

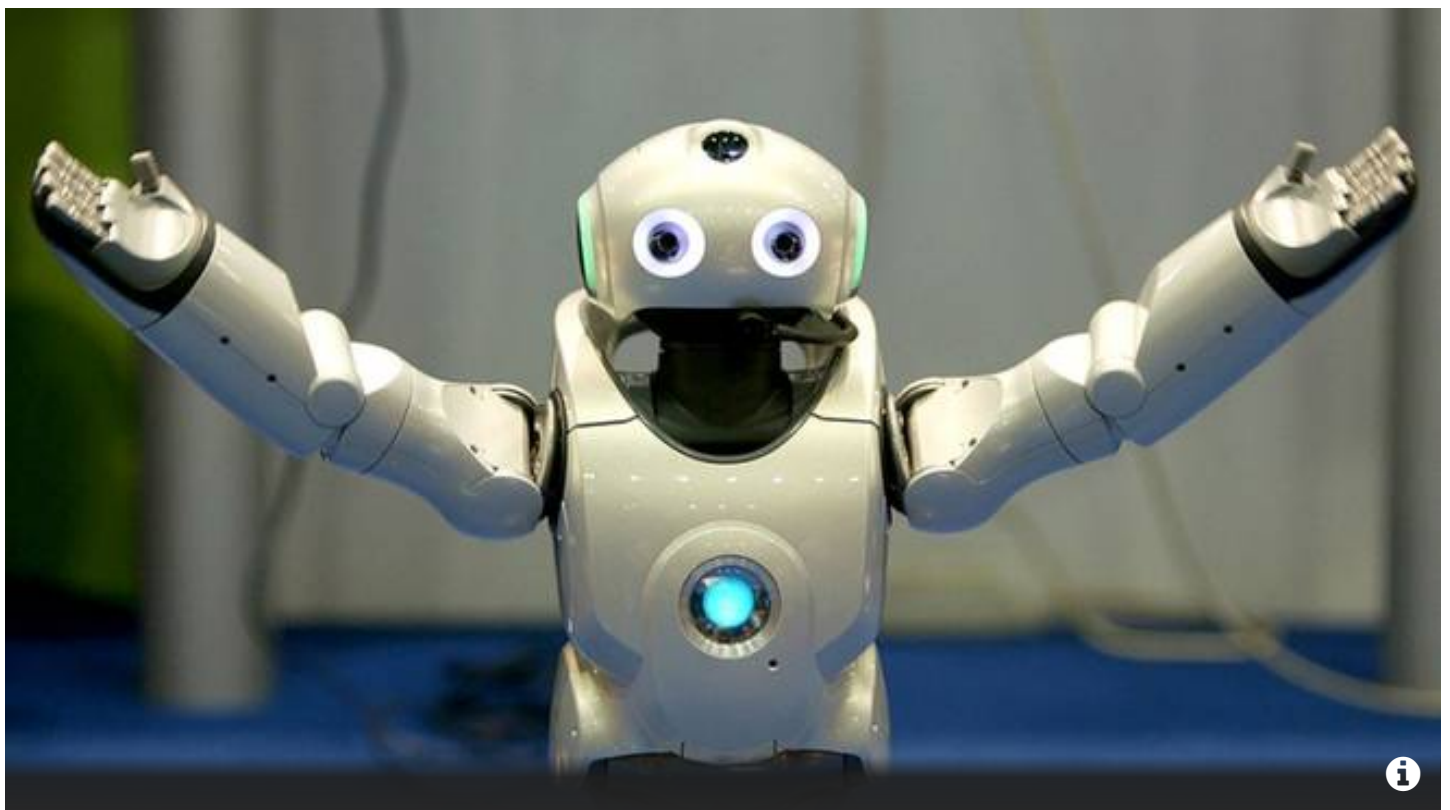
AI-powered 'mini-brains' to help robots perceive pain, self-repair

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Scientists at Nanyang Technological University (NTU) have developed an artificial intelligence-based solution, designed to help robots perceive pain and repair themselves.

The solution uses artificial intelligence (AI) in the network of sensors at different points with multiple small processing units, that work like 'mini-brains' on the robotic skin, a NTU release noted.

The AI-enabled sensors can process and react to pain caused by external pressure, and also help the robot to detect its own minor damages and repair itself, it added.

The system uses a type of self-healing ion gel material to help the robot recover its mechanical functions in case of minor damages.

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"This mimics how our biological system works, much like the way human skin heals on its own after a cut," Rohit Abraham John, first author of the study, said in the release.

Since the system allows the robots to learn and process things locally, the scientists claim, it can reduce the wiring requirements and response time for the robots by five to ten times compared to conventional robots.

"Our work has demonstrated the feasibility of a robotic system that is capable of processing information efficiently with minimal wiring and circuits," Arindam Basu, co-lead author of the study, said.

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Further, to train the robot, the scientists used 'brain-like' electronic devices called memtransistors, which work as artificial pain receptors.

"For robots to work together with humans one day, one concern is how to ensure they will interact safely with us," Basu, said. "For that reason, scientists around the world have been finding ways to bring a sense of awareness to robots, such as being able to 'feel' pain, to react to it, and to withstand harsh operating conditions," he added.

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