SHDLOGISTICS

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Bionic muscle

AS ROBOTIC TECHNOLOGIES CONTINUE TO DEVELOP APACE, **DAVE BERRIDGE**, SECRETARY OF THE AUTOMATED MATERIAL HANDLING SYSTEMS ASSOCIATION (AMHSA), CONSIDERS WHAT ROLE EXOSKELETONS MIGHT PLAY IN THE LOGISTICS INDUSTRY.

> **The rise of e-tail is driving a need for robotics to support or replace logistics workers and thereby increase productivity**

According to the 2016 World Robotics Report, published by the International Federation of Robotics (IFR), the number of industrial robots deployed globally will rise to some 2.6 million by 2019 – a million more than in 2015. However, around 70% of industrial robots today work in the automotive, electrical & electronics and metal & machinery sectors.

Of course, there is considerable automation in the logistics industry but little of it could be described as robotic in the strictest sense. The reason is that the picking and sorting tasks involved in logistics are complex. Traditional robots are adept at repeatable tasks in a controlled environment – such as moving heavy but identical metal parts on a car production line – but struggle with uncertainty, such as when tasks vary over time or the working environment changes.

DRIVERS FOR ROBOTIC AUTOMATION

A number of factors are coming together, however, to make the adoption of robotics in the logistics industry – and elsewhere – more achievable.

First and foremost is the fact that advances in the enabling technologies – such as sensors, big data analytics, improved battery solutions and cloud computing – have dramatically reduced the cost of robotics. Secondly, the growth in e-commerce is making distribution more labour-intensive, as the picking, packing and transport processes traditionally carried out by consumers themselves in bricks-and-mortar retail are brought within the four walls of the warehouse.

Combined with reductions in the available workforce as population levels fall in the West, the rise of e-tail is driving a need for robotics to support or replace logistics workers and thereby increase productivity.

COBOTS

Some early adopters successfully integrated robotics into their operations. Amazon so loved the robotic vehicles supplied by Kiva Systems that it bought the company in 2012, renaming it Amazon Robotics. DHL has recently tested robotic technology for picking at one of its warehouses in Germany. The device trialled is an automated trolley that follows pickers through the warehouse, taking care of most of the physical work.

Both of these examples are of collaborative robots (cobots), designed to work safely in the same environment as humans. In reality, the technology behind them is not significantly different from AGV systems that have been in use in distribution and production environments since the 1970s.

ROBOTS

Advances in what might be deemed strictly robotic solutions are being made all the time. For example, Cambridge Consultants recently developed a robot capable of picking up fruit from a bowl and sorting it by colour. The capability to handle similar but non-identical items requires high-powered image-processing algorithms. Similar vision-enabled systems have been installed by AMHSA members in logistics applications in recent years, albeit handling regular – usually boxed – products.

There is a long way to go, however, as demonstrated by Amazon's open robotic competition last year – the winners of the $20,000 prize for the robot able to pick the most items from Amazon's shelves developed a robot that successfully picked only 10 different items.

EXOSKELETONS

Meaning 'outer skeleton', exoskeletons have their roots in nature – from cockroaches to crabs, they provide important protection against predators.

In recent times, robotic exoskeletons have been developed to offer humans additional support, strength or endurance. Initially driven by military and medical requirements, these 'robot suits' are now being tailored to commercial needs. Some, for example, can enable a human to lift 50kg in each extended hand and can exert 10 times the force the user applies to an object. The keys to successful adoption of exoskeletons are lower weight and reduced cost – factors that robotic advances are improving every year. Combined with augmented reality (AR) technology, the market potential for exoskeletons is huge and they may bridge the gap while full robotic automation is being perfected.

LOOK EAST

A Japanese haulage company that employs a number of elderly staff recently invested in exoskeleton technology to help take the strain of manual tasks. It is easy to see how Japan's shrinking and ageing population makes the search for affordable robotic solutions more urgent.

Many pundits believe, however, that it will be China that will see the greatest growth in robotics. Indeed, the IFR's 2016 World Robotics Report predicts that in 2019 approximately 40% of the worldwide market volume of industrial robots will be sold in China.

It's likely that an increasing number of these will be deployed in China's logistics sector. Why? Because of China's burgeoning e-commerce industry. According to KPMG, by 2020 China's e-commerce sector will be larger than those of the USA, Great Britain, Japan, German and France put together.

With only some 4% of China's urban workers owning a car, e-commerce is a convenient consumption channel but China's warehouses are currently ill-equipped to cope with the volumes of internet orders to be picked, packed and delivered. Watch this space. ∎

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