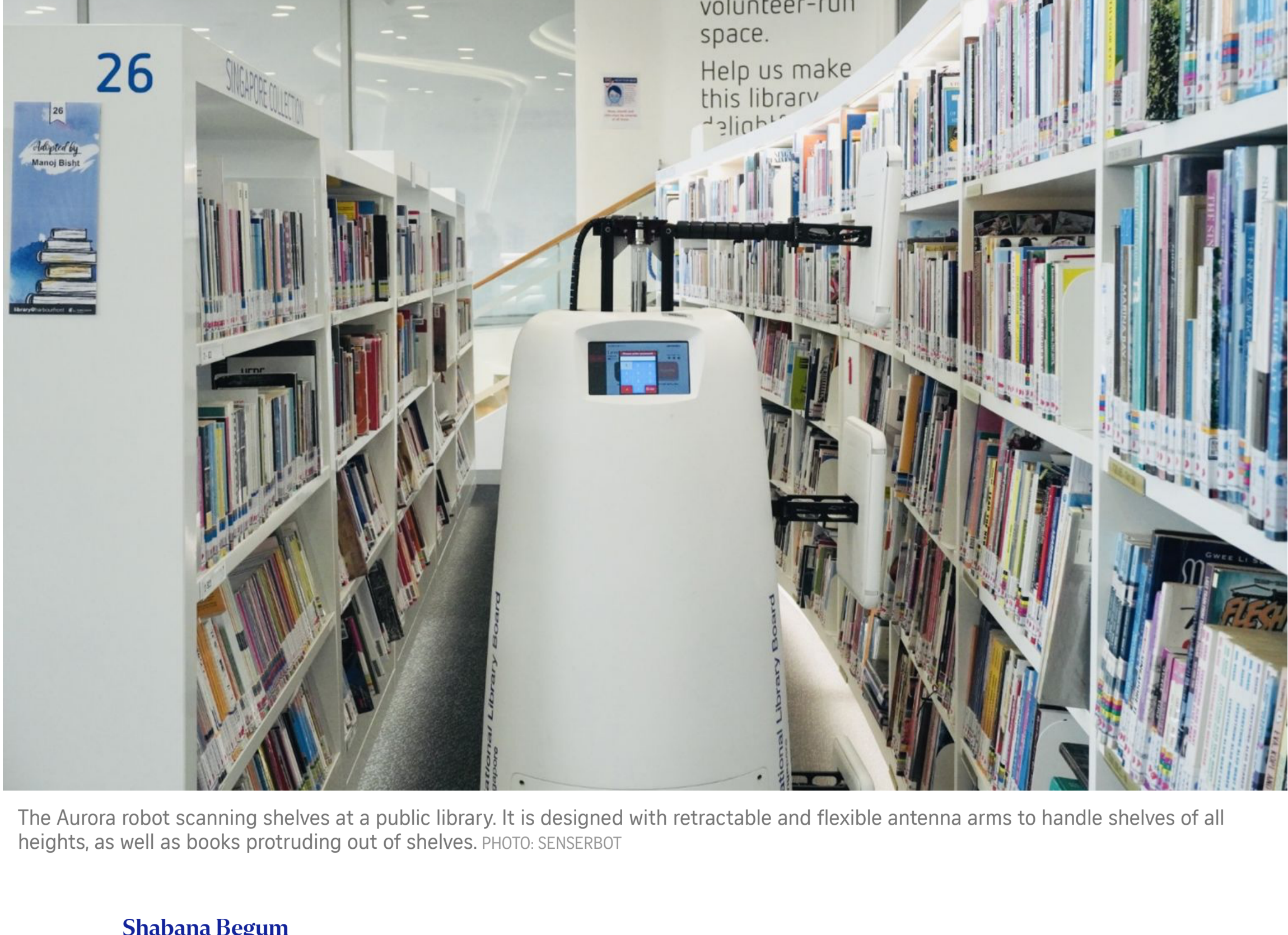


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Innovations by A*Star that have impacted daily life



The Aurora robot scanning shelves at a public library. It is designed with retractable and flexible antenna arms to handle shelves of all heights, as well as books protruding out of shelves. PHOTO: SENSERBOT

Shabana Begum

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SINGAPORE - Singapore has built up a reputation as a hotbed of innovation.

