's faster and improve patient prognosis, a new study from the University of Sheffield has revealed.

The new research from the University of Sheffield's Neuroscience Institute examines how the routine use of AI in healthcare could help to relieve the time and economic impact that common neurodegenerative diseases, such as Alzheimer's and Parkinson's, put on the NHS.

The main risk factor for many neurological disorders is age, and with

populations worldwide living longer than ever before, the number of people with a neurodegenerative [disease](#) is expected to hit unprecedented levels. The number of people living with Alzheimer's alone is predicted to treble to 115 million by 2050, posing a real challenge for the health system.

The new study, published in the journal *Nature Reviews Neurology*, highlights how AI technologies, such as machine learning algorithms, can detect neurodegenerative disorders—which cause part of the brain to die—before progressive symptoms worsen. This can improve patients' chances of benefitting from successful disease-modifying treatment.

Lead author of the study, Dr. Laura Ferraiuolo from the University of Sheffield, said: "Most [neurodegenerative diseases](#) still do not have a cure and in many cases are diagnosed late due to their molecular complexity.

"Widespread implementation of AI technologies can help, for example, predict which patients showing [mild cognitive impairment](#) will go on to develop Alzheimer's disease, or how severely their motor skills will decline over time.

"AI-powered technologies can also be used to help patients communicate their symptoms remotely and in the privacy of their own homes, which will be an enormous benefit to patients with mobility issues."

Machine learning algorithms can be trained to recognise changes caused by diseases in medical images, patient movement information, speech recordings or footage showing patient behaviour, making the AI a valuable diagnostic aid.

For example, it can be used by trained professionals in radiology departments to analyse images more quickly and highlight critical results for an immediate follow-up.

Algorithms can also listen to patients' speech and analyse their vocabulary and other semantic features to assess their cognitive function. Machine learning can also use information contained within [electronic health records](#) or genetic profiles to suggest the best treatments for individual patients.

The study is the result of a long-term close collaboration between the biotech company BenevolentAI and a team of researchers at the University of Sheffield's Neuroscience Institute, Monika Myszczyńska, Dr. Richard Mead and Dr. Guillaume Hautbergue.

First author of the paper, Monika Myszczyńska from the University of Sheffield, said: "Using AI in clinical settings can lead to savings in the NHS by reducing the necessity of patients affected by debilitating diseases, like MND, to travel to clinic—which is very relevant during the current pandemic—and the time patients and physicians spend in clinic.

"It is too early to talk about outcomes in terms of treatments but, in this study, we examined how machine learning methods can be used to identify the best course of treatment for patients based on their disease progression or how it could be used to identify new therapeutic targets and drugs.

"Further research will now focus on the improvement of current diagnostic technologies, as well as a generation of new algorithms to make the use of AI in prognosis prediction and drug discovery a reality. AI feeds on data, therefore generation of international consortia and collaborations are the key to these future endeavours."

The research forms part of the work of the University of Sheffield's Neuroscience Institute, which aims to bring academics and scientists together from across varied specialties to translate scientific discoveries from the lab into pioneering treatments that will benefit patients living

with neurodegenerative disorders.

More information: Monika A. Myszczyńska et al. Applications of machine learning to diagnosis and treatment of neurodegenerative diseases, *Nature Reviews Neurology* (2020). [DOI: 10.1038/s41582-020-0377-8](https://doi.org/10.1038/s41582-020-0377-8)

Provided by University of Sheffield

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