

Innovations

Robots may soon be able to see as well as bees

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ROBOTS may soon be able to see with their own "eyes", at least as well as bees do, and move around without the need for large, costly computers.

Australian scientists said last Wednesday they had developed a microchip, called a retina chip, which imitates many aspects of insect vision and can be installed for 10 per cent of the cost of existing systems.

The chip was successfully tested for the first time last month on an electronic arm, which was programmed to veer away from any approaching object detected by the retina chip, **Adelaide**-based research engineer **Derek Abbott** said.

It saw objects and reacted to them within 10 thousandths of a second, faster than current vision systems which use lenses based on the human eye and require high-powered computers to interpret every image before a robot can move, Mr Abbott said.

The chip, modelled on the way bees see the world, contains a row of 60 light detectors wired to a bank of parallel processing elements and more than 22,000 transistors, all squeezed into an area the size of a thumbnail.

"Biological behaviourists identified how bees fly and measured their visual behaviour," said the University of **Adelaide**'s Associate Professor Kamran Eshraghian. "Our team developed the new and inexpensive smart sensor or retina microchip based upon novel parallel architecture."

The chip detects motion and adjusts for contrast, something called lateral inhibition. It contains the decision-making circuit all in one microchip and does not need an iris, the researchers said.

The breakthrough, after three years of research by the University of Adelaide and Canberra's Australian National University (ANU), came in a mathematical model developed by ANU's Professor Adrian Horridge which allows the tightly-packed Gallium Arsenide chip to work like an insect eye.

But the chip is unsuitable as a human eye implant. "You don't actually see pictures like a human eye does," said Mr Abbott. "I'm not sure a human would be happy ... they'd want to see everything in all its colour and glory."

The retina chip paves the way for mobile robots, from robot vacuum cleaners to those working in risky environments such as nuclear reactors, which had been hampered by slow visual guidance systems, the researchers said.

"It's much simpler than the human eye," said Mr Abbott. "In robotic applications, in cars or any application where you're trying to avoid collision between two objects, you want the vision system to be as small as possible."

The scientists said other research groups had tried to make such a chip, but that their efforts foundered on mathematical models that were too complex. - Reuter

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