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IFFA 2025: Increasing data-based added value via innovative technologies

Frankfurt am Main, 13 March 2025. Data is a valuable asset for the meat-processing industry, too. By collecting and analysing data, companies can not only optimise production processes but also identify problems at an early stage, thus enabling them to react flexibly to market fluctuations and changing customer preferences. IFFA – Technology for Meat and Alternative Proteins – the world's leading trade fair for the sector, showcases the technologies that can be used for this under the top theme of 'Creating value from data.'

Data is collected at practically all stages along the process chain. In slaughtering and cutting, sensors and high-resolution camera systems monitor the process by analysing weight, meat quality and hygienic parameters. When it comes to processing and packaging, measuring instruments record parameters such as temperature and humidity to ensure product quality and recognise irregularities at an early stage. In storage and logistics, temperature and humidity sensors are used to ensure optimum storage conditions and prevent perishable products from spoiling. And in sales, intelligent algorithms analyse sales data to gain insights into future demand and customer preferences, as well as to manage restocking routes and supply chains accordingly.

Many forms of value creation

Klaus Schröter, Chairman of the VDMA Meat and Protein Processing, Technology Division, believes that the use of data adds value in many ways: “By collecting data in real time, purchasing, production and sales processes can be optimised. Sensory solutions help to make production and cleaning processes less harsh and more efficient. Moreover, key indicators of plant availability can be used, for example to avoid and predict unplanned downtime. Data can also be used to simulate process sequences. Therefore, they are also an important tool for preparing and making investments, to ensure a certain degree of investment security."

Creating value from data is a top theme in the production process.
Source: Messe Frankfurt

Control systems and modules

Several manufacturers offer central command units designed to control and optimise the entire production process. For example, such control units interconnect filling and portioning lines and analyse production, storage and sales data. Machine data, such as output, throughput, quality, capacity utilisation and downtimes, are centrally recorded via standardised Ethernet connections. Current key production figures can be accessed in real time and provide a rapid overview of the value added of the individual lines.

In addition to complete solutions, machine control modules are used in individual stages of production. For example, the performance of high-precision tools can be improved through data collection, e.g., machine and production data on slicer blade sharpness and wear. Such data also permits conclusions to be drawn as to whether a particular type of blade is suitable for the product. Another example is intelligent portion cutters, which utilise modern image processing systems to ensure precise cutting and even portioning in terms of shape, size and weight.

Butchers also profit

Data is used not only in industrial production but also in smaller artisan businesses to automate processes and thus, as a side effect, alleviate staff shortages. For example, butchers can even automatically mix complicated multi-stage recipes in the cutter. Each batch is prepared on the basis of stored recipe data and processed in accordance with predefined parameters. Tracking ingredient consumption facilitates long-term material procurement. All the data collected and information about the various functions are transferred automatically to downstream merchandise management and accounting systems. This standardised process not only ensures a consistent product quality but also simplifies administrative and documentation procedures.

AI as a data booster

In common with many industrial sectors, artificial intelligence (AI) is also growing in importance for the meat-processing sector. Only AI can fully exploit the potential of data by identifying patterns of action and causal relationships when analysing the data. AI can also be trained for specific applications, such as cutting up sides of pork to optimise the cutting process. “The use of AI is a major trend in our sector,” says Klaus Schröter. AI is

also set to become more widespread in the trade, even if there are still obstacles to overcome, as Herbert Dohrmann, President of the German Butchers' Association, acknowledges: “Integrating AI into artisan businesses is still a challenge at present because nine out of ten of them have different structures and business models.”

When it comes to quality assurance, particularly on the packaging side, AI-aided image processing systems are used to detect irregularities, such as colour deviations, foreign objects or faulty packaging. Inline inspection systems with self-learning cameras automatically reject defective packaging. These systems can also visualise more complex causes of defects. For example, they can detect melted ham fat that has a similar colour to the packaging tray.

Predictive maintenance is another field in which AI is used. AI-aided systems monitor the condition of machines and predict downtimes. Any maintenance work required is carried out during the ongoing process, which prevents downtime and breakdowns. Last but not least, AI-aided systems are virtually indispensable for preventing and detecting cyberattacks on modern, fully networked smart factories. They analyse network traffic in real time and identify suspicious activities that could indicate an attack.

Data usage on the packaging side

In the packaging sector, material and process data is used to develop alternative packaging materials, especially by combining biopolymers, fibre-based materials or mono-materials with suitable barriers. For example, scientists at the Fraunhofer Institute for Process Engineering and Packaging, IVV, use data, such as the concentration of carbon dioxide in the packaging, to simulate the shelf life of food. Using shelf-life simulations, scientists can predict which technical properties packaging must have for a product to retain its flavour. The packaging with the corresponding materials is produced in the IVV's own technical centre. Recyclable polymers are used to create multi-layer sheeting that offers the same protection against oxygen penetration as conventional materials. AI is also used to suggest the best possible packaging designs for a particular product while minimising the amount of material required, taking into account factors such as shelf life, the eco-balance of the packaging, the use of recyclates and consumer acceptance.

IFFA – Technology for Meat and Alternative Proteins – presents state-of-the-art technology in Frankfurt am Main from 3 to 8 May 2025. Further details at www.iffa.com.

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