

Robotics Activities in The Netherlands

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Since April 2010, in The Netherlands robotics activities are coordinated by RoboNED. This Dutch Robotics Platform, chaired by Prof. Stefano Stramigioli, aims to stimulate the synergy between the robotics fields and to formulate a focus.

The goal of RoboNED is three fold: 1) RoboNED aims to bring the various fields and disciplines involved in robotics together, 2) RoboNED aims to stimulate the innovation ecosystem in The Netherlands by uniting stakeholders from research, education, industry, and society, and 3) RoboNED aims to stimulate the social acceptance of robotics in The Netherlands.

State of the Art

The Dutch market has a high potential and a lot of opportunities, especially in the high-tech industry. Examples are well-known multinationals such as ASML (www.asml.nl), world leader in lithography machines, and Philips (www.philips.com), and also some small and medium enterprises (SMEs) such as Demcon (www.demcon.nl), which realizes high-tech mechatronic systems and products. A relatively large part of the mechatronic system developers in The Netherlands has the ambition to extend into the medical and health-care market. A real leading position for The Netherlands is the dairy and cattle market that extensively uses robotics for a large part provided by the international operating company Lely (www.lely.com). Another robotic market is agriculture, where for example the companies Jentjes (www.jentjes.nl) and Aris BV (www.arisbv.nl) are active.

Strategic Agenda

To reach the goals, RoboNED is developing a strategic agenda for policy, research, and industrial collaboration from different perspectives. Both society perspective (demography and aging) and technological perspective (stimulating NBIC convergence; the unification of nanotechnology, biotechnology, information technologies, and cognitive science), and the connection with other disciplines are taken into account. RoboNED organizes the robotics field in clusters and together these clusters are writing the strategic agenda. This strategic agenda can be used to advise the government in investing in robotics. Figure 1 gives a preliminary overview of the clusters that are formulated. The clusters confirm mainly with the American Roadmap (CCC) on robotics by Prof. Hendrik I Christensen and the European roadmap (EUROP) on robotics by Dr. Horst J. Kayser. In the Dutch situation, a large cluster will be Health. In this cluster, there is a great need for robotics, bringing solutions to the increasing demand for care by the aging population and a

shortage of care professionals. For example, defense is expected to be of less importance in The Netherlands as a result of a small defense department.

RoboNED distinguishes five clusters: health, industrial, consumer services and applications, professional services and applications, and space. Health represents the field of robotics that are involved in the care and cure of people, e.g., robots that feed people, robots that lift people, robots that are a companion to people, robots that assist in the rehabilitation process, surgical robots, and robots that autonomously transport objects in the hospital.

“Industry” represents the robots that manufacture products. In most of the cases, these robots work in an environment that is specifically furnished for robots and do not account for humans in their environment: physical human machine interaction is usually avoided. Examples of these robots are manufacturing robots, robots that sort products, robots that load a truck, robots that pack products, and welding robots.

“Consumer services and applications” represents the robots that are specifically developed to deal with humans in their working environment. Examples of these robots are robots in the household, robots that assist in education and training, and robots for edutainment.

“Professional services and applications” represents the field of robots that are working for a company or organization and are most of the time not stationary. Examples of these robots are maintenance and inspection robots, robots that milk, robots that are performing harvesting, robots that can build houses, robots that can autonomous transport goods, and robots that guard buildings.

“Space” represents robots performing tasks in measuring and detecting for research in space. Examples of these robots are manipulation robots, robots that take samples, measure, and detect.

Results and Approach

On 25 June, RoboNED organized a seminar in which the community was brought together. Representatives of various disciplines attended the meeting and formulated the application fields, goals, and challenges for robotics in The Netherlands.

The cooperating robotic fields aim to reach a greater efficiency to present through. Per application field, actions are formulated to involve all possible players in the ecosystem, spanning from technology developers, users, and policy makers.

These groups of people will form clusters that will identify the needed actions to be taken to have a breakthrough of the cluster subfield in technical and market development. The seminars that RoboNED organizes facilitate these developments.

To stimulate the synergy, RoboNED is also developing a database holding all relevant summarized data about all activity

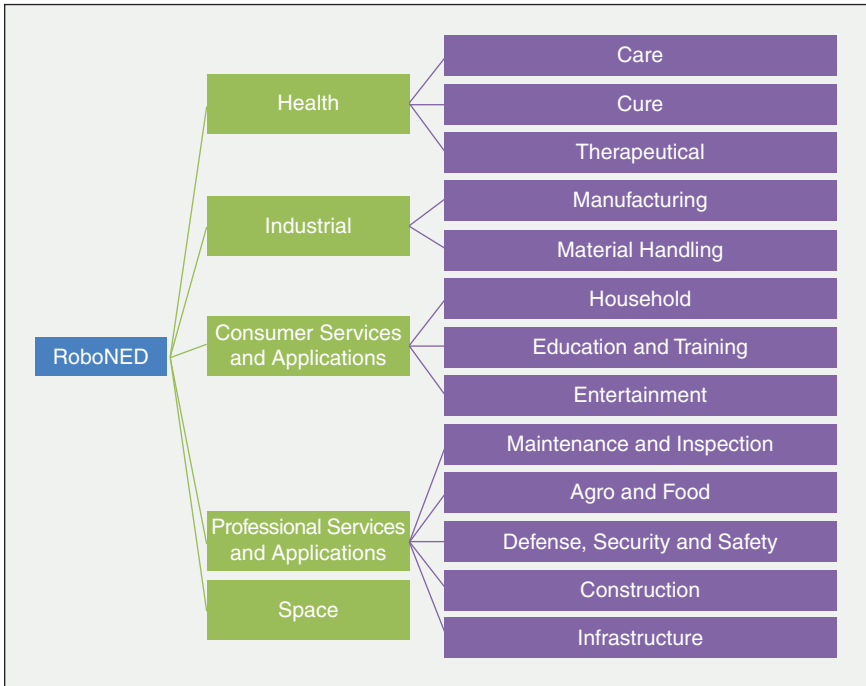


Figure 1. Clusters in the robotics field in The Netherlands.

in robotics in The Netherlands. Examples of data in this database are: projects, people, applications, core technologies, location, budgets, etc. All people in the community will be able to easily access the data through a Web page. Different views on the data are easily created from an intuitive interface. In this way, one can choose the overview of all projects in a certain application field.

Agro and Food Robotics

One of the clusters that is of high importance in The Netherlands is the subcluster “Agro and food.” This subcluster



Figure 2. A robot milking a cow (www.lely.com).

consists of agriculture, cattle breeding, and greenhouses. Robots are used in several processes, such as the production of food, floriculture, and the generation of raw materials for biofuels and bioplastics. In The Netherlands, agriculture, cattle breeding, and greenhouse supply an important part of the export. Besides, the products are (compared with other countries) of high quality and produced with high efficiency. There is already a high level of automation in The Netherlands, e.g., picking cucumbers, cutting plants, milking cattle, weeding, and harvesting. Figure 2 shows a robot, milking a cow. Still, a lot of repeating acts with a relative low complexity are done by humans and can be done by robots. The main driver of the use of robots in this sector is the lack of staff, but food safety and quality improvement are also important reasons to use robots. Technological challenges in this sector are the picking of products. The products

often have an unstructured geometry and an unstructured environment. Advanced technologies are needed to deal with these conditions. A picking robot needs to perform the following steps: 1) localizing the product, 2) detecting the properties of the product, such as size and maturity, and 3) perform the picking of the product. To be able to perform these steps, computer vision is of great importance. Another challenge is the detection of the quality of the product. The quality of the product is often based on subjective requirements and can change because of the decrease or increase in quality on the market. Writing an algorithm that deals with subjective and changing requirements is difficult. To develop a technological solution useful for all kind of crops is a big challenge because of the great variety in geometries and environmental difficulties. For a company on its own, the development of a picking robot is often economically not feasible. Developers and users should work together to develop technologies that can be used for several crops. RoboNED brings the developers and users together and stimulates the accomplishment of robotic solutions, where as much as possible parties can benefit from.

Holland: Flowers, Windmills, and Robots!

RoboNED wants to use the great potential and opportunities of the Dutch high-tech market and hereby give the Dutch robotic market and research a great boost. In the future, if you will think of Holland you will not only think of flowers and windmills but also robotics!

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