

Role of Artificial Intelligence in Livestock and Poultry Farming

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Abstract: One of the technologies, artificial intelligence (AI), requires quick adoption in the livestock sector. The use of AI technology can be highly beneficial in a number of key areas in the livestock business, including monitoring, forecasting, optimizing the growth of farm animals, contend with pests, diseases, threats of biosecurity, and monitoring farm animals and farm management. Livestock farms will be helped by artificial intelligence to gather and analyses of data in order to precisely forecast consumer behavior, including purchasing patterns, top trends, etc. Operation of farm will be done by using automatic means which directly minimize the expense and increase the quality of egg, milk and meat products but this system needs some extra investment to start.

Keywords: Artificial intelligence, Livestock farms, biosecurity, Automatic operations, Farm animals

INTRODUCTION

Modern animal husbandry and aquaculture technology that incorporates artificial intelligence can automatically detect weight of various animals and stages of developmental, we can feed them according to our will or desire of Animals and monitor the effect of feed in order to get better results (Olejnik, et al., 2022). As we know that our population is increasing day by day which is directly enhancing the need of things like egg, meat, and milk. Researcher conclude that for the smart farming we need A.I in the form of robots and other tools like software which contain A.I module in them. These tool will minimize the cost of farming and also will give the quality of product. So for these they research and a smart cow house was built in which there were some sensor which sense the activity of cow and also sense weight, and disease by using artificial intelligence (Blanes et al., 2010). The early diagnose and tracking system may help to diagnose disease at early stage which also help to treat the disease earlier and save farmer from big loss. Recent times have seen demands for increased farm animal production. Many applications for AI

LITERATURE REVIEW

Automated milking using artificial intelligence

Animal husbandry's milk booth is one area where artificial intelligence is being used more and more. The automated milking devices can evaluate the milk quality and indicate any anomalies in the product using smart sensors that have AI capabilities (costa et al., 2012).

Modern precision livestock farming

Through their sensors and artificial intelligence technology, dairy is integrating cow, milk, and herd intelligence. They provide a variety of sensors, such as those that monitor a cow's health and detect heat and calving, as well as daily behaviours like rumination, eating, and walking patterns, like the Sense Time Solution sensor. Farmers may now monitor changes in animal movements, food intake, sleep cycles, and even air quality in animal shelters with the use of a variety of sensors that are readily available. This sensor gives consumers early, proactive solutions to issues when combined with artificial intelligence software. The sensor offers farmers solutions for each individual cow in addition to the capacity to capture data on reproduction, health, and nutrition (Nääs et al., 2010)

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Using artificial intelligence to track one's health:

Additionally, the AI notifies the farmer via alerts when the behaviour of the cow changes, enabling human intervention as necessary. Without AI, it would be nearly impossible for the farmer to watch every cow in the herd carefully. Farmers may now recognise, anticipate, and prevent disease outbreaks even before a widespread breakout by employing cutting-edge Artificial intelligence is very helpful to guess abnormalities or irregularities (Zhou & Yamamoto., 1997).

Use of AI for Detecting Oestrus:

A sensor attached to the neck of cow which will record whole data of cow per day the good thing of that sensor is that is also help to secure records of many days. The dairy automation system's artificial intelligence components analyses the gathered data to offer insights on heat stress, changes in feeding efficiency, and the cow's oestrus. Special hormones are released when an oestrus cycle occurs, affecting the cow's behaviour and movement (Dineva et al., 2021) .

Use of Robot for doing vaccine at Poultry House:

In the modern era of innovation A.I and robotic system is much more reliable source for doing medication and other medication of different diseases because there is approximately 0.001% chance of mistakes as A.I is very accurate logarithm system. In these days Poultry is connected to A.I as it will help to achieve better results than the use of conventional means. The robotic system also have data about the immunity or status of immunity. The conclusion is that robots also being used for vaccination and medication in some of countries (Thomas et al., 2011) .

Application of artificial intelligence to the food supply chain:

Blockchain can link the entire supply chain, from the producer to the consumer, enabling food safety and traceability. From the perspective of agriculture and food, presenting this kind of proof to consumers will become a competitive advantage and might not be as difficult in the dairy sector as it is in other agricultural sectors, like cattle, where ownership changes more frequently (Oecd., 2021)

The use of artificial intelligence in data collection:

Until recently, information was gathered was generalised to a whole dairy farm. AI and other technology can offer unique data for each cow using sensors, enabling farmers to make management decisions with more precision and accuracy (Van Limbergen et al., 2020)

Using artificial intelligence to increase the quality of feed

When compared to traditional manual harvesting, the usage of robotics is highly efficient and reduces harvesting time. Additionally, the automated equipment continuously determines the yield and moisture content of the harvest of cereals (Neethirajan et al., 2020),