But scientific developments here are not just confined to laboratories. To mark the Agency for Science, Technology and Research (A*Star)'s 30th anniversary this year, Shabana Begum highlights three innovations that have impacted people's daily lives.

Aurora, the shelf-reading robot

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After dark, once visitors have left the library, the porcelain-white robot comes to life, gliding through the maze of shelves and browsing the collections.

This is Aurora, a shelf-scanning robot that can alert librarians if there are missing or misplaced books. The robot does this by scanning radio frequency identification tags on each tome on the shelves, and producing reports on missing and out-of-sequence books.

This helps to ease the workload of librarians, who can focus more on other work, including sorting and shelving books, and providing customer service.

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Previously, librarians had to manually inspect the shelves and look out for books placed in the wrong categories - including those that were deliberately hidden by visitors who want sole access to certain titles.

Today, the robots - which use their iPad-like scanners to scrutinise shelves with up to 99 per cent accuracy - are deployed in 10 public and academic libraries here.

Aurora was first introduced at Pasir Ris Public Library in 2015 under a pilot run.

A sorting algorithm virtually replicates each library's shelves. The smart robot has sensors and cameras to help it steer away from obstructions and even books that protrude from shelves.

Aurora was developed by scientists from the A*Star's Institute for Infocomm Research, and commercialised by local company Senserbot.

A game to help children with ADHD



PHOTO: NEEURO

This animated computer game helps children with attention deficit hyperactivity disorder (ADHD) improve their concentration.

The game is not controlled by a joystick; it is controlled by the child's brain.

A digital headband worn against the child's forehead will track his brainwaves.

If the child is focused, the cartoon character in the game is activated, and it starts racing forward. If the child loses focus, the character will slow down or stop moving.

This conditions the child to pay attention and, over time, helps to improve his concentration, said Dr Alvin Chan, co-founder and chief executive of Neeuro - a company spun off from A*Star that licensed the technology behind the CogoLand game.

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A*Star's Institute for Infocomm Research developed the brain-computer interface technology driving the game.

In 2019, the game was used in a pilot programme for 20 children with ADHD - aged between six and 12 - who were undergoing treatment at the Institute of Mental Health.

The trial involved the institute, Duke-NUS Medical School, A*Star and Neeuro.

The trial is still in progress, but results so far show "statistically significant improvement to children's inattentive symptoms", added Dr Chan.

Neeuro has also offered CogoLand to other countries via distributors and partners in China, Germany and Turkey.

A local translation tool for the community

PHOTO: SCREENGRAB FROM SG TRANSLATE

This publicly available translation tool has been essential in sending out Covid-19-related information and updates in all four national languages.

Trained through machine learning, the SG Translate engine can generate accurate translations of Singapore-specific phrases such as Pioneer Generation and MediSave. Other translators such as Google Translate may not be as effective.

The tool is trained with data from government communication materials, and produces decent first-cut translations, which are then edited by public officers.

It was built jointly by A*Star's Institute for Infocomm Research and the Ministry of Communications and Information (MCI).

Initially, when there was not enough bilingual data - for instance, for the Tamil language - the team used other artificial intelligence technologies, such as data augmentation and filtering, to produce large amounts of quality data to train the AI-powered tool.

A Tamil linguist was also seconded by MCI to help enhance the translation and improve the tool, said Ms Aw Ai Ti, principal investigator of the SG Translate project and head of Institute for Infocomm Research's Aural and Language Intelligence Department.

She added: "The team is working towards a universal engine that can evolve with time, and is able to pick up new vocabulary, understand and translate the language regardless of style and communication channels.

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