

NTU scientists create program that can detect higher risk of depression

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Scientists from Nanyang Technological University (NTU) have developed a computer program that can detect individuals who are at a higher risk of developing depression.

The predictive program, called the Ycogni model, analyses a person's physical activity, sleep patterns and circadian rhythms through data from wearable devices, such as Fitbit watches.

A trial of 290 adults carried out in 2019 over three months showed that the program has an accuracy of 80 per cent in detecting those with depression, or who are at a high risk of developing depressive symptoms/depression, as compared with healthy individuals.

Trial participants were adults between 21 and 69 years old and they wore a tracking device for two weeks. The average age was 33 years.

Professor Josip Car, director of the Centre for Population Health Sciences at the Lee Kong Chian School of Medicine, who led the study, said yesterday that to fine-tune and improve the machine-learning algorithm, the team is planning larger studies of more than 1,000 participants monitored over the course of two years.

Anyone can join the study and there are no selection criteria, Prof Car added.

Depression affects 264 million people globally, and is undiagnosed and untreated in half of all cases, according to the World Health Organisation's website.

The Institute of Mental Health said in August last year that a study of more than 1,000 participants found that 13 per cent reported symptoms of anxiety or depres-



Professor Josip Car and Dr Iva Bojic from Nanyang Technological University's Lee Kong Chian School of Medicine with a test simulation generated by the program, which they developed with a team of scientists. It utilises data from wearable devices. PHOTO: NTU

sion during the Covid-19 pandemic.

Prof Car said of the NTU study: "Our study successfully showed that we could harness data from wearables, and given the increasing popularity of such wearable devices, it could be used for timely and unobtrusive depression screening."

Nearly a billion people worldwide wear activity trackers.

The researchers cautioned that their program is not intended to predict the possibility of an individual getting depression but, rather, to detect if a person is at high risk of suffering from depression at present.

The team also found that certain patterns in a person's behaviour can be associated with depressive symptoms, such as feelings of help-

lessness and hopelessness, loss of interest in daily activities, and changes in appetite or weight.

Those who had more varied heart rates between 2am and 4am, and between 4am and 6am, were prone to showing more severe depressive symptoms.

This confirms findings from previous studies, which found that changes in heart rate during sleep may be a valid physiological marker of depression.

Less regular daily rest-activity patterns, such as varying sleep-wake times and other activities, are also associated with a higher tendency to have depressive symptoms.

Although weekday rhythms are mainly determined by work routines, a person's ability to follow these routines differs between depressed and healthy individuals. Those who are healthy are more regular in their daily routines and behaviours.

"We look forward to expanding on our research to include other vital signs in the detection of depression risk, such as skin temperature. Fine-tuning our program could help in facilitating early, unobtrusive, continuous and cost-effective detection of depression in the general population," Prof Car said.

Associate Professor Georgios Christopoulos from NTU's Nanyang Business School, who co-led the study, said: "Our team will also be working on expanding to other types of psychological status, such as mental fatigue. The program could also be personalised in the future."

The results of the study were published in peer-reviewed academic journal JMIR mHealth and uHealth in November last year.

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