

## Case Study: Neocortex Pallet Sorter

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In today's age of shipping and distribution, there is one commonality across almost every DC: pallets. They are involved in virtually every industry, from frozen pizza to car parts. Due to a large volume of incoming and outgoing pallets, companies often turn to third-party suppliers to handle their pallet needs. These companies specialize in providing other businesses with pallet-handling services. They facilitate the arrival and retrieval of pallets to locations based on demand. Then after use, the empty pallets are retrieved and brought to a processing facility. Upon arrival, mixed pallet stacks will vary in type and quality, so they must sort the pallets and decide which need to be recirculated, repaired, or dismantled. The good ones are stacked and returned to circulation for the next customer, while the others go to their respective areas (repair, recycle, etc.). This facility must quickly move pallets in and out because the longer they are idle, the less money they can make. Moreover, since most stacks come in mixed, the facility needs to be able to sort them quickly for return to distribution.

### The Problem

In one of these facilities for a nationwide pallet-handling company, they ran into problems with sorting. Formerly there was limited infrastructure in place for sorting pallets. So, individual forklift drivers handled sorting. Traditionally to maintain throughput, they would have dedicated a team of approximately four workers per shift solely to sorting. Previously these operators gathered heterogeneous stacks of pallets, staged them, and slowly restacked them by type. This solution may be appropriate on a small scale; however, scaling this requires significant demand for space and labor. For example, if one worker can only process 75 pallets per hour, and the facility generates hundreds of pallets an hour, this creates a considerable backlog ahead of the sorter. Because of this, the facility will employ as many workers as is necessary to correspond with throughput.

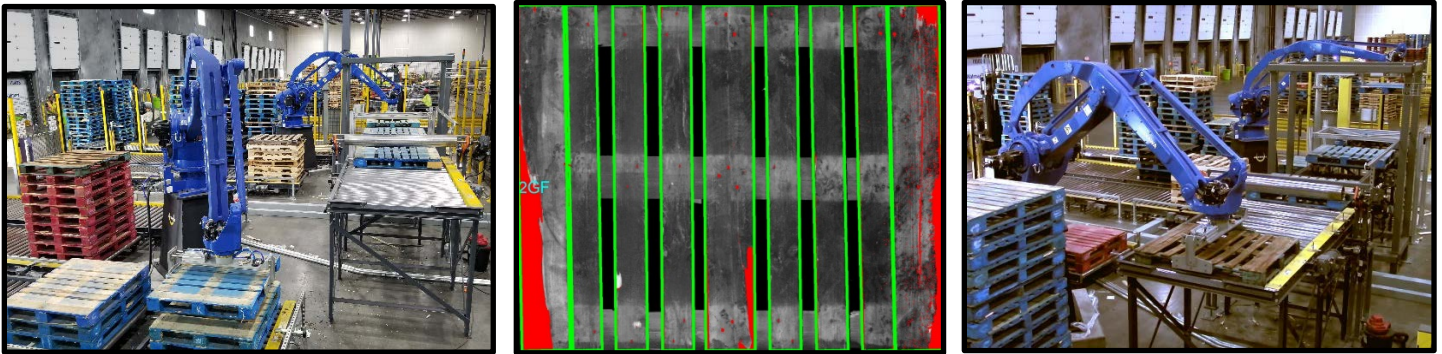
With workers trying to maintain overall output, secondary tasks like inspection become overlooked. Meaning assessment by getting out of the forklift and looking at each pallet is infeasible. Due to this, the inspection often doesn't happen. Continued negligence creates a significant problem in recirculating broken and unusable pallets. While some apparent issues, such as missing and split runners, may be noticed, others will pass right through. In this setup, there is no reliable pallet inspection because the only eyes on the pallet come atop the forklift. As a result, damaged pallets are recirculated and cause various problems, including poor stack stability, impaired structural integrity, and creating debris that could raise safety concerns later on.

### The Solution

To combat these inefficiencies, this facility installed the Neocortex Pallet Sorter with Inspection - a two-robot automated pallet sorting system. This system unstacks mixed pallets, inspects them, and sorts them by type and quality. Afterward, an operator will remove the stacks and place them into outbound trucks for recirculation. Using sensors and AI vision, the sorter can make all the decisions an operator would while providing greater accuracy.



Inbound stacks travel down the conveyor to the first robot pick zone. This robot then uses sensors to check for type and any debris (slip sheets, plastic wrap). Depending on this information, the pallet is brought to an inspection system or bypassed directly to outbound stacking. If sent for inspection, the conveyor will then carry it through a brush to clean off the lingering dirt and debris and pass it through two high-resolution inspection sensors, capturing images of the top and bottom of the pallet. Universal's proprietary AI software, Neocortex, assesses and locates defects and determine the appropriate outbound stack. Pallets with protruding nails pass under a nail roller, pressing them flat. Subsequently, a second robot picks the pallets from the inspection line and stacks them on one of four outbound conveyors. Once these homogenous stacks reach trailer height, they are released for a forklift operator to load them into the trailers.



With the Neocortex Pallet Sorter, a single operator runs the cell and manages the forklift infeed and outfeed. This one worker exceeds the throughput of manual sorting while providing higher accuracy and generating real-time data metric reporting. Additionally, this system requires less dedicated floor space and improves overall quality. The automation drastically reduces the cost of labor and allows the facility to reallocate multiple workers across several shifts. Neocortex can sort with greater than 97% percent accuracy and handle the same throughput as four full-time workers. The system provides an eight-month return on investment, all while being a fixture in the facility for years to come.

If you have pallet sorting or inspection needs, contact [sales@universallogic.com](mailto:sales@universallogic.com) or call 615-366-7281.