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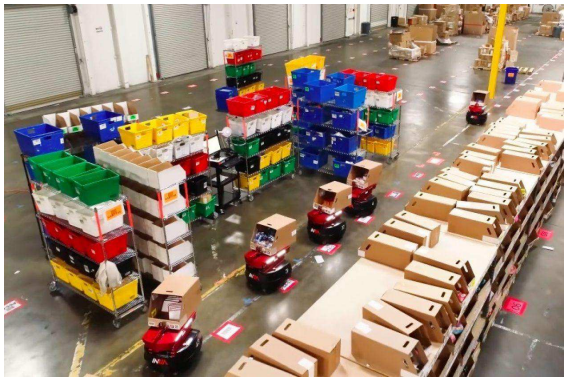
Warehouses Test a New Breed of AI Robots

XPO Logistics, Rakuten are among companies rolling out automation to boost productivity, increasing human-machine collaboration



Robots from inVia operate inside a warehouse owned by Hollar, an online dollar store. PHOTO: INVIA ROBOTICS

By Jennifer Smith

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Machine learning is creating a new era of automation in warehouses as more operators test artificial-intelligence-powered robots to help speed up e-commerce orders.

Logistics providers and retailers are using mobile robots to cut down on the number of steps workers take and are deploying AI-aided mechanical arms for more nuanced tasks long deemed possible only for human hands, from sorting apparel to learning how to pick up a range of objects.

XPO Logistics Inc. is rolling out 5,000 AI-equipped robots that bring shelves full of products to workers. Rakuten Super Logistics, a division of Japanese online retailer Rakuten Inc., is deploying robots to retrieve bins filled with apparel, electronics and other products from shelves and deliver them to workers who pick individual items. Gap Inc. is using AI-aided mechanical arms to help sort clothing orders.

The software controlling such warehouse robots analyzes data in real time and, in some cases, builds on experience to decide the best order for picking a series of items or where to store goods based on demand.

Logistics providers and warehouse operators testing these new technologies say they can boost productivity and improve the accuracy of automation such as mechanical arms. Machine learning also is teaching autonomous mobile robots to map out warehouse environments and adapt to changes in layout or inventory location.

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Some automation, such as so-called collaborative robots designed to work alongside humans, also is touted as an efficient way for warehouse operators to manage seasonal labor demands.

Still, most warehouse operators rely largely on human labor with workers pulling carts through aisles or driving forklifts. But more logistics providers are looking at AI as they strive to keep up with blistering online sales growth and customers who expect delivery within two days or less.

The broader market for warehouse and logistics automation, roughly at $46 billion now, is expected to surpass $75 billion by 2022, said Jeremie Capron, head of research at ROBO Global, a research and investment advisory firm.

“The big efficiencies come from machine learning,” Bradley Jacobs, XPO’s chief executive, said in an interview last year when the company announced it was deploying AI-equipped robots from Singapore-based robotics company GreyOrange Ltd. across its North American operations. “The robots do their job automatically without supervision and roll up to the charging station before they run out of juice.”

The autonomous robots resemble Roomba vacuums that move storage racks loaded with products around the warehouse. The units deliver goods to stationary picking stations where workers can fulfill up to 48 orders at one time, the companies said.

Even though the robots are being phased in still, they have produced a fourfold increase in productivity where they are in use, said Mario Harik, chief information officer for XPO, whose clients include IKEA and Industria de Diseño Textil SA’s fast-fashion retailer Zara.

It typically takes a couple of months to ramp up a location, in part because the warehouse must be reconfigured to accommodate the system.

“We’ve made great progress, especially in retail and e-commerce,” Mr. Harik said.

Robotics companies also are pitching collaborative robots, or “cobots,” as a flexible way of handling surges in volume, instead of investing in more costly permanent infrastructure.

XPO, for instance, uses such robots to guide workers through warehouse aisles, lighting up when they reach the next item to pick.

Rakuten Super Logistics, which fulfills e-commerce orders at a network of U.S. warehouses, is testing “cobots” and said they can help handle increases in volume without adding temporary staff, said Mary Marriott, the company’s vice president of operations.

The company began using 40 autonomous mobile robots at its Las Vegas facility before the holiday rush. “We’re probably picking 50% to 70% more orders in the same time frame than if we just did the human pick,” she said.

These collaborative robots from Los Angeles-based inVia Robotics Inc. also reduce the amount of walking human workers do in the warehouse. A computer screen mounted on the pickup station displays the inVia user interface, which is integrated with the company’s warehouse management system. Instead of workers pulling their carts from location to location as they pick items, goods stored in robotic locations in the warehouse come to the workers.

“In beta testing we told the workers the robots are there to support you and help you do your job more efficiently,” Ms. Marriott said. “The team members took it in stride and really embraced having the robots in that facility, especially when they saw it made their job easier.”

Robotic picking is also gaining traction, particularly in industrial settings. Startups have developed pliable grippers with squishy fingers that use AI to pick up fragile objects such as tomatoes and the pillowy marshmallow treats known as Peeps.

But e-commerce remains more challenging because of the vast range of objects the machines must be trained to lift and grip. Last month, RightHand Robotics Inc. raised $23 million in funding for its mechanical-picking technology, which incorporates artificial intelligence and cameras that perceive depth and color with a robotic arm that uses a polymer gripper with a suction cup to pick up objects.

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