

The Robot That Can Pick Almost Anything, Except Your Whole Shopping Order

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A modern warehouse can find a product, move it across the building, and bring it to the right station almost entirely on its own. Yet when the product finally arrives and needs to be picked up and placed into an order, a person often still has to step in. Why is this final, small movement so difficult to automate?

Picture an online order of your clothing. Software has already done the clever part. Shelves glide to a picking station, the right products arrive in the right order, and travel time, the old enemy of warehouses, has mostly been engineered away. This is called a goods-to-person system, and it works beautifully. Then the order reaches its very last step, where a single item has to be grasped and dropped into your tote, and almost everywhere in the world, a human hand is the one that does it.

That gap is what we set out to understand. At first, it looked like an obvious next move. If goods already travel to a person, why not send them to a robot instead? But the closer we looked, the clearer it became that this final step is not the easy leftover of automation. It is a hard piece of the puzzle.

Picking hides an enormous amount of quiet human skill. You recognize an object, judge how to orient a case from wireless headphones versus a simple bag of rice, notice dented packaging, catch something before it slips, and tuck it into a box so nothing gets crushed. For a person, this is effortless. For a robot, mimicking those tiny decisions becomes a separate problem of cameras, software, and grippers.

We interviewed fourteen people who build, study, or use these robots, and combined what they told us with existing research. One pattern stood out. The robotic arm itself is no longer the problem. The difficulty lives in the “brain”: the vision that makes sense of a cluttered bin, and the judgment needed when something unexpected happens.

Our favorite finding even has a name now: the order blind spot. A robot might handle 70 to 80 percent of the products in a shop. That sounds like success, until you remember that real orders are mixtures. If just one awkward item lands in a basket of ten, a person has to finish the whole order by hand. So a robot that picks most products can still complete far fewer full orders. The real question is not “can it pick this thing?” but “can it finish a real customer’s basket?”

There is a twist in what happens to the people. The robots do not make workers vanish. They change jobs. Instead of grabbing items by hand all day, a worker now watches over several machines, steps in when one gets stuck, swaps a worn suction cup, and keeps everything flowing. One person compared it to herding sheep. We came to call this role a system steward: less manual labor, more keeping the automated picture running.

So are warehouses about to go human-free? Our answer is a clear no, and also not so fast in the other direction. This technology is neither magic nor mere hype. It works well in the right place: a busy warehouse, suitable products, costly or scarce labor, and machines already humming in the background. In the wrong place, a human hand is still cheaper, faster, and more flexible. To capture this, we built a simple guide to help a company decide whether to scale up, run a trial, redesign first, or just wait and watch.

The last movement in the warehouse, the one that looks too small to matter, turns out to be where the real game is being played.

This popular scientific article is derived from the master’s thesis: *Goods-to-Person or Goods-to-Robots? The Emergence of Robotic Pick-and-Place Technology in Automated Retail Warehouses*, written by Akhil N Babu and Guyon De Abreu (2026).