Big Data for Veterinary Sciences: Instructions for Use

Oscar TAMBURIS[a,b,*]

[a] National Research Council of Italy, Institute of Biostructures and Bioimaging, 80145 Naples, Italy.
[b] University of Naples Federico II, Department of Veterinary Medicine and Animal Productions, 80137 Naples, Italy.
E-mail: oscar.tamburis@cnr.it

* Author to whom correspondence should be addressed

Abstract
The integration of Big Data into veterinary sciences is revolutionizing animal health management, providing advanced tools for disease surveillance, treatment optimization, and welfare assessment. This transformation aligns with the broader One Digital Health paradigm, which emphasizes the interconnectedness of human, animal, and environmental health. As veterinary data become increasingly complex, leveraging informatics-driven approaches is essential to enhance decision-making and ensure sustainable animal care practices. This presentation explores two key research areas: veterinary medical informatics and precision livestock farming, each supported by real-world case studies. In the context of pet care, the use of electronic medical records (EMRs) combined ML models facilitates early disease detection, improves diagnostics, and enables personalized treatment strategies. By harnessing structured data, veterinary professionals can refine medical protocols, leading to better patient outcomes. In livestock management, the integration of smart cameras and artificial intelligence supports real-time health monitoring and predictive analytics, helping farmers detect early signs of disease, optimize resource allocation, and improve production efficiency. These data-driven innovations contribute to precision livestock farming, promoting animal welfare while enhancing food security and sustainability. By merging AI-related techniques, sensor-based monitoring, and advanced analytics, Big Data is shaping the future of veterinary sciences. This data-centric approach not only strengthens veterinary practice but also reinforces One Digital Health, ensuring a holistic and evidence-based strategy for managing animal health in a rapidly evolving digital ecosystem.

Keywords: Veterinary Medical Informatics; Precision Livestock Farming; Big Data; Digital transformation; One Digital Health.