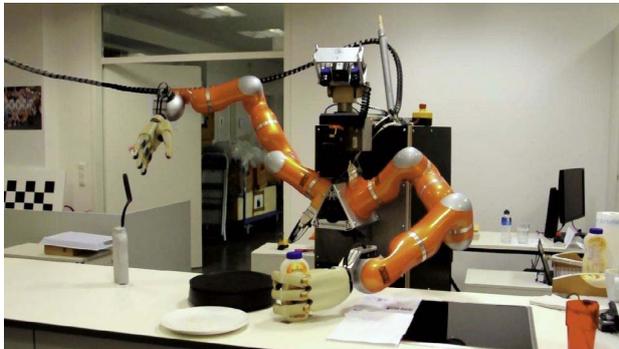Brussels, 25th November 2013

5 cool robots the EU is funding

It's EU Robotics Week time again. For the third consecutive year, the achievements of Europe's researchers and inventors working in robotics are celebrated in over 300 events from November 25th to December 1st. Here are some examples of the best EU-funded Robotics projects.

RoboHow – Can a robot learn to make pancakes on its own?

A robot that can make pancakes doesn't seem different from a bread machine. But, a robot that has learnt by itself to make pancakes, fold laundry, throw away garbage and do other everyday activities around the house is entirely different.

The project enables robots to learn on their own how to carry out tasks in human working and living environments by finding instructions online or by observing humans doing them. The goal is to develop robots that can help people in everyday activities, as well as to find out to what extent a robot can learn by itself. Robohow allows robots to load the instructions they receive into their knowledge base. However, a lot of information is still missing, so these instructions are combined with information from videos showing humans perform the tasks in question and from kinaesthetic teaching and imitation learning. The project is led by Universität Bremen, with the participation of researchers from France, Sweden, Belgium, The Netherlands, Greece, Germany and Switzerland. See the video & the website.

RADHAR – Self-Driving

Driving a wheelchair can be difficult and very tiring. As a result, the user may over-steer the wheelchair or not have enough strength to steer it. The RADHAR (Robotic ADaptation to Humans Adapting to Robots) project has developed an intelligent wheelchair that enables people with cognitive or physical challenges to independently drive around in an everyday-life environment.

Researchers from Belgium, Germany, Austria, Sweden & Switzerland have developed an intelligent system with advanced sensors, which allow the wheelchair to identify, interpret and correct confusing or weak signals from the driver and to help the wheelchair user navigate in various environments. The driver of the wheelchair is able to decide how much help he or she needs. Meanwhile, the robot can correct the projected path using information from online 3D-laser sensors reading the terrain. It is also equipped with cameras monitoring the position of the user in order to be able to judge if he or she is awake and in control. The robot takes in information on the surroundings, the position and the focus of attention of the driver; it then adjusts the path avoiding dangers, such as steps or obstacles. The robot also has haptic sensors in the joystick; they use tactile feedback sensing the touch of the user to measure how much force is being used. It then uses all the sensors together to interpret the user's intention and the environment and is then able to either make small corrections in steering or to take more control and navigate the wheelchair around safely.

The RADHAR project, which just finished after three years, was led by Katholieke Universiteit Leuven. Find out more in RADHAR website.

Stiff-Flop - A Surgical Robot based on an Elephant's Trunk

During the European Robotics Week, at the Science Museum in London we'll meet swimming, flapping or crawling robots mimicking real animals.

The EU-funded Stiff-Flop project will be showing a robotic arm inspired by the softness and agility of an elephant's trunk and by the octopus' ability to find food by exploring small cavities in rocks.

This robotic arm could be used in keyhole surgery, as it is able to adjust its texture and stiffness to organs inside the human body; it can soften to get through narrow passages and then stiffen again when needed avoiding damage to soft tissue. It also has a gripper at the edge and is able to learn and develop how to manipulate soft objects in the human body, through interaction with a human instructor. This project could make keyhole surgery safer and minimise post-operative pain and scarring.

The consortium led by King's College London is made up of researchers from the United Kingdom, Spain, Italy, Poland, Germany, The Netherlands and Israel and supported by the European Commission 7.4 m euros out of a total estimated cost of 9.6 m euros). Find out more here.

ROBOFOOT – Robots bring manufacturing back to Europe

The industry for hand-made fashion shoes is one of the important industries in Europe, which faced intense competition from low-cost countries. The EU-funded ROBOFOOT project showed that robots can also be introduced in traditional footwear industry, maintaining most of the current production facilities and help Europe's footwear industry. Starting in September 2010 and ending in February 2013, a consortium of 10 partners from Spain, Italy and Germany led by Fundación Tekniker have been developing the technology and the results have been implemented in a set of relevant manufacturing operations. The project had 2.6 m euros of EU funding (out of a total cost of 3.7 m euros).

Robots are still not widely used in the footwear industry, which amounts to more than 26.000 companies and almost 400.000 employees in Europe. The introduction of robotics will help overcome the complexity in automation processes. The ROBOFOOT project has developed robots using laser sensors to identify the shoe and its position. The robots are able to work with soft materials and can grasp, handle and package shoes without damaging them and at the same time taking on dangerous jobs, such as inking the shoes, while supervised by humans. Find out more in this video and in the Robofoot website.

STRANDS - The Last Robot Standing Wins!

A robot marathon will take place during European Robotics Week in the UK, Sweden, Germany and Austria. Robots will battle it out to be the last one standing in the STRANDS Robot Marathon; the challenge is for them to autonomously patrol a populated environment for as long as possible, covering the most distance in the shortest time possible.

STRANDS is an EU-funded project enabling robots to achieve robust and intelligent behaviour in human environments. STRANDS robots will be evaluated in a care home for the elderly in Austria (assisting human carers), and in an office environment patrolled by a security firm in the UK. STRANDS is developing a complete cognitive system, which will use and exploit long-term experiences, learning and adapting from memory. The approach is based on understanding 3D space and how it changes over time, from milliseconds to months. Researchers from the United Kingdom, Sweden, Austria and Germany contribute to this project.

The robots developed by STRANDS will be able to run for significantly longer than current systems. Runtime has been a huge roadblock in the development of autonomous robots until now. Long runtimes provide previously unattainable opportunities for a robot to learn about its world. Society will benefit as robots become more capable of assisting humans, a necessary advance due to the demographic shifts in our society.

Find out more on Strands in this video, in this article and in the project website.

Background

During European Robotics Week (November 25 - December 1, 2013), various robotics-related activities across Europe will highlight the growing importance of robotics in a wide variety of fields. Businesses, universities, museums and research centres participate in activities aimed at the general public (school visits with lectures on robotics, guided tours for pupils, open labs, exhibitions, challenges and robots in action in public squares).The Week should raise awareness of recent achievements in robotics in Europe and inspire Europe's youth to pursue a career in science.

The European Commission funds over 100 collaborative projects under the 7th Framework Programme on advanced research into robots. The projects aim at helping robots better understand the world around them through sensing, perception, understanding, reasoning and action. The projects cover subjects ranging from autonomy, manipulation / grasping, mobility and navigation in all terrains, to human-robot interaction and cooperative robots. Many, if not all, of the projects tackle seemingly simple tasks which are very difficult for machines: how to pick up a ball, avoid bumping into a wall, recognize a danger in the home and so on.

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