

Robot Advancements Drive **Efficiency,** **Productivity** in Protein Processing

White Paper



As advanced automation technologies break down barriers, food manufacturers reap the benefits.

Dealing With Delicate Product

Food manufacturers have weathered unprecedented challenges over the past two years, exacerbated in large part by the COVID-19 pandemic. Production disruptions from lockdown mandates early in the pandemic soon gave way to labor shortages and supply chain issues that still linger today.

Recent data from the U.S. Bureau of Labor Statistics (BLS) indicates that things may be turning around: in February 2022, employment at food manufacturing facilities increased by 7,200 workers, marking the third straight month of employment gains in the segment. Despite the cautiously optimistic employment figures, persistent challenges remain across the food manufacturing landscape.



A Tough Environment

One of the biggest challenges in food processing is the nature of the work itself. It can be tedious and repetitive in environments subject to extreme heat or cold. At a time when workers are increasingly focused on work/life balance, working conditions become a critical factor in employee satisfaction. As a result, attracting, training, and retaining talent has become difficult. Wage increases and bonuses can help, but there is a limit to how much of an increase in operational expenses a food manufacturing business can tolerate while sustaining healthy production margins for overall growth.

Occupational health and safety are other concerns. According to BLS, more than 21,000 workers sustained injuries or illnesses in the food processing industry in 2020. Many of them were attributed to overexertion (lifting, lowering, and microtasks), slips and falls, and unintended contact with equipment. Compounding this is the fact that employees must often work near one another, limiting the ability to physically distance and prevent the spread of COVID-19. This has been an issue at meat-packing plants, where coronavirus infections were high during the first year of the pandemic. According to a Reuters report, data from the five biggest meatpackers in the U.S. published in October 2021 showed 59,000 cases of COVID-19 and 269 deaths among their workers between March 2020 and February 1, 2021 — figures that were about three times higher than previously thought.

Innovations in efficiency are **fundamental** to solving challenges



Robot Reliance

Innovations in efficiency are fundamental to solving the many challenges facing food processors, creating an exciting and fertile landscape for automation technologies to bridge the gap between labor shortages and production demands. A recent report by the Association for Advancing Automation (A3) relates that North America saw record sales of robots in 2021, up 28% over 2020. In food and consumer goods specifically, robot sales were up 29% in 2021 compared to the previous year.

“More industries recognized that robotics could help reverse productivity declines and fill repetitive jobs human workers don’t want,” said Jeff Burnstein, president of A3, in a press release. “It is no longer a choice whether to deploy robots and automation. It’s now an absolute imperative.”



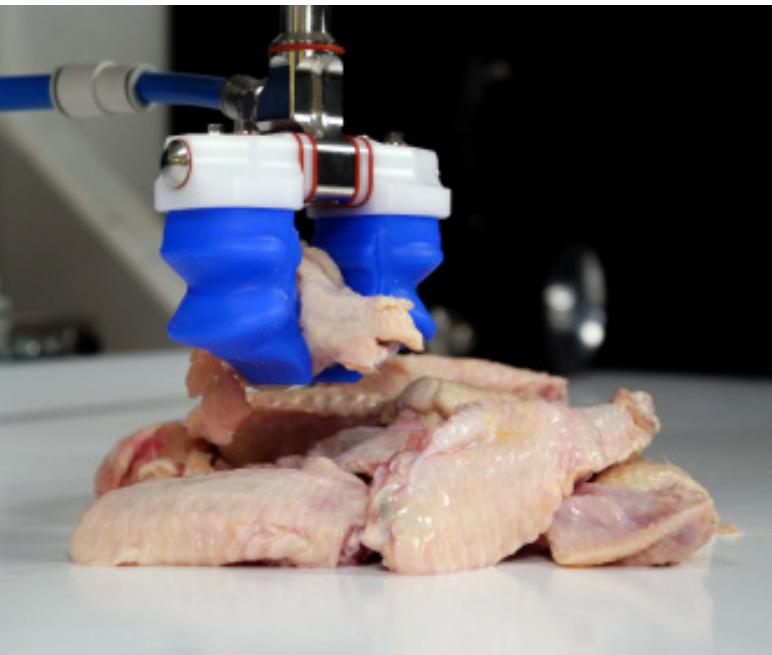
Protein Problems

Historically, such tasks have been performed by humans, but owing to advancements in technologies such as machine vision and artificial intelligence (AI), as well as soft grippers specifically designed to handle proteins, robots are helping to automate repetitive, labor-intensive tasks that previously could only be completed manually.

Implementing robotics in food processing industries is not without its challenges. For example, in picking and sorting operations, delicate or fragile foods of varying sizes and colors must be recognized, analyzed for defects, and handled carefully to avoid breakage, bruising, or scarring.

Automation in protein handling operations is particularly challenging. In plants where raw beef, pork, or poultry are processed, cut, sorted, and packaged, stringent food safety standards must be observed. For example, grippers coming into contact with proteins must be sanitary and easily cleaned. The varying sizes and shapes of cuts of meat can present other challenges. These unsymmetrical and often slippery items are difficult for traditional robots to grab and place.

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According to Boston Consulting Group (BCG), several leading protein producers have made significant moves to automate operations. Tyson Foods invested \$215 million from 2014 through 2019 to create an innovation center for the use of advanced technology in processing red meat and poultry. JBS invested \$100 million to acquire automation and engineering companies to facilitate implementation of automation systems in its lamb production facility and expects to automate the production of pork and beef in the next few years. Smithfield Foods noted in its 2019 Sustainability Report that it will invest tens of millions of dollars in robotics to automate production processes in its facilities.

Getting a Grip

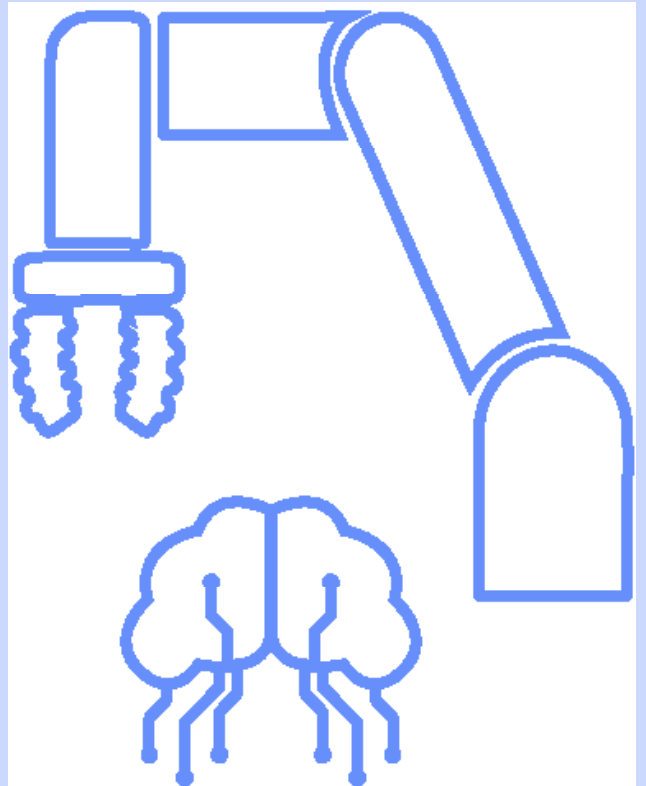


When it comes to designing, specifying, and implementing a vision-guided robot system for a food environment, ensuring that a robot's grippers will not damage or destroy products is among the many important considerations. Recent developments in gripping technology have resulted in soft, food-grade grippers that enable robots to pick up disparate products safely and efficiently.

Paired with a pick-and-place automation system, soft grippers can safely and accurately place a variety of raw protein products into thermoformers at a high rate of speed. Even items with an irregular shape or size, such as raw chicken, can be reliably gripped without having to change or adapt variables of the automation system.

Some soft grippers have an IP69K ingress protection (IP) rating from the International Electrotechnical Commission (IEC). Protected against dust, high temperatures, and high-pressure cleaning solutions, the grippers are safe for use in food processing, where equipment must be carefully and rigorously sanitized.

But soft grippers alone cannot handle the complex bulk processing tasks typically performed manually in the protein industry. Like all other robotic systems, so-called blind robots can effectively perform repetitive functions, where everything in a robotic cell is calibrated and in a fixed position. Adding 3D vision to the system gives a robot "eyes," allowing it to guide the grippers to make pick-and-place movements. Taking it even further, the addition of AI software allows the robot to make unstructured picks without relying on 3D models of the protein, which would slow down the process.





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Looking Ahead

Obstacles to the widespread use of robotics in the food processing and protein industries remain, however. These include high investment costs and the need for a skilled workforce to operate automation systems. But with the cost savings that robots offer, estimated by Technavio to reach 22% by 2025, combined with their ability to work continuously with little error and no supervision, automation in food processing sectors is poised to increase efficiencies to meet production goals while addressing post-COVID-era labor shortages. Turnkey robot systems designed specifically for handling delicate objects such as proteins and other food items can reduce waste, provide cost consistency, and help put high-quality food products into the hands of customers.



For more information about the soft gripper, 3D vision, and AI technologies discussed in this article or to schedule a demonstration of how these systems can improve your protein automation processes, please visit www.softroboticsinc.com.