Using facial recognition technology to enhance animal health

There are numerous beneficial applications, including assisting us in understanding the animal's emotional and attentional states (Sih et al., 2004). For instance, scientists can now reasonably predict an animal's mood and amount of enthusiasm by observing its ear and eye movements. It might assist us in controlling animal pain symptoms. Further investigation may turn up wounds, illnesses, or even signs of predator assaults (Paris et al., 2022)

10. Role of A.I in FCR improvement

Farmers can measure feed intake for individual cows and manage feed costs based on the demands of their animals with the help of RGB-D cameras (Detsch et al., 2018). We can precisely predict farm animal performance with the use of technology. Based on parity, the milk yield component, and body condition score, their lactational energy expenditure can be calculated. (Brunberg et al., 2011)

METHOD

We use method of A.I or we used A.I based instrument in order to check their effectiveness in live stock as well as in poultry. In this we used A.I related softwares and as well as instruments or panel which gave us remarkable results. In this method we use some sensor also at poultry shed in order to monitor the health status of Poultry and also to check weight of live birds. Some sensors are also used to examine the manure in order to check the health status of birds

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RESULT

The results shows that artificial intelligence has a positive effect on Animal management and Production also are helpful in carrying out processes at farm level. The sensor which are used in order to check the weight of live birds gave accurate measurement. The sensors which are used to check the health status predict the health status of bird accurately. Under these circumstances we can say that our results were positive which means AI can play key role in maintaining Livestock farm and Poultry farms

DISCUSSIONS

Role of Artificial intelligence at Poultry farm

Using tools, keep an eye on production parameters and behavior

Many panels of A.i are available in market for doing different applications at poultry farm. This study aims to give overview of A.I and its available tools in market and their use for numerous jobs at poultry house. as well as an appraisal of their potential future applications in the commercial poultry sector through the use of empirical research carried out in environments suitable for large-scale farming. Instead of focusing on how directly farmers use or adapt technology and the ensuing socioeconomic impact this review show the role of A.I in sensing diseases and weigh of bird, role in FCR improvement, food supply chain, enhancing of quality of feed and role in vaccination (Stamp et al., 2004).

