Bee research breakthrough might lead to artificial vision

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(Phys.org) -- An international research breakthrough with bees means machines might soon be able to see almost as well as humans.

The Australian and French research shows that honeybees use multiple rules to solve complex visual problems.

Study author Dr Adrian Dyer, from RMIT University, said the findings held important implications for our understanding of how cognitive capacities for viewing complex images evolved in brains.

Dr Dyer said that rule learning was a fundamental cognitive task that allowed humans to operate in complex environments.

"For example, if a driver wants to turn right at an intersection then they need to simultaneously observe the traffic light colour, the flow of oncoming cars and pedestrians to make a decision," he said.

"With experience, our brains can conduct these complex decision-making processes, but this is a type of cognitive task beyond current machine vision.

"Our research collaboration between labs in Australia and France wanted to understand if such simultaneous decision making required a large primate brain, or whether a honeybee might also demonstrate rule learning."

Dr Dyer said the research team lead author Dr Aurore Avargues-Weber (Université de Toulouse) trained individual honeybees to fly into a Y-shaped maze which presented different elements in specific relationships like above/below, or left/right.

With extended training the bees were able to learn that the elements had to have two sets of rules including being in a specific relationship like above/below, while also possessing elements differing from each other.

Dr Dyer said the findings showed that possessing a large complex brain was not necessary to master multiple simultaneous conceptual rule learning.

"This offers the possibility of deciphering the neural basis of high-level cognitive tasks due to the simplicity and accessibility of the bee brain," he said.

The research was published last month in the *Proceedings of the National Academy of Sciences*.

Provided by RMIT University