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Singapore project to build voice AI for detecting early elderly depression

Subsyndromal depression is said to be five times more common than clinical depression among Singaporean seniors.

By [Adam Ang \(/author/adam-ang\)](#) | October 28, 2024 |

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Photo: shapecharge/Getty Images

A multi-sector partnership involving the National Healthcare Group and Nanyang Technological University is building voice AI and a community intervention programme to detect an early form of depression among the elderly.

The three-year project also engages the NHG Polyclinics and Institute of Mental Health (IMH) and two NTU Singapore schools – Lee Kong Chian School of Medicine (LKCMedicine) and College of Computing and Data Science (CCDS).

WHAT IT'S ABOUT

The project – dubbed SoundKeepers – will involve more than 600 senior individuals aged 55 and above who are connected to Hougang and Woodlands polyclinics.

Voice records of the participants from casual conversation or passage reading will be collected with consent and identified as a representative sample for the AI model. The voice samples will be anonymised and stored in a central storage terminal.

The AI, to be jointly developed by NTU Singapore's LKCMedicine and CCDS, will then analyse these sample recordings for their acoustic properties, including pitch, volume, timbre, rhythm, shimmer, jitter, and harmonics-to-noise ratio.

"When we use our voice, we are activating and coordinating more than a hundred different muscles and neurobiological processes. A change in speech acoustic features can reveal abnormalities in these neurobiological processes," explained Dr Lee Eng Sing, co-principal project investigator. He is also an assistant professor and the clinical director of NTU LKCMedicine's Primary Care and Family Medicine research programme.

Meanwhile, a second component of the project is a 24-week community intervention programme led by the IMH. It will comprise module-based psychoeducation, community activities (such as exercise and recreational activities), and befriending. The programme will be delivered with assistance from social service agencies, Fei Yue Community Services and Club HEAL.

Moreover, a randomised controlled trial – to be led by the NHG Polyclinics – will recruit 300 participants with those observed having early depression to compare their levels of loneliness, anxiety, well-being, and depression literacy before and after the intervention programme. These will also be compared to a control group.

This cluster-wide project has received S\$5.6 million (\$4.2 million) in funding from the Lien Foundation.

WHY IT MATTERS

The NHG-based project targets the condition called subsyndromal depression (SSD), an emergent form of depression observed among seniors. The project partners consider the condition as a "largely unaddressed health risk."

In a statement, they claim that SSD is five times more likely to become depression within a year; individuals with this condition are reportedly 12 times at higher risk of dementia.

There are five times more people with SSD than those diagnosed with depression over a year, they noted.

The condition is also said to affect around 13% of seniors living in community homes, based on self-reported assessments – which may be an underestimation.

Additionally, it was observed that seniors with early depression incur more healthcare costs as well as have a higher uptake of outpatient services than those without it.

"Currently, SSD is not actively diagnosed or treated," admitted Dr Mythily Subramaniamad, also a co-principal investigator of the SoundKeepers project. She is also the assistant chair of the Research Medical Board at IMH.

Their project, Dr Subramaniamad added, will "facilitate the early detection and diagnosis of SSD with a tool that can be easily used in the community setting."

"[A]s while previous studies have demonstrated the feasibility of detecting depression through vocal analysis, little work has been done on the more subtle SSD," claimed NTU CDDS professor Guan Cuntai, another co-principal investigator of the project.

Once proven effective, SoundKeepers is hoped to be expanded to cover more polyclinics, GP clinics, and participant cohorts. Project partners also see the voice AI-driven project as potentially becoming part of Singapore's national mental health ecosystem through such existing government-funded community programmes as CREST and COMIT.

THE LARGER TREND

Another social service agency in Singapore, Lion Befrienders, is also leveraging AI and mobile technologies to monitor and improve the mental conditions of community-dwelling seniors.

In 2021, it started a two-year pilot with software company Opsiis (<https://www.mobihealthnews.com/news/asia/ai-powered-emotion-analysis-technology-help-diagnose-mental-health-conditions-seniors>) to check the mental state of over 4,000 seniors by capturing and analysing their facial expressions.

Last year, the Singapore University of Technology and Design worked with Lion Befrienders (<https://www.mobihealthnews.com/news/asia/multilingual-dementia-app-enhances-seniors-cognitive-abilities>) to launch a mobile application to prevent dementia among seniors through multilingual instructions. The app, called Ami, has been installed in over a thousand digital tablets used in one of the service's active ageing centres.

ON THE RECORD

"We need new ways to listen to our seniors. While they may not express their worries through words, we can now try to hear it through their voices," Lien Foundation CEO Lee Poh Wah underscored in a statement.

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