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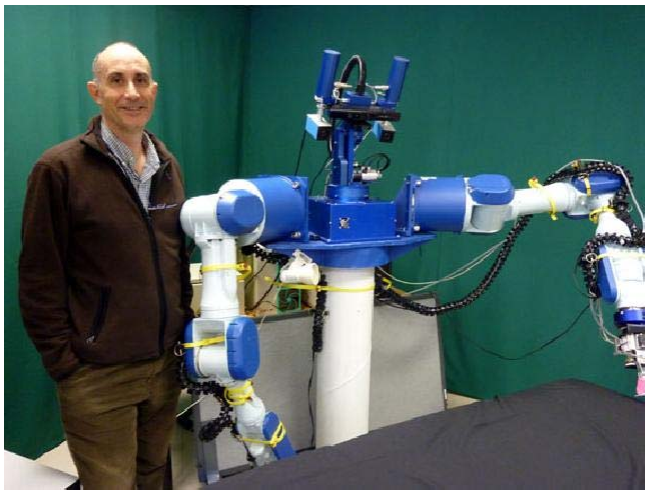
Project Applies Neuroscience To Robot Vision Mimicking Human Eyesight

Research centres present the results of an EU-funded study which has attempted to replicate in robots human behaviour such as vision, grasping objects and spatial perception.

After three years of intense work, the members of EYESHOTS* have made progress in controlling the interaction between vision and movement, and as a result have designed an advanced three-dimensional visual system synchronized with robotic arms which could allow robots to observe and be aware of their surroundings and also remember the contents of those images in order to act accordingly.

For a humanoid robot to successfully interact with its environment and develop tasks without supervision, it is first necessary to refine these basic mechanisms that are still not completely resolved, says Spanish researcher Ángel Pasqual del Pobil, director of the Robotic Intelligence Laboratory of the Universitat Jaume I. His team has validated the members' findings with a system built at the University of Castellón (Spain) consisting of a robot head with moving eyes integrated into a torso with articulated arms.

Ángel Pasqual del Pobil



Credit: Universitat Jaume I

To make the computer models the team started from the knowledge of animal and human biology, for which experts specialised in neuroscience, psychology, robotics and engineering worked together. The study began by recording monkeys' neurons engaged in visual-motor coordination, as humans share our way of perceiving the world with primates.

The first feature of our visual system that the members replicated artificially was our saccadic eye movement which is related to the dynamic change of attention. According to Dr. Pobil: "We constantly change the point of view through very fast eye movements, so fast that we are hardly aware of it. When the eyes are moving, the image is blurred and we can't see clearly. Therefore, the brain must integrate the fragments as if it were a puzzle to give the impression of a continuous and perfect image of our surroundings."