

Machine learning could improve the diagnosis of mastitis infections in cows

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The new study, published today in *Scientific Reports*, has found that machine learning has the potential to enhance and improve a veterinarian's ability to accurately diagnose herd mastitis origin and reduce mastitis levels on dairy farms.

Mastitis is an extremely costly endemic disease of dairy cattle, costing around £170 million in the UK. A crucial first step in the control of mastitis is identifying where mastitis causing pathogens originate; does the bacteria come from the cows' environment or is it contagiously spread through the milking parlour?

This [diagnosis](#) is usually performed by a veterinarian by analysing data from the dairy farm and is a cornerstone of the widely used Agriculture and Horticulture Development Board (AHDB) mastitis control plan, however this requires both time and specialist veterinary training.

Machine learning algorithms are widely used, from filtering spam emails and the suggestion of Netflix

movies to the accurate classification of skin cancer. These algorithms approach diagnostic problems as a student doctor or veterinarian might; learning rules from data and applying them to new patients.

This study, which was led by veterinarian and researcher Robert Hyde from the School of Veterinary Medicine and Science at the University of Nottingham, aims to create an automated diagnostic support tool for the diagnosis of herd level mastitis origin, an essential first step of the AHDB mastitis control plan.

Mastitis data from 1,000 herds' was inputted for several three-month periods. Machine learning algorithms were used to classify herd mastitis origin and compared with expert diagnosis by a specialist vet.

The [machine learning](#) algorithms were able to achieve a classification accuracy of 98% for environmental vs contagious mastitis, and 78% accuracy was achieved for the classification of lactation vs dry period environmental mastitis when compared with expert veterinary diagnosis.

Dr. Hyde said: "Mastitis is a huge problem for [dairy](#) farmers, both economically and in welfare terms. In our study we have shown that machine learning algorithms can accurately diagnose the origin of this condition on [dairy farms](#). A diagnostic tool of this kind has great potential in the industry to tackle this condition and to assist veterinary clinicians in making a rapid diagnosis of mastitis [origin](#) at herd level in order to promptly implement control measures for an extremely damaging disease in terms of animal health, productivity, welfare and antimicrobial use."

More information: Automated diagnosis of mastitis infection patterns in dairy herds using machine learning, *Scientific Reports* (2020).

Provided by University of Nottingham

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