Control of the Shed's Environment

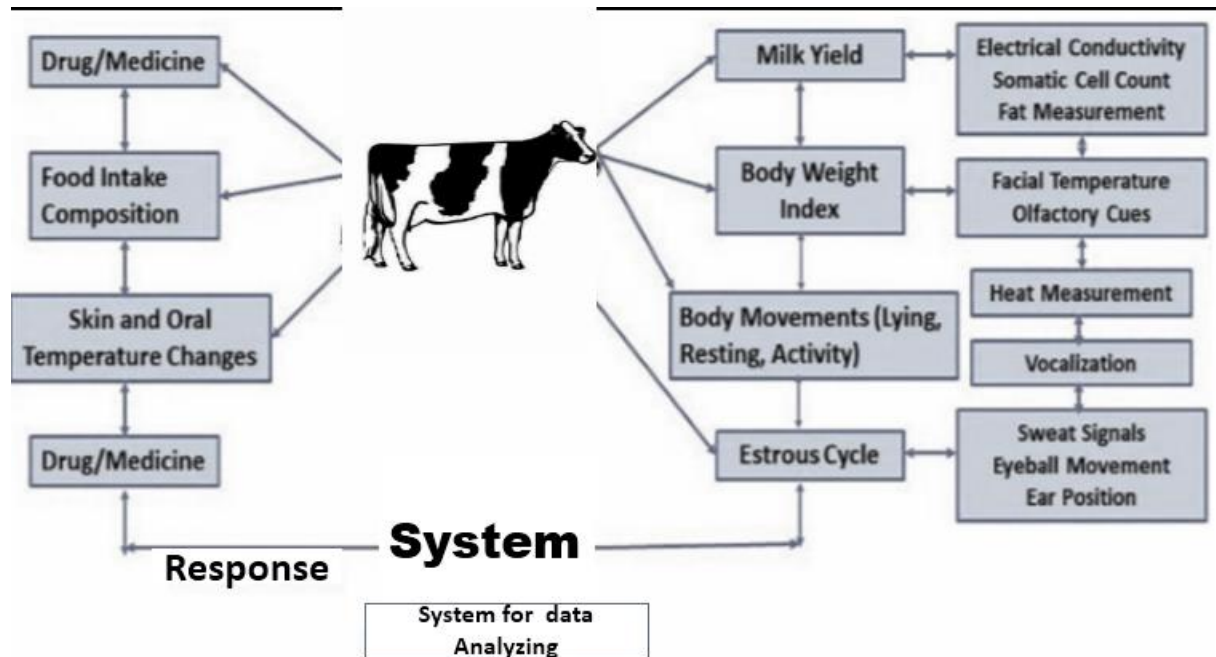
The following overview examines a number of subjects in turn, including maintenance guideline of shed or herd, deviations in conditions environmental, there is need to examine the temperature of air, Proper ventilation, its impact on other environmental basics (such as gasses which may cause harm), The schedule lighting and its draw back (if not follows the schedule), and some other application of light as integral thing conditions of rearing and optimization of these by consuming the A.I tools. To the greatest extent possible, the kept herd must be accurately identified in order to reduce decreased welfare and growing stress levels while producing chicken meat and eggs. In accordance with Directive 2007/43/EC, the maximum density of chicken kept for meat production in a farm or poultry house may not exceed 33 kg•m². In some circumstances, this amount could be increased to 39 kg or even 42 kg•m². According to Council Directive 1999/74/EC, there cannot be more than nine animals per square metre of usable land when stocking laying hens. (with the potential to increase to 12 animals per m² if the conditions, such as a greater substrate area available, are met. Each egg-laying hen raised in a cage requires a minimum of 750 cm² of cage space, and the cage should never be any lower than 35 cm. Farmers find it difficult to keep track of a single animal in a large herd that is densely packed. PLF methods offer data on the entire herd that is automatically acquired 24 hours a day, 7 days a week, resulting in more efficient farm management (Yahav., 2009). Farmers who employ PLF systems, according to study b, prefer integrated data to traditional management strategies and generally do not see any disadvantages other than the potential for high prices (Tablante, et al., 2000). They believe that PLF, however, may also lead to higher profitability. The research by Jones et al. found that management strategies had longer-lasting effects on welfare and the environment than stocking density decrease. The large-scale study, which housed 2.7 million Birds at five different stocking densities, found that housing conditions may have an even greater impact on welfare than density itself. Due to increased consumer awareness of the recommended diet and general housing conditions for birds in large-scale farming, commercial farms needed to control animal welfare more. The circumstances of the environment can be improved and maintained with the aid of an autonomous farming system that can offer better feed and nutrient utilisation changes. If environmental conditions deviate from accepted norms, animals may consume less food, which would limit their growth, feel more stress, and have higher mortality rates. Animals must always have access to water, and feeders must allow them to consume complete meal combinations that are appropriate for their age and production requirements (Kashiha et al., 2013). The primary function of the Kai-Zen Feeding Robot (Metabolic Robots, Kfar Tavor, Israel) is to tailor the feed dose to the needs of the herd at its current developmental stage. The Food Conversion Rate (FCR) can be optimised and perhaps increased by up to 4%. Farmers may accurately change the right feed formulation and ambient conditions, such as temperature and lighting schedules, with the help of the self-sufficient solar Feed Cast (Little Bird Systems, Fayetteville, NC, USA) system. Live data on feed consumption and other factors, such as water intake. Modern chicken coops come with water metres that may be used to monitor daily water usage for either the entire coop or each row. Water intake patterns can be utilised to identify problems with feed quality or the general health of the flock based on the data acquired. When a flock's health is at risk, water consumption normally declines; in contrast, it rises when feed quality issues, such as higher salt levels, are present. Monitoring water use could discover infrastructure leaks that increase farming costs. Because poultry farming is an intense form of production, producers must take care to use resources as effectively as possible. Precision livestock farming can

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be used in the poultry industry by monitoring and recording the behaviour of the birds in real-time. Large-scale agriculture makes it difficult to personally check the equipment's correct operation due to the installation's size. The utilisation of the dynamic system (Fancom BV, Panningen, The Netherlands), cameras, and subsequent image processing techniques abundantly proved the value of autonomous monitoring in broiler houses. Using this approach, 95.24% of anomalies could be found in real time. The knowledge gained might enable speedier and more efficient methods for changing or fixing broken equipment components, such as feeds, fans, and heating systems (Bloch, et al., 2020).

Figure



CONCLUSION

The above mentioned areas show the effectiveness of A.I in poultry sector and as well as livestock sector. This paper show that A.I make easier the farming as it helps to lot of jobs and we don't need so much labor cost. This review clearly told that if we use A.I it will minimize cost, maximize quality of product, diagnosis of disease, and improve of Quality of feed, Improve in the yield of Animal. So there is need to improve R&D (research and development) in order to modernize ourselves in areas of Agriculture and other areas where AI can be used. A.I gave us an easy path for doing our maximize function in agriculture and it is very necessary to develop new technologies to easier farming and as well as our daily life

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