



- Support from Agri-EPI Centre helps form partnerships and secure R&D funding
- Facilities on-site key to development of new tech and validating data capture
- Agri-EPI Centre network provides support throughout project

## Background

Lameness is recognised as the primary animal welfare issue in dairy farming. Nationally, 25% of dairy cows are lame at any one time. Although it has multiple causes, the key factor in most herds is endemic diseases, such as digital dermatitis, sole ulcers, and white line disease. Early detection and prompt intervention is critical to effective control and treatment of lameness, which costs farmers in excess of £300 per case. Many hoof lesions, especially relating to digital dermatitis, are visible

prior to lameness developing but can be difficult to see in practice and require specialist training to diagnose.

The Hoofcount footbath was developed and introduced to the UK market in 2012. Designed with simplicity in mind, it now has a sustained reputation in the UK as the Market leader in Effective and Reliable Footbathing.

The UWE academic team collaborating on the Hoofcount project is led by Dr Wenhao Zhang of the Centre for Machine Vision. Wenhao's team are

working on developing and integrating machine vision technology and AI software for hoof disease detection. Their aim is to realise algorithms, able to capture, filter, and analyse hoof images several times daily in a non-invasive way, to detect hoof issues in the earliest stages and to monitor for changes. Experiments and tests are being conducted in several UK dairy farms.

## About Hoofcount

Hoofcount, based in Lancashire, is a small family business that prides itself on their team full of hard working and dedicated individuals who are passionate about what they do. From accounts to service engineers, each one of them is responsible for the continued success of Hoofcount.

