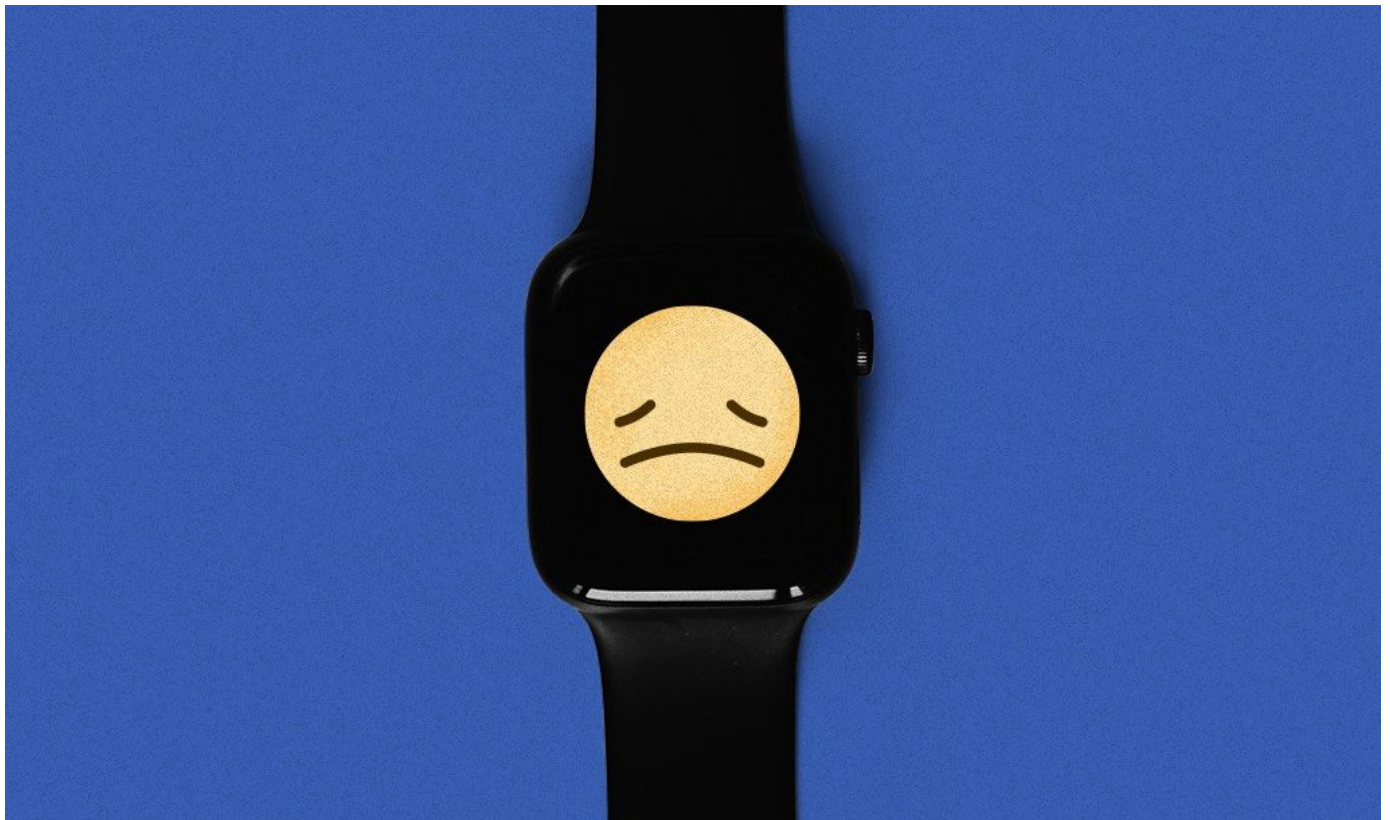March 29, 2022   <u>In the Lab</u>   By **<u>Asian Scientist Newsroom</u>**

Watching Out For Depression Risk

Scientists from Singapore have developed a machine learning program to predict depression risk based on vital signs tracked by wearables.

AsianScientist (Mar. 29, 2022) – Imagine if you could screen for your mental health using your smartwatch! That day might not be far. In a study published in *JMIR mHealth and uHealth*, Singapore-based scientists reported findings from a predictive computer program, Ycogni, that uses peoples vital signs and behavioral data to identify individuals who are at high risk of depression.

An estimated 280 million people worldwide live with depression. As a leading cause of disability, mental health conditions contribute to 10 percent of the global disease burden. Moreover, due to various factors such as social stigma and lack of access to mental healthcare services, these disorders remain under-diagnosed and untreated. In order to improve their well-being, many people are increasingly turning to wearable technologies like smartwatches to build better habits or monitor their health. These activity trackers can collect a comprehensive amount of data from sleep patterns to the number of steps a person has taken in a day.

A research team from Nanyang Technological University, Singapore (NTU) sought to find out whether these physiological and behavioral patterns could be used to detect depressive symptoms. They asked 290 working adults in Singapore to wear smartwatch fitness trackers for two weeks.

At the start and end of the trial period, the participants also completed health surveys designed to screen for depressive symptoms. These symptoms included feelings of hopelessness, loss of interest in daily activities, and sudden changes in appetite and weight. The wearable devices, meanwhile, tracked the participants' physical activity, heart rate, energy expenditure, and sleep patterns.

The researchers then developed a computer model called Ycogni to correlate these vital signs and behaviors with depressive symptoms. Powered by machine learning algorithms, Ycogni was able to spot patterns between certain physiological markers and depression. For example, people with greatly varying heart rates between 2 am and 4 am, and between 4 am and 6 am had a higher tendency for experiencing severe depressive symptoms. The analysis also revealed associations between irregular sleep patterns and depression. In contrast, overall healthy individuals showed more consistency in the time they go to bed and wake up each day.

After discovering these associations, the team used Ycogni as a predictive model to screen for depression by analyzing a person's vital signs and behavioral data. Results showed an 80 percent accuracy in distinguishing high-risk individuals from those with little to no risk for developing depression.

Through the use of models such as Ycogni, the researchers hope that depression screening can become more cost-effective, unobtrusive and continuously accessible. That could help facilitate early detection and effective interventions for mental health

disorders, they added. To expand the model, future studies will also explore biomarkers and other conditions such as cognitive fatigue or brain fog.

"This is a study that, we hope, can set up the basis for using wearable technology to help individuals, researchers, mental health practitioners and policymakers to improve mental well-being," said NTU Associate Professor Georgios Christopoulos.

The article can be found at: Rykov et al. (2021) Digital Biomarkers for Depression Screening With Wearable Devices: Cross-sectional Study With Machine Learning Modeling.

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Source: Nanyang Technological University, Singapore; Illustration: Lam Oi Keat/Asian Scientist.

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#Activity Trackers #Artificial Intelligence #Depression #Machine Learning #Mental Health #Mental Illness #Nanyang Technological University #Singapore #Wearable Technology

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