

Can AI offer the veterinary profession a more sustainable future?

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Current narrative predictably discusses the applications of artificial intelligence (AI) in the veterinary profession. We argue that, to be sustainable, we should reframe the conversation to understand the role of the veterinary profession in field of AI.

An AI is a machine-based system designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment. It will, for explicit or implicit objectives, infer from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments (Dwivedi *et al.* 2021).

In contrast, veterinary medicine is the prevention, management and treatment of disease and injury in domestic and wild animals (Coffey 2008). It is a profession that balances the science and the ethics of animal and client care. In the 260 years that the profession has been recognised, it has adapted to and consumed new technologies and remained the principal trusted advisor on animal health. With this legacy, it would be defensible to regard the next emergent technology with ambivalence. However, proponents of AI see a more significant step change for society, suggesting that AI represents an advance similar to the industrial (1780), electrical (1870) or internet revolutions (1990) (Akinsulie *et al.* 2024).

Suggesting that every new technology is a revolution, however, misclassifies revolutions. Technological revolutions profoundly change the nature of work, occupational structures, and systems of production (Barley 2020). Preceding technological revolutions were all characterised by a single general-purpose technology that has led to widespread societal change whereas the anatomy of this revolution sits at the crossroads of AI, biotechnology, and the internet of things (IoT) that has more recently been termed a technology super cycle. It represents a philosophical change in our relationship with technology and changing the nature of society.

How should we behave in a revolution?

Technological revolutions offer widespread improvements, but often at the cost of the status quo. These disruptions challenge professions to find means to remain sustainable. Sustainability, in this discussion, is the resilience of the veterinary profession in its domain after the impact of AI is fully established. This will be driven by our understanding of a new technology and our appetite to change.

The Data Value Chain model provides an expedient framework to categorise options to engage. It proposes four sequential processes to explain how value is generated from data moving through a chain: (1) Data generation processes, (2) Data collection processes, (3) Data analytical processes and, (4) The end user or consumer. For the veterinary profession seeking a more sustainable future the AI Data Value Chain helps frame opportunities

Veterinary profession as end users

The simplest means of accomplishing sustainability is to consume AI to provide better service to clients (i.e. Process 4 on the Data Value Chain). A repurposed observation of the legal profession suggests AI won't replace vets, but vets that use AI will replace vets that don't is prescient. Benefits of consuming AI include:

- **Enhanced diagnostics:** AI can analyse medical images, lab results, and patient data to provide accurate and timely diagnoses, reducing the need for unnecessary tests and treatments.
- **Personalised treatment plans:** AI can help veterinarians tailor treatment plans based on individual patient data, leading to more effective care and reduced waste.
- **Efficiency and productivity:** AI Automation of routine tasks can free up veterinarians' time, allowing them to focus on complex cases and client communication, reducing the need for additional staff and resources.
- **Improved patient outcomes:** AI-driven insights can lead to early detection of diseases, better monitoring of chronic conditions, and overall improved patient outcomes, reducing the need for costly and resource-intensive treatments.

Consuming AI offers the profession an opportunity to improve its service to customers and compete with other practices through efficiencies. However, it does not ensure sustainability through AI-based alternatives to first opinion triage, or pricing fluctuations. It certainly places no value in our privileged position at the frontline nor our clinical training.

Veterinary profession as data generators

An alternative mechanism for sustainability for veterinarians is to become a key contributor to the other end of the value chain (Process 1) and commoditize their clinical observations and data to feed the pipeline. Assuming that ethical and competitive considerations are met (Brownlie and Laing 2024), aggregated and anonymised information from nationwide veterinary practices can hold value if it can be collected and validated in an efficient manner and a suitable data collector can be identified.

Veterinary profession as data validators

This represents the most ambitious and complex process to which veterinarians can contribute but simultaneously offers the most sustainability. AI autonomy and its outcomes are the products of model training or feedback. The principal mechanism in supervised and semi-supervised AI models is reinforcement learning and this is often undertaken through human input (RLHI). Recognising the professions unique nationwide network of veterinary expertise, undertaking RLHI for model training represents a deep impact and understanding of the emerging technology. The challenge is coordinating a profession level agreement on this practice and engaging with strategic technology partners.

Integrating AI in veterinary practice presents exciting opportunities for improving patient care, practice efficiency, while also contributing to a more sustainable profession. By addressing ethical considerations, seeking appropriate advice and education, and implementing appropriate regulation and standards, the veterinarian professions can make informed decisions about the extent to which it wishes to pursue sustainability in the face of the true technology revolution.

References

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