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# The robots move like humans to see

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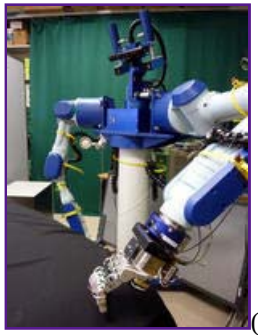
**The Universitat Jaume I (UJI) in Castellon presents the results of European study EYESHOTS where robots tried to replicate human behavior related to vision, grip objects and spatial perception. It participated neuroscientists, psychologists, engineers and experts in artificial intelligence.**

 (The PLC Intelligent Robotics Laboratory of the UJI, who participated in the project EYESHOTS. Image: RUVID)

After three years of work, the project team EYESHOTS (*Heterogeneous 3-D Visual Perception Across Fragments*) Has made progress in controlling the interaction between vision and movement of a robot, and develop an advanced three-dimensional visual system is synchronized with the arms and allows the machine to perceive, be aware of your surroundings and also remember to act accordingly.

The project, funded by the European Union through the 7 th Framework Programme and coordinated by the University of Genoa (Italy), have also participated in the UJI, University Westfälische Wilhems (Germany), University of Bologna (Italy) and the Catholic University of Leuven (Belgium).

For a humanoid robot successfully interact with their environment and develop tasks independently, it is first necessary to refine these basic mechanisms are still not satisfactorily resolved, says the researcher's POBIL Angel Pasqual, director of the Intelligent Robotics Laboratory of the Universitat Jaume I (UJI) in Castellón. Have validated their findings with oculomotor system consisting of a robot head with moving eyes integrated into a torso with jointed arms built at the University of Castellon.

Computer models have been based on knowledge of human and animal biology, for which experts have joined in neuroscience, psychology, robotics and engineering. The study of control of the vision began recording the neurons of monkeys engaged in visual-motor coordination, as our way of perceiving the world we share with primates that have a visual system similar to ours.

The first characteristic of our visual system that was intended to artificially replicate the saccadic eye movement related to the dynamic change of attention. According POBIL Angel, "constantly change the point of view with rapid eye movements, while we are hardly aware. When the eyes are moving, the image is blurred and we can not perceive clearly, so that the brain integrates the fragments as if it were a puzzle to give the impression of a continuous image and perfect environment. "

**You learn to base connecting neurons**

From the records neural computational models were part of the brain that integrates images with both eyes movements of arms. The background assumption is that this integration is very different than what is usually done in engineering or robotics and information representation also differs. In this sense, the experts attempted to show that when people make a wide movement toward an object, the brain does not calculate the coordinates, but the arm know where to go because it 'say' eyes.

"It's not from the eyes, the brain calculates a position and then the arm to move to that position, but is much more straightforward: to look at the eyes to a point, his eyes 'say' the arm where it to go. All this is learning during the stages of development: babies do not know that relationship but we learn to base connecting neurons, "explains the researcher.

These learning mechanisms are simulated in EYESHOTS from a computational model of neural networks consisting of learning to look, building a representation of the environment, conserving the appropriate images and use the memory to reach for objects with the hand but not being observed in that time.

It is therefore a basic research project that applied. "Our findings can be applied to any future humanoid robot capable of moving the eyes and focus to a point. These are priority issues for the other mechanisms work properly," says the researcher.

The Intelligent Robotics Laboratory work in parallel in the European project GRASP focused on robotic grip, ie the manipulation of different objects. The aim is to demonstrate that the prototype robot able to empty a shopping cart with items of different size and shape without falling off and placed neatly in another location. Is another fundamental issues of robotics that these researchers are trying to solve.

Source: RUVID



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