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AI useful in Alzheimer's diagnosis at early stage, reveals IIT Indore study

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Indian Institute of Technology (IIT), Indore has conducted a study that revealed that advanced Artificial Intelligence (AI) techniques are useful in unlocking new potentials in Alzheimer research, marking a significant advancement in understanding and diagnosing this challenging condition.

The article on this study named 'Ensemble Deep Learning for Alzheimer's Disease (AD) Characterisation and Estimation' has been published in the Nature Mental Health journal.

The study provides an in-depth exploration of recent advancements in deep learning, delving into sophisticated design features, diversity, and the combination of different types of data, including neuroimaging and genetic information. It thoroughly investigates current trends and challenges within the field, offering crucial insights into the evolving landscape of Alzheimer's disease diagnosis and management.

Alzheimer's disease is a devastating condition characterised by progressive deterioration of cognitive abilities in elderly population, presenting a major global health challenge. To address this, the team discussed cutting-edge artificial intelligence techniques to enhance understanding and diagnosis of AD.

Leveraging neuroimaging data obtained from advanced techniques such as Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET), the researchers have meticulously reviewed sophisticated ensemble deep learning models in the manuscript. These models, combining multiple deep neural networks in a variety of ways, demonstrate exceptional potential in precisely identifying both structural and functional changes in the brain associated with Alzheimer's disease, providing additional straightforward benefits such as quantification of uncertainty of their predictions.

Prof Tanveer, faculty member at IIT Indore, heading the study said, 'Accurate and early diagnosis of Alzheimer's disease is paramount for effective intervention and treatment planning. Our research not only enhances diagnostic precision, but also enriches understanding of the intricate dynamics underlying AD. This research not only highlights the transformative role of Artificial Intelligence in advancing medical diagnostics, but also emphasises the critical role of multidisciplinary expertise and international collaboration in tackling complex healthcare challenges.'

The team includes Dr Tripti from NIT Silchar, Dr Rahul, and Dr Ashwani from IIT Indore, along with distinguished international faculty Dr Iman Beheshti from the University of Manitoba, Canada, Prof Javier del Ser from TECNALIA, Spain, Prof PN Suganthan from Qatar University and Prof CT Lin from UTS Australia.