

AI enhanced Precision Livestock Farming (PLF) is the next step in farm animal management for optimal productivity and animal welfare

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Consumers, worldwide, are calling for better farm animal welfare and sustainable livestock production, and there has been an enduring change in consumer attitudes and values with respect to animals in general. A change in ethical values can have a significant impact on the consumption of animal products, which is currently reflected in the increasing proportion of ethically motivated flexitarians, vegetarians, and vegans. The schism is that at the same time there is a need for sustainable ways to feed a steadily growing population that with increasing wealth is demanding high quality animal protein in the diet. Meat from pigs and poultry can be produced with substantially less greenhouse gas emissions than meat from ruminants, and therefore have the potential to be part of the solution.

To meet the growing ethical requirements and at the same time promoting high – or even increasing - productivity, PLF technology is an excellent tool. PLF is the use of technology to automatically monitor production animals. It collects precise data on productivity and welfare parameters thereby assisting farmers in management decisions such as how to set an optimal climate, choose the right feeding strategy and initiate treatment or interventions. With PLF, we can actively minimize the distance between the animals Istwert (the animals present state) and Solwert (what the animal want/need) (Wiepkema, 1987) in an environment, where the individual animal is left with very few possibilities to by itself respond and change its present state.

PLF is useful in both poultry and pig production. In both types of production, animals are currently being monitored by manual inspection and by using resource-based indicators such as feed and water usage. It is a difficult task, because poultry and pig production are characterized by large farms with a limited number of employees responsible for managing many animals. Manual monitoring is time consuming and relies on very experienced staff. On the other hand, more advanced PLF systems based on automated AI analysis of audio- and vision data to continuously collect information on animals, using animal-based indicators, will not only provide 24/7 status of all animals, but it will also allow the farmer to react immediately on deviations and problems as they occur. Furthermore, it will provide a more complete and continuous view of the animal welfare status without disturbing and stressing the animals.

In conclusion, to keep up with feeding a growing world population and at the same time accommodate the increasing ethical demands, there is an urgent call for new and innovative ways to monitor and manage animals. However, poultry and pig production are highly competitive with cost-price driven markets and low profit margins, requiring that expenses must be kept at a minimum. Therefore, it is important that technology is developed with focus on both technological and economic feasibility to make it accessible to farmers.

Literature:

Wiepkema, P. R. (1987), "Behavioural Aspects of Stress," in P. R. Wiepkema and P. W. M. van Adrichem (eds.), *Biology of Stress in Farm Animals: An Integrative Approach*, Dordrecht: Martinus Nijhoff, pp. 113-133.