Robot picks out castors as fast as blueberries

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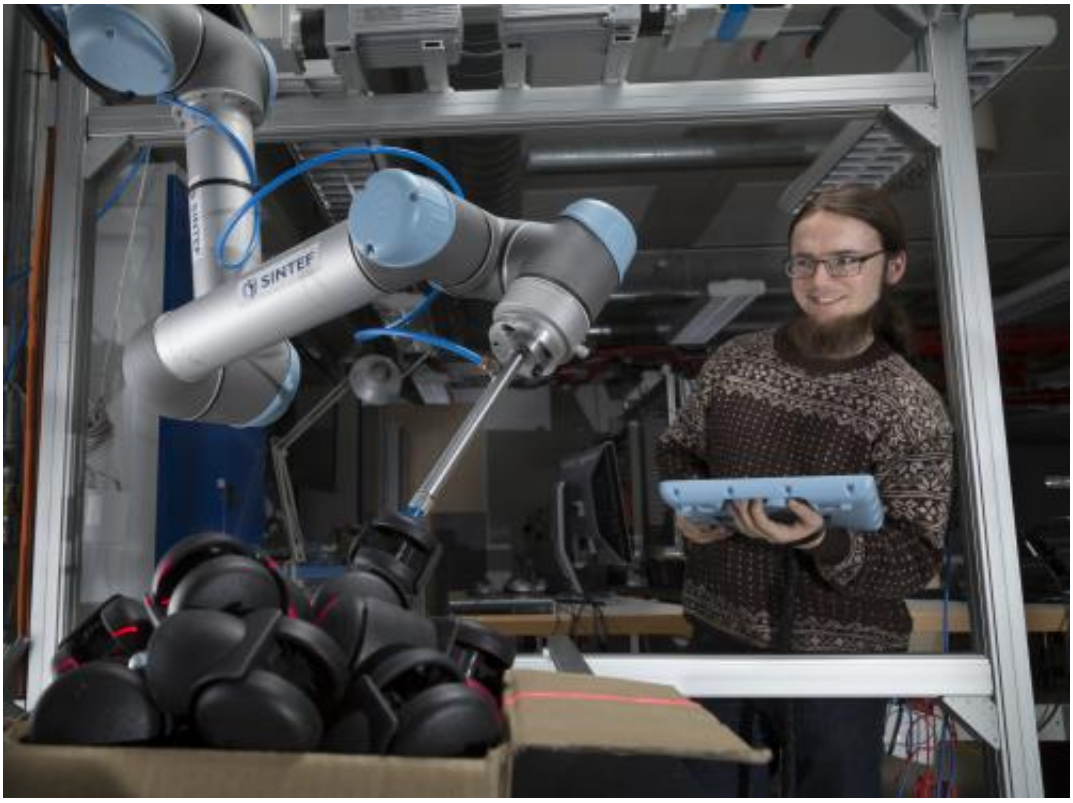

Researcher Sigurd Albrektsen is sitting at a PC that calibrates the settings of two robotic arms and a box of castors. Credit: SINTEF/Thor Nielsen.

The robot effortlessly picks up one castor after another from the pile in the box and puts them into the channel. No matter how the wheels are lying, the robot manages to get an exact grip.

Operations run smoothly and automatically when assembling the various

parts of an office chair at the SB Seating production unit at Røros. But when it's time to fit the wheels, humans must intervene. The five wheels lying jumbled in a box have to be picked up and then aligned in a row before robots can take over again and attach them to the feet of the chair.

Researchers from SINTEF now believe they have found a solution that could make production more effective and reduce costs.

Robots that can see and grasp

We are in a light and spacious laboratory in Trondheim. This is where the work to optimise the industrial production line has been taking place.

Researcher Sigurd Albrektsen is sitting at a PC that calibrates the settings of two robotic arms and a box of castors. He tells us that one of the robots is fitted with a gripper tool, while the other has 3D vision (laser and advanced camera) that recognises the various parts and identifies their position.

"The robotic gripper can pick up castors in four different ways", he explains while pressing the start button. "That's important, because the castors are all in different positions".

Since SB Seating produces one chair every 20 seconds, the researchers have to enable the robot to pick out a wheel every 4 seconds. During the next few seconds, the wheels are quickly picked up out of the box by the robotic gripper.

Development at an advanced stage

Svein Peder Berge at SINTEF ICT tells us that 'bin-picking' has been a

problem with which all researchers have been grappling for many years. "The current pick-and-place robots are very good at picking up parts arranged in specific positions, but not if they are unsorted in a box. Now we can use a drawing (CAD model) to tell the robot which castor they must pick up. We teach the robot to recognise the wheel and its position in the box, so that it can grip it accurately and pick it up, regardless of its position in the box.

Solution with a wider perspective

Stein Are Kvikne at SB Seating says that picking up castors was chosen as the most relevant task because the company currently uses a robotic assembly cell to mount castors into the foot socket.

"At the moment, the wheels have to be picked up manually and arranged by an operator. This job is very challenging for a human being, and not exactly optimal from an HSE perspective. This consideration will be uppermost if we decide to automate this particular operation", says Kvikne. "We will also get further productivity benefits in the form of a better working environment, enabling us to make better use of the operator's core skills".

However, Kvikne emphasises that SINTEF's robot reveals applications that are of interest far beyond picking out castors:

"They demonstrate a generic technology in which many different components can be handled by the same system. The combination of 3D vision, a flexible robot/gripper and a 3D CAD model of the component means that we can pick the component directly out of the transport packaging without any extra handling. We are now very close to having a system in which we would want to invest, both from a technological and a financial perspective", relates Kvikne.

More information: Read more: gemini.no/2012/02/roboter-pa-s … sthash.7tzHWc6p.dpuf

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