AUTOMATIC ASSISTANCE

Robots are moving off the screen and into real life

by LEN LEWIS

For more than a century, robots and androids have captured the imagination of science fiction fans, engineers and techno-geeks — everything from Fritz Lang's groundbreaking 1927 film "Metropolis" and the antics of Star Wars' C3PO and R2D2 to Isaac Asimov's vision of a future dominated by robotic workers.

To some, advanced robotics are still the stuff of science fiction. However, robotics may be the new business "disrupter," a herald of a new machine age that could significantly change the retail business.

Robots are already the workhorses of the automotive and aviation industries, programmed to perform intricate surgeries, play musical instruments with the precision of a virtuoso and plumb the depths of the oceans and the furthest reaches of space — as well as more mundane tasks such as delivering packages. Some researchers on the extreme edge of robotics are focusing on making machines that look and act more like humans to facilitate interactions between the two.

For retailers, though, the real question is: Can they restock shelves?

"We're very passionate about robotics and autonomy, but we're also very passionate about the insight and behavioral change we can drive in retail with this sort of information," says Brad Bogolea, CEO and co-founder of Simbe Robotics. The company's Tally robot was developed to scan shelves for misplaced or low inventory, in a fraction of the time needed by humans.

ON THE STREETS

From all indications, humans are ready to accept robotics. A recent study by the Pew Research Center found that 65 percent of Americans expect robots and computers will do much of the work now done by humans over the next 50 years.

65 percent of Americans expect robots and computers will do much of the work now done by humans over the next **50 years**.
— Pew Research Center

One of the biggest opportunities may be on the road. Driverless cars are thought to have the potential to be the fastest-growing segment of robotics. Intensive research and development is being done by automotive and Silicon Valley companies including General Motors, Mercedes-Benz, Nissan, Honda, Tesla and Uber.

One of the most publicized experiments is being done by Google, with dozens of driverless cars, guided by lasers, radar and high-resolution video cameras, on the streets near the company's headquarters in Mountain View, Calif.

Observers are quick to point out that driverless vehicles are far more practical than drones for transporting goods: Google has filed with the U.S. Patent Office for a truck that can make individual deliveries. When the truck arrives, customers use a personal identification number code to open lockers; once the locker has been secured, the truck drives to its next destination.

However, Google's autonomous technology is not without its problems. The delivery truck is still too slow — one was recently stopped by police for going 11 miles below the speed limit in a 35 mph zone.

Safety is another issue. While proponents believe automated cars will be safer than those operated by human drivers, a Google car recently got into a slow-moving accident with a bus when changing lanes. Since then, the algorithms that enable the cars to determine road behaviors have been changed and the vehicles

are back on the streets.

Starship Technologies, started by the co-founders of Skype, has developed a six-wheeled robotic car designed to carry about 20 pounds of groceries, with a delivery time between five and 30 minutes. The cars only travel about 4 mph and are capable of making deliveries within a three-mile radius traveling along the same pavement as pedestrians.

The cargo bay is locked throughout the journey and can be opened only by the recipient using a mobile app. The robot's movements are tracked, so consumers know the exact location of their order and the estimated time of arrival.

IN THE STORES

Some high-profile exceptions notwithstanding, much of the retail action in robotics will take place behind the scenes. In May, Saks and Lord & Taylor parent Hudson's Bay Company said it plans to open a 450,000-square-foot all-channel robotic fulfillment center in Pottsville, Pa., this month.

"This investment leapfrogs us to the forefront of Internet distribution technology," CEO Jerry Storch said in making the announcement. The company expects the new technology will enable it to expand its business as well as reduce costs and improve output volume and accuracy.

Amazon has already used robots extensively in its distribution centers to package and ship orders in an effort to speed up customer delivery times and cut operating costs as much as 20 percent. In the run-up to the 2014 holiday season, the company installed more than 15,000 robots in 10 warehouses. The 320-pound robots from Kiva Systems, acquired by Amazon in 2012, move around the floor on wheels.

Simbe Robotics' Tally is programmed to walk a store's aisles and take stock levels at any time, then return to the charging station. The unit stops in front of each shelf and gets a high-resolution image of product labels, which are automatically checked against a map of the optimum layout for each section. The information is sent to store staffers who can restock and reorder goods.

Tally can inventory an entire small store in about an hour, compared with about 25 hours per week that human employees need to track inventory, and as much as 200-300 hours per week in a large big-box store, according to Bogolea.

Six different retail projects using Tally are now taking place, many in conjunction with manufacturers. While it was designed with supermarkets in mind, Bogolea says Tally would be just as effective in other venues. "We're working on capabilities that would open us up to other channels of retailing in the future," he says, noting that Tally's accuracy rate in tracking shelf inventory is in the mid- to high-90 percent range.

Hudson's Bay Company said it plans to open a 450,000-square-foot all-channel robotic fulfillment center in Pottsville, Pa.

"We're getting a lot of positive feedback and interest from global retailers," Bogolea says. "There's a clear need out there. Retailers see something that will allow them to free up resources from mundane tasks and focus on more meaningful things like restocking and customer service."

WITH THE CUSTOMER

The field is seeing increased competition. RF Spot has developed an in-store sensing robot that has been used to track and maintain apparel inventory at Tesco stores in the United Kingdom. Researchers at Carnegie Mellon University are working on a system called AndyVision that scans store aisles and shelves to tell staffers when an item is running low or merchandise is out of place.

The consumer market for robot assistants like these is expected to grow to $6.5 billion in 2016, according to Hong Kong-based Fung Business Intelligence Centre, a firm that analyzes market data on sourcing, supply chains and retail. Budgee is a rolling basket from Five Elements Robotics that can hold up to 50 pounds and is controlled via a smartphone or tablet or a transmitter worn by consumers. The unit follows users as they shop and is equipped with bump sensors that bring it to a stop when it hits something.

An increasing number of experiments are taking place with the assumption that a fully automated store may become a reality in the next several years.

Social and consumer robotics are also emerging. One of the first was Pepper from SoftBank, whose initial production of 1,000 units, priced at $1,600 each, sold out in one minute. Jimmy, produced by Intel, is a 3D-printed robot that can walk, talk, move its arms and dance. Later this year, Intel will introduce a robot kit with 3D-printed parts for consumers at $1,600; a research version running on an Intel i5 core processor will be available for $16,000.

An increasing number of experiments are taking place with the assumption that a fully automated store may become a reality in the next several years. Among them is Hointer, a Seattle-based company founded by Nadia Shouraboura, former head of supply chain and fulfillment technologies at Amazon.

Once shoppers in the company's Seattle store download the Hointer app, they can scan an item's QR code, tap the size they want, hit the "try on" button and are immediately assigned a fitting room. Within 30 seconds the item is delivered to the fitting room via a robotic cable system. Merchandise can be sent back the same way or paid for on the spot.

When it comes to customer-facing robotics, Lowe's has OSHbot. Currently in use at selected stores, OSHbot communicates with customers via touchscreen menu. Customers use it to find the item they want and then follow the robot to the shelf where the item is located. Built by Fellow Robots, it also has LCDs on its back for advertising and can understand and speak both English and Spanish.

IN THE JOB MARKET

As research in robotics continues, workers have become increasingly concerned about losing their jobs to robotics or automation. One study done in Australia has predicted that nearly 40 percent of that country's jobs have a "moderate to high" likelihood of being eliminated over the next decade or so.

Along these lines, the McKinsey Global Institute has estimated that two-fifths of U.S. employees are in occupations where half their time is spent doing tasks that could be automated. This includes retail sales, cashiers and food preparation and serving.

This was underscored by a research report from the Bank of America Merrill Lynch, which found that up to half of retail jobs could be replaced in 20 years by robots or computerization. Many would be some of the lowest-paying jobs in the industry, including salespersons and cashiers.

The Fung Center also approached the labor issue, noting in a report that many future jobs will be for qualified personnel to oversee robotics in factories and other industries.

"Those jobs need skills — but not necessarily the ones taught at the prestigious engineering universities," the report said. "A variety of programs are now underway to create community college degree programs and training to develop the new crop of workers skilled at overseeing robotic machinery and the maintenance of those machines. These two-year degree programs will provide well-trained workers for these critical, well-paying jobs." **STORES**

Len Lewis is a veteran journalist and author covering the retail industry in the U.S., Canada, Europe and South America.