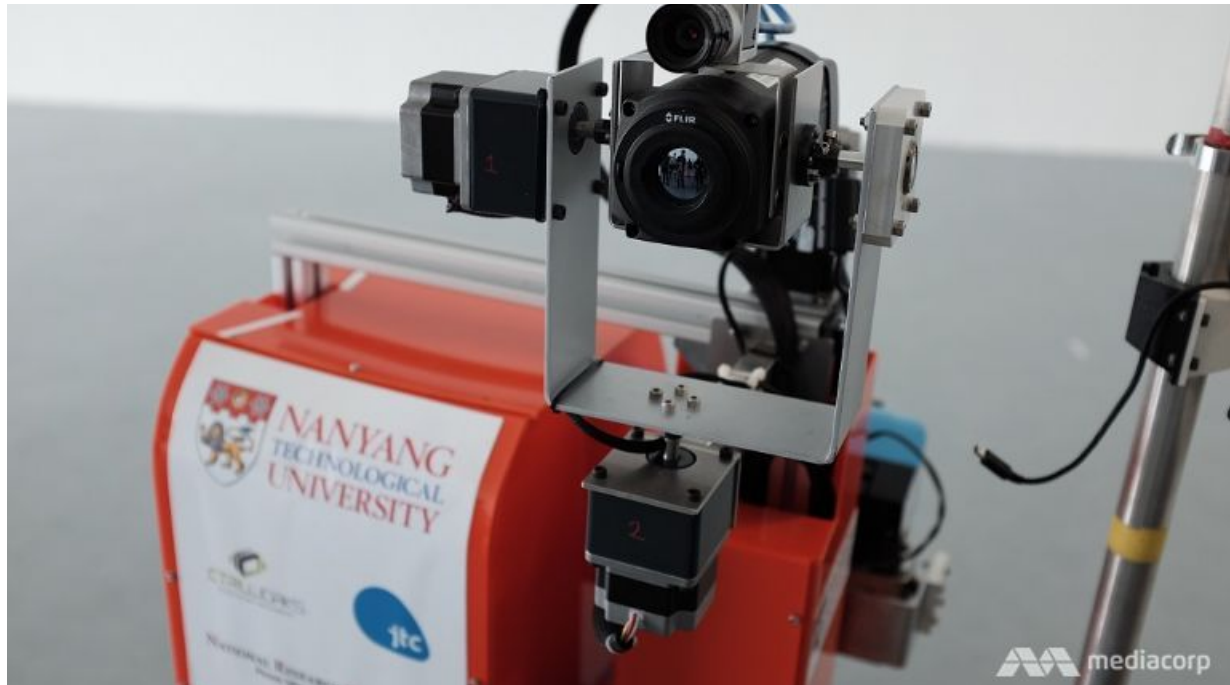


Robotic inspector to speed up building checks

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Close-up of the "Quality Inspection and Assessment Robot" - or QuicaBot. (Photo: Loke Kok Fai)

SINGAPORE: New buildings in Singapore may soon be inspected by a high-tech robot armed with laser scanners and cameras capable of spotting the tiniest cracks and defects.

Named the "Quality Inspection and Assessment Robot" - or QuicaBot, it was invented by scientists from Nanyang Technological University, and co-developed with Singapore's national industrial developer JTC and local start-up CtrlWorks for over a year.

The robot can move autonomously to scan a room in minutes, using an array of sensors and cameras that include:

- 1) A small laser scanner for navigation and mapping;
- 2) A large laser scanner to inspect walls' evenness and squareness;
- 3) An Inclinometer to check the evenness of the floor;
- 4) A thermal infrared camera to check for hollowness in tiles;
- 5) A small standard colour camera to detect cracks on walls.

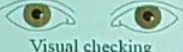





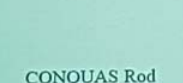




Asst Prof Kayacan demonstrating the robot's capabilities. (Photo: Loke Kok Fai)

Developers say their solution is more accurate, reliable and consistent than a fully manual inspection done by human inspectors with measurement tools like a spirit level and set square. For instance, inspections typically done by sampling points might miss possible errors which will not be overlooked by the robot as it can scan the entire space., according to its developers. Neither will the robots tire across the 36 hours of operation time they get on a single 2 hour charge.

Several of these robots could also work together, uploading 3D data of the scans to the cloud for a human operator to inspect critical and complex defects. They could also handle much of the routine, tedious inspection work and free up human inspectors to focus on areas that require more expertise and judgement to examine.

Assessment Tools

Manual Assessment		Automated Assessment	
Tools	Assessment Items	Sensors	Assessment Items
 Visual checking	Cracks of grounds, wall, and ceiling	 RGB camera	Cracks of ground and wall
 1.2m Spirit Level	Evenness of ground and walls	 LMS500 laser scanner	Evenness of ground and walls, and alignment of two walls
 Set Square	Alignment of two walls	 FLIR A310 thermal camera	Hollowness of ground and walls
 CONQUAS Rod	Hollowness of ground (By distinguishing the sound)	 AGS005 inclinometer	Inclination of ground



The key aim is to automate and speed up the building inspection process according to standards set by the Building and Construction Authority, said Project Leader from Nanyang Technological University's School of Mechanical and Aerospace Engineering Assistant Prof Erdal Kayacan.

"Visual inspection of a new building is an intensive effort that takes two inspectors, so we have designed a robot to assist a human inspector to do his job in about half the time, saving precious time and manpower," said Asst Prof Kayacan.

Having cleared small-scale lab testing, QuicaBot will be test-bedded at suitable locations within JTC's industrial developments like JTC Space @ Gul in the first quarter of 2017. Success there could see further scaling up to other projects and commercialisation.

- CNA/mn