

FOCUS ON: *Robotics*



Photo: Hollandse Hoogte

Consider Denise, a two-legged robot that walks more like a person than a machine. Martijn Wisse in the Biorobotics Laboratory in Delft developed Denise. Like us, she falls forward and then catches herself with each step.

How about arms? Under the leadership of Dutchman Dr. Patrick van der Smagt, a European research team is currently developing the most human robotic arm ever created. The arm will simulate virtually all human limb movements and will partially take orders from a “brain” modeled on ours. Called Robo Habilis, it will be able to snap its fingers, handle an egg, and pick up a cup of coffee without spilling it.

Until recently, robots carried out relatively narrow, standardized tasks, such as screwing a cap onto a bottle. Nowadays, robots have learned to “see” and “think” using 3-D vision technology and robot mechanics. They can categorize products by certain features and shapes, without each object having to be identical. The new robotic skills are a synthesis of new technologies that enable robots to perform complex tasks.

Dutch enterprises have become accomplished in developing new robots and linking existing robots into complex systems via smart software. Close cooperation within industry as well as solid partnerships with universities of technology and knowledge institutes have made possible these innovations and skills. Dutch researchers and businesses are continually enhancing their special role in the robot’s transition out of factories and into ordinary workplaces and even households.



VDL Steelweld BV

Selected Dutch applications discussed below describe the introduction or extended use of robots in such industries as food, horticulture, medical rehabilitation, and metalworking.

Handling food

The new Loadmax robot developed by Dutch machine building company Jentjens has found a place in various segments of the food industry. In one case, its gripper grasps scattered sausages and quickly and precisely places them neatly in a small box. Software enables the Loadmax to select products based on any number of visual features, such as shape, color and size.

The Netherlands is a leader in the production of cheese. When aging cheese, someone must rotate, brush, and coat it in plastic, then return it to the shelf. Increasingly that someone is a robot from Ferdar Automation Technology.

The Netherlands dairy industry has benefited from sophisticated robot technology. For instance, as cows walk independently and voluntarily through a self-cleaning cowshed, they are milked by a fully automated milking robot. The robot, made by the Dutch company Lely, milks cows in more than 60 countries around the world.

Horticulture innovations

Two new robots have entered the Netherlands rose industry: a cutting insertion system and the rose harvesting robot.

The cutting insertion system consists of a conveyor belt, a camera/software unit, and a robotic arm. The arm takes the cuttings from the conveyor belt as they pass by and places them gently and precisely in small pots. The benefits are consistent quality and cost savings plus less concern with the high turnover of unskilled labor.

The rose harvesting robot scans the rose plants from above. If it decides a rose is ready for harvesting, the arm descends and cuts the stem with extreme positional accuracy. The rest of the processing and packaging is completely automatic.

Health applications

While robots have enhanced the abilities of surgeons for some time, they’re now helping patients undergo rehabilitation. Clinic Het Roessingh has been successfully collaborating with the University of Twente, Northwestern University in Chicago, and the Dutch business sector for many years. These efforts have resulted in several robotic systems for partly paralyzed patients, such as from a stroke. Examples include:

- Freebal, which compensates for gravity when the patient makes arm movements
- Dampace and Limpact increase or lower resistance for targeted training
- Lopes, an exoskeleton, helps to teach patients how to walk again following paralysis.

Jaap Buurke, responsible for the restoration of human function at

Roessingh Research & Development, notes that Dutch robot systems focus on the patient’s learning and training process rather than being driven by technology. “For example, we place great emphasis on learning theory and the use of serious games,” he says. This approach, which is typically Dutch, is the result of close collaboration between clinics, researchers, and businesses.

Metalworking

Metalworking represents a field where robots have been used for years, especially in the automotive assembly. While the Netherlands does not really have a car industry, Dutch companies such as VDL Steelweld have been active in their manufacturing for many years. A robust family-owned company, VDL Steelweld designs and arranges production lines for carmakers such as Ford, Volvo, Jaguar, and Land-Rover. The robots are accurate

in their tasks to within a tenth of a millimeter.

The latest technological metalworking advances involve programming directly from computer-aided design systems. “The Netherlands is the only country in western Europe where extremely small batches of a product and one-off items are made,” says Remco Valk of Valk Welding. Valk produces towing hooks, for instance, in batches of between five and 25. Each part requires perhaps five minutes of welding. So in some cases, reprogramming must occur every half hour.

Minimizing the time required to re-adjust the robot’s settings is extremely important. Valk Welding supplies systems that use a 3-D drawing for totally automated programming of the welding robot within just a few minutes.



Photo: Jaap Spieker

Photo: Ruben Keestra

