



Robots and humans working hand in hand

Robots with fixed processes and large access guards will soon be a thing of the past. A young Swiss company is working on a robotic arm that responds adequately to changing situations, keeps learning new skills, and could soon be used in private households.

The science of robotics is advancing rapidly. Robots are evolving from machines with rigidly defined processes towards interactive assistants that no longer need to be locked away behind guards and light barriers. Instead, they will be able to move freely while still being safe for humans. Hollywood has shown the way with the Iron Man movies. The main character, played by Robert Downey Jr., is assisted by a robotic arm that holds the solder, turn screws, or pass tools as needed.

Robots wrapped in artificial leather

The scene described above might soon become reality, at least if the masterminds of the Swiss start-up F&P Robotics have their way. The company's 20 employees have developed a robot that might revolutionize the working relationship between humans and machines. The robotic arm is 1.1 meters long in the standard version, has a working radius of 80 centimeters and six degrees of freedom. The aluminum body of P-Rob (for Personal Robot) is covered in a high-quality artificial leather skin for a better user experience.

“With P-Rob, we want to take personal robots to the next level,” says Hansruedi Früh, CEO of F&P Robotics. He even has some clear ideas of potential applications in laboratories and in industrial automation. “The robot could handle containers and vessels or be used in quality control.” With its newly developed software, it can recognize, grip and manipulate objects while being aware of its surroundings, so that it responds correctly when a person approaches.



P-Rob 1R with six degrees of freedom (right) and 1U, a smaller-sized version. Image © maxon motor

“Our robot is able to analyze situations to develop and follow what it deems to be the optimal course of action.”

Hansruedi Früh, CEO F&P Robotics

However, if the engineers at F&P Robotics are successful, this will only be the beginning. P-Rob might soon work together with other robotic arms or even with people, recognizing the social behavior of humans so that it may function as an autonomous machine. “It is able to analyze situations to develop and follow what it deems to be the optimal course of action,” says Hansruedi Früh. Quite possibly, these robots will soon be able to autonomously correct malfunctions in a production line instead of shutting down, as robots currently do when an unplanned event occurs.

Hansruedi Früh can also imagine his robot working in households, e.g. to prepare food or perform other tasks. “The idea is to build an intelligent, interactive arm that is safe and reliable and will be perceived not as a machine, but as an assistant or friend.”



The robot's head can be fitted with various manipulators.
Image © maxon motor

Brushless DC motors ensure precise movements

F&P Robotics powers its robotic arms with brushless DC drives by maxon. Up to eight brushless maxon EC flat motors with diameters of 45 and 90 millimeters and an output power of 70 or 90 W are used for P-Rob's joints and manipulators. Their power, compact design, and good heat dissipation make these drives an ideal solution for robotic applications. “We think that the flat design in particular is a great advantage,” says Hansruedi Früh. In combination with maxon sensors, the flat motors also make good force sensors, since the torque can easily be determined by measuring the current in the drive.

Ease of control and ease of use are among the core design objectives of the young Swiss company. A standard laptop is sufficient to control and program P-Rob. This makes the robot an interesting option for many potential customers. The first few projects with the innovative robotic arm are already on the way, with more to follow soon. For certain, the future will continue to see a growth in robotic applications interacting with humans. F&P Robotics and maxon motor are spearheading this development.

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maxon EC 45 flat motor
This drive delivers 70 W of power, at a diameter of 45 mm. The external multi-pole rotor ensures especially high torque.



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This maxon encoder uses a magnetic functional principle. An interpolator enables very high speeds. It is possible to select from several different counts per turn.

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