

Examples of artificial intelligence in slaughterhouses to improve animal welfare

It may be helpful for Competent Authorities (CAs) and inspectors to get an impression of the possibilities to monitor animal-related measures in slaughterhouses through the application of sensor technology and artificial intelligence (AI). Sensor technology cannot yet replace a human during the meat inspection, but it has potential to play an important role in the future. Currently it can already add value to the inspections and provide better insight into animal welfare issues than by human inspections alone (Voogt et al., 2023).

This document provides several examples of digital technology systems to improve animal welfare. Disclaimer: EURCAW-Pigs has not tested or evaluated any of these systems. Therefore, EURCAW-Pigs is not able to give certain recommendation for any of these systems. The order in which the systems are presented does not reflect a ranking of the systems. Although EURCAW-Pigs supports the general principle of using digital technology to improve animal welfare, reference to a particular product or company should not be taken as an endorsement or recommendation by EURCAW-Pigs to use that particular product.

More information can be accessed via the links given below. Anyone wishing to obtain more information about the technology should contact the person listed.

Genba Solutions GmbH - AUSTRIA

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Website: [Animal Welfare Monitoring Systems - Tierschutz- Monitoringsysteme für Schlachtbetriebe \(genbasolutions.com\)](https://www.genbasolutions.com/en/animal-welfare-monitoring-systems-tierschutz-monitoringsysteme-fuer-schlachtbetriebe)

Short description: The sensors and cameras of this technique are developed to automatically check animal welfare in slaughterhouses in accordance with Regulation EC 1099/2009 and the requirements of bsi-Schwarzenbek. The checklist app intends to support daily inspection tasks and to enable the organized correction of deficits This system promises transparency and a well-founded database, which is a prerequisite for high process capability in dealing with animals.



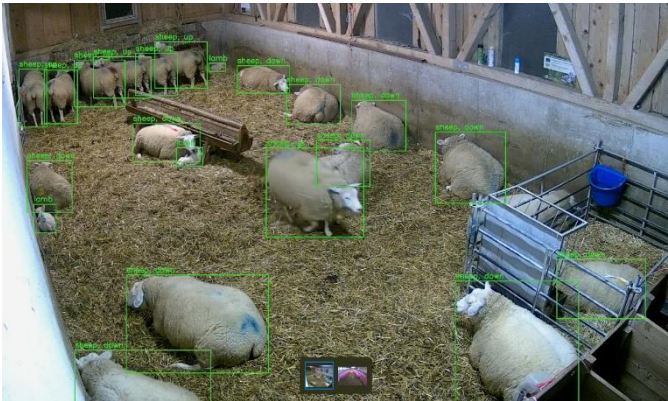
Monitoring of stunning (©GenbaSolutions)

Neurinos GmbH

Contact: Alexander Vandeweyer, Dr. Denise Vandeweyer

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Website: neurinos.com



Recognition of sheep in the barn (©Neurinos)

Short description: Neurinos is leveraging AI technology to transform animal husbandry. Their system is also developed e.g. to optimize slaughter processes for sheep, cattle, and pigs. Neurinos aims to reduce costs and enhance animal welfare throughout the entire production chain. With an app-based user interface for farmers and butchers, Neurinos promises to make animal farming smarter and more compassionate.

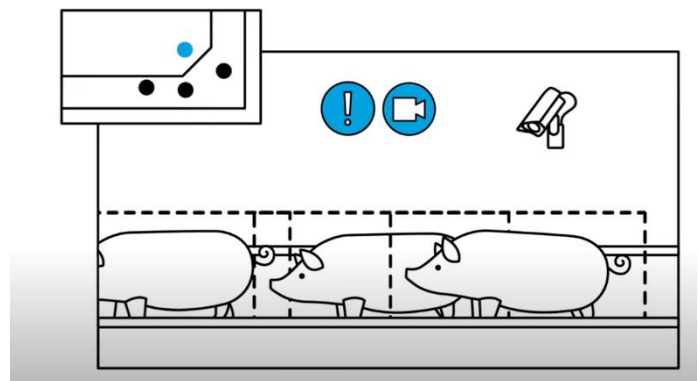
AI4Animals (Deloitte)

Contact: Carlos Morales

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Website: [AI4Animals | Deloitte Netherlands](https://www.deloitte.nl/ai4animals)

Short description: AI4A (Artificial Intelligence for Animals) is a newly developed video software which uses AI to monitor the handling of animals, the movement of persons, animals and objects and their interaction. Video sequences that potentially contain handling contrary to animal welfare are automatically selected by the AI4A algorithm and presented to the official veterinary inspector or person in charge to be reviewed. Subsequently corrective measure can be taken according to the evaluation by the responsible employee.



Intelligent video software at slaughter
(©Eyes on Animals)

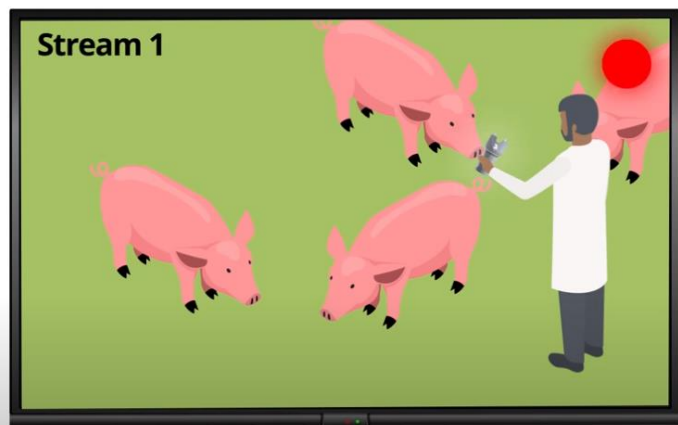
Argus Computer Vision (SAAS)

Contact: Niels Ilmer
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Website: Argus

Short description: Argus combines video content analysis and sensory readings and has been developed to give real-time support to animal welfare officers in slaughterhouses, to optimize CCTV review and to produce valuable key performance indicators (KPIs). Numerous AI powered analyses monitor the process looking for risk indicators in movement of animals, equipment usage, interaction between people and animals, absence of consciousness after stunning, and others.

Results of these analyses may be used to alert supervisors in real-time, to highlight situations for review after production and to provide insight into performance trends to management.

Camera surveillance on farm (©Argus)

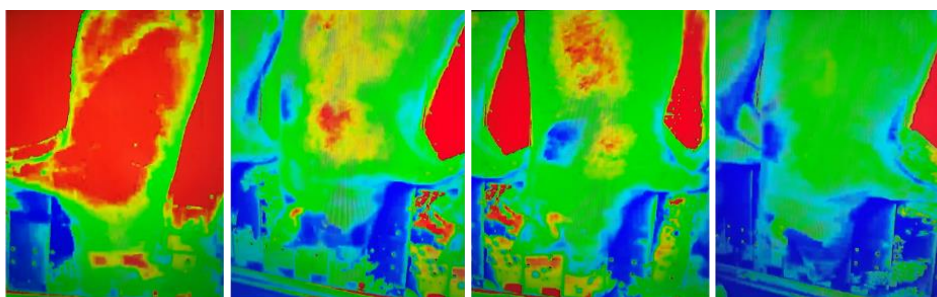


FX-1000 VSA®

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Short description: FX-1000 VSA has been developed to monitor the bleeding of a slaughtered animal in real time using camera and sensor-based technology with a capacity of up to 10,000 animals per hour. FX-1000 VSA is copyright and patent protected. The VSA® technology is designed to detect "vital signs" (including heart activity, spontaneous blinking of eyes, vascular circulation, lifting the head) of the respective slaughter animal in real time and to display them to the staff on a screen. For example, the system is recognising eyelid closure in pigs as a possible sign of insufficient stunning, transmit this to the monitor of the relevant staff and is displaying an indication of the need to re-stun that pig. This technology, including artificial intelligence that can filter the information and send warning signals, is currently being validated. The illustration shows

the progressive bleeding out and decline in vital signs (e.g. heart activity) of an animal.



Monitoring of bleeding at slaughter (©FX-systems)

Reference

Voogt, A. M., Schrijver, R. S., Temürhan, M., Bongers, J. H., & Sijm, D. T. H. M. (2023). Opportunities for Regulatory Authorities to Assess Animal-Based Measures at the Slaughterhouse Using Sensor Technology and Artificial Intelligence: A Review. *Animals*, 13(19), 3028 <https://doi.org/10.3390/ani13193028>