



IFFA 2025: AI, robotics and sensor technology are raising the industry to new heights

Frankfurt am Main, 30 January 2025. The meat and protein processing industry is facing major challenges. Pressure on prices, a wide range of products and the ongoing shortage of skilled labour call for efficient working practices if the industry is to remain competitive globally. Increasing automation and innovative technologies such as artificial intelligence and robotics represent potential solutions: they can boost productivity and cut operating costs. Under the motto 'Maximum Performance', the world's leading trade fair for the meat and protein processing industry, IFFA - Technology for Meat and Alternative Proteins, will show what is already possible and demonstrate the course the industry needs to take in the future.

Automation is the name of the game in many branches of industry: it not only improves the performance of machines and systems but also helps avoid production interruptions and save energy and materials. In the food industry, for example, automatic product control and traceability is virtually mandatory to ensure a consistently high level of quality and meet strict legal requirements. It is also an ideal tool for tackling challenges such as rising costs and the shortage of skilled labour.

Process automation in the meat and protein industry ranges from raw material preparation with mixing and grinding, via processing with portioning, filling and moulding, as well as thermal processes such as cooking and cooling, to automatic packaging and intelligent logistics. In many cases, however, the various process stages and production lines are not networked with each other, meaning that data exchange is impossible and cannot be used to optimise the various processes. Fortunately, there is a remedy because web-based process control systems such as MES and ERP often consist of modular software systems that can be retrofitted to existing installations. Thus, the advantages of a fully networked smart factory are not just the preserve of new production facilities.

The foundation of many automatic processes is real-time data collection and analysis. Modern sensors supply precise information regarding temperature, humidity, weight and pressure. For example, temperature and humidity sensors in cold stores are used to prevent the temperature rising and thus avoid the risk of contamination. Weight sensors check the weight of each individual meat product and ensure that the packaging is in line with specifications. This not only reduces the amount of material used but also minimises waste and the return rate. Another example is sensors for monitoring the gas composition in packaging, which ensures the desired conditions are maintained at all times.

AI speeds up and improves processing

In common with many other industries, the introduction of artificial intelligence (AI) is also transforming the meat and protein industry and taking it to a new level by enabling machines not only to collect data from the various stages of production but also to analyse and deduce potential improvements from it. In the event of disruptions in the production process, AI can identify cause-and-effect relationships and thus rectify problems without stopping the production process or prevent them occurring in the future. This not only boosts efficiency but also means higher levels of certainty for both consumers and companies.

Industrial image recognition and processing is also based on AI models that have been trained for the application in question. For example, it is used to sort meat products in accordance with specific criteria, such as size, shape and structure. This reduces the employee's workload at the same time as increasing precision. If used to identify quality criteria, such as grain or fat content, it can significantly increase the selling price of individual items. AI-aided image processing systems are also employed in quality assurance. Using historical image data, they are trained to inspect the entire production process in real time and detect any irregularities such as colour anomalies, foreign objects or defective packaging.

Predictive maintenance is another area of application. AI-aided systems monitor machine status and predict downtimes so that maintenance work is only carried out when required. According to a McKinsey study, predictive maintenance in the food industry can reduce maintenance costs by as much as 30 percent and increase plant utilisation by 20 percent.

Machine learning lifts robotics to a new level of development

Today, industrial robots are an established feature in the food industry, especially in larger companies. Operating around the clock, they can bring about considerable gains in efficiency and productivity. However, the dividing line between conventional machines and those with integrated robot technology is not clear cut. It can be said, however, that industrial robots are mainly used to perform repetitive tasks, such as those typically found in the meat processing industry, for example cutting, portioning, packing, wrapping, sorting, picking and placing.

AI is also taking robotics to a new level of development. Generative AI can use machine learning to adapt independently to new circumstances and situations, thus enabling industrial robots to act more autonomously and agilely. A good example of this is autonomous mobile robots (AMR). Equipped with cameras and sensors, they can independently assess and analyse their surroundings. For instance, they look for new paths when obstacles block the planned route and act independently in abnormal situations. Accordingly, they are perfect helpers in unstructured production settings, as well as in warehouses or logistics centres where packaging and palletising are involved. Despite the multitude of items in such distribution centres, AI-aided industrial robots can select and retrieve the right articles, reject faulty or deformed ones and also detect packaging formats and weights. Such robots achieve pick rates of 750 to 1,400 items per hour and can, for example, pack up to 200 meat products per minute – a significant increase in productivity compared to manual processes. Robots are also superior to their human colleagues in terms of precision, e.g., they can cut meat faster and more precisely at a very specific cutting angle, as well as portion by weight and ideal shape, which not only speeds up the production rate but also minimises raw-material waste.

Multifunctional robotic work cells hold out the promise of an enormous increase in flexibility and are set to replace traditional line production in the meat industry, too. For example, using AI, the robotic work cell can independently process pork sides in a series of operations, which are carried out all at once instead of a series of small operations. Thus, different products can be processed in parallel, enabling an optimum product mix without the restrictions of line production. At the same time, the robotic work cells form autonomous networks with the AMRs, which react independently when faced with changing requirements.



Thanks to AI, industrial robots can operate with greater autonomy and agility. Source: Messe Frankfurt

AI, robotics and sensor technology boost performance and accelerate the pace of change

The meat and protein processing industry is on the cusp of radical change, driven by the use of new technologies such as AI, robotics and sensor technology. These technologies are not only an opportunity to automate processes and increase efficiency but also to enhance product quality and sustainability. Companies that integrate these technologies at an early stage are well prepared to ensure their competitiveness on the global market and meet the increasing challenges of tomorrow's world.

IFFA - Technology for Meat and Alternative Proteins - presents the latest technological developments in Frankfurt am Main from 3 to 8 May 2025. Further information at: www.iffa.com

With four trade fairs on three continents, Messe Frankfurt is flanking the process of dynamic growth in the food industry, which meets at the company's events in Argentina, Thailand, the USA and Germany. Further information at: www.food-technologies.messefrankfurt.com.

IFFA
Technology for Meat and Alternative Proteins

The next IFFA will be held from 3 to 8 May 2025.

Information and photographs for the press:

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