Future robots to teach maths and work in nursing homes

‘Boris’ the mechanical hand might be able to load up a dishwasher by next April

Video Images

The next generation of robots is going to have a new mix of talents, capable of teaching students the delights of maths or working as a care giver in a nursing home.

Dick Ahlstrom, Michel Destrade

Topics: News Science robotic manipulator autonomous robot robotic tutors robots

Fri, Sep 12, 2014, 01:08

The next generation of robots is going to have a new mix of talents, capable of teaching students the delights of maths or working as a care giver in a nursing home. It is nice to know however that they will also still be doing the jobs we hate like loading up the dishwasher.

The future of robotics was on display on the closing day today of the British Science Association’s festival of science at the University of Birmingham. There is a growing trend of “social robotics”, where robots are programmed to act as partners to humans, rather than as replacements for them.

Developments in computer learning have increased their capabilities and helps them overcome problems on their own without human intervention, said Prof Jeremy Wyatt the head of Birmingham’s computer department.

He presented “Boris” the robotic manipulator, effectively a mechanical hand that can pick up objects, even unfamiliar ones. It scans an object and then picks it up “in the same way as people do”, he said. It can learn and try new moves and becomes better at the task, so much so that Prof Wyatt hopes Boris will be able to load up a dishwasher by April next year.

Clever computers could also be deployed as assistant teachers, ones that have infinite patience but will also respond to their pupils’ emotions. Dr Ginevra Castellano, a senior researcher at the School of Electronic, Electrical and Computer Engineering at the university is leading a large European effort to design “empathic robotic tutors”.

Her robots are helping some 11-13 year-olds with a geography lesson, teaching them to improve their map reading skills in a regular classroom environment.

They communicate “face-to-face” with the humanoid robot, Emote, who speaks, moves and gives updated instructions as the lesson proceeds.

The children get instant feedback from the system, and a camera picks up their facial expressions to figure out their emotional state. “The idea is to collect a lot of data that can be used to train the algorithm, using real-time information to detect children’s emotions and learning process,” says Dr Castellano. She hopes that interaction with robots will ignite the pupils’ interest in STEM subjects (Science, Technology, Engineering and Mathematics).

“We found that teachers are very enthusiastic as long as we involve them in the design phase and they have a say into how the technology can help them,” Dr Castellano said.

Dr Nick Hawes of Birmingham’s school of computer science introduced Bob the autonomous robot. Bob is expected to operate in and around humans and his computer learning software helps him to do this, Dr Hawes said.

Bob is given tasks, on the day they included checking whether security doors at opposite ends of the room were closed and checking whether fire extinguishers were in place. The goal is to start Bob off and then have him operate without any further human intervention for a target of 120 days, Dr Hawes said. “Bob decides for himself what activity it should do to accomplish the task.”

But he could be given many other jobs given his ability to learn suggests Lenka Mudrova a PhD researcher at Birmingham. Austrian collaborators in the research want to use him as an aid in a nursing home context, she said.

He can “see” and interpret the movement of people allowing him to stay out of the way and avoid blockages. Yet his grasp of the local environment means he can spot changes, for example if a person has fallen and is not getting up.

Bob could call for immediate assistance and also reassure the person that help was on the way, Ms Mudrova said. He could detect if windows or doors had been left open with the risk of a patient leaving or could accompany a person to visit an onsite doctor.