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Scientists at NTU are Using AI to Identify Mental Illnesses to Help with Proper Diagnosing and Treatment

Can advancements in data collection, artificial intelligence, and other observational tools lead to improvements in diagnosing mental health and neurological disorders before they fully manifest? This is a question that a group of researchers from Singapore's Nanyang Technological University (NTU) is hoping to answer. This is one of the latest bids to utilize emerging AI tools to fight debilitating diseases when symptoms are often too mild to detect.

The challenge is the nature of mental illnesses themselves. Often, they can manifest with a variety of symptoms and other indicators that can be difficult to identify. To complicate matters even further, physicians have to asses symptoms from patients themselves which can be even more challenging and possibly leave the patient without proper diagnosis. So how can AI help? This is where biomarkers come to play.

By using artificial intelligence, researchers want to process and gain insights from vast datasets that can identify the biomarkers that point to these illnesses early on, while symptoms are still mild or even non-existent. This is one of the focuses of Nanyang Technological University's Centre for Biomedical Informatics.

Partner projects include the New Zealand-Singapore Data Science Research Programme. This is a collaboration between NTU Singapore, the Institute of Mental Health in Singapore, and Auckland University of Technology. Their goal is to help predict schizophrenia in youth before it fully manifests by developing machine learning models that can identify the biomarkers associated with the illness.

The project's team is currently using an AI algorithm, developed by the Auckland University of Technology, to analyze the gene expressions and metabolic profiles of over six hundred blood

samples of young people. Then they are comparing those finding with clinical and behavioral data from the same set of participants.

Speaking on the program and what it can do, Assistant Professor Goh stated, "AI programmes that analyse large datasets have made it possible for us to spot relationships between gene expression and metabolic data. Looking at more dimensions in the data may enable physicians to identify early indicators of schizophrenia and treat the disorder before the patient's quality of life deteriorates."

But schizophrenia isn't the only illness NTU seeks to identify early with the help of AI. NTU Singapore's Dementia Research Centre is also developing AI tools to help predict, identify and potentially delay the illness. With the help of local hospitals in Singapore, they've recruited over fifteen hundred patients from all ethnic backgrounds who suffer from mild cognitive impairment; the earliest stage of dementia. The study will last for five years and attempt to learn as much as possible about what is happening to the brain during this state of illness.

Similar to the project centering around schizophrenia, the goal is to identify biomarkers in the blood by studying the brain's structures from scales and measuring activity using MRIs. Director of the Dementia Research Centre & senior consultant neurologist Prof Nagaendran Kandiah of NTU Singapore's Lee Kong Chian School of Medicine stated, "This will help us develop personalised strategies which could potentially prevent and delay the development of dementia in each patient,…For example, we can formulate interventions to improve a patient's weak cognitive areas as well as enhance their strengths to delay the progression of dementia."

The use of artificial intelligence in a bid to detect life-threatening illnesses early on isn't new. Researchers at MIT are betting that their new neural network can pave the way in detecting Parkinson's Disease early, and while a patient just sleeps. It's clear why medical professionals and data scientists are pushing to use AI to catch these illnesses early. Early treatment means improved quality of life and dignity for partition suffering from these diseases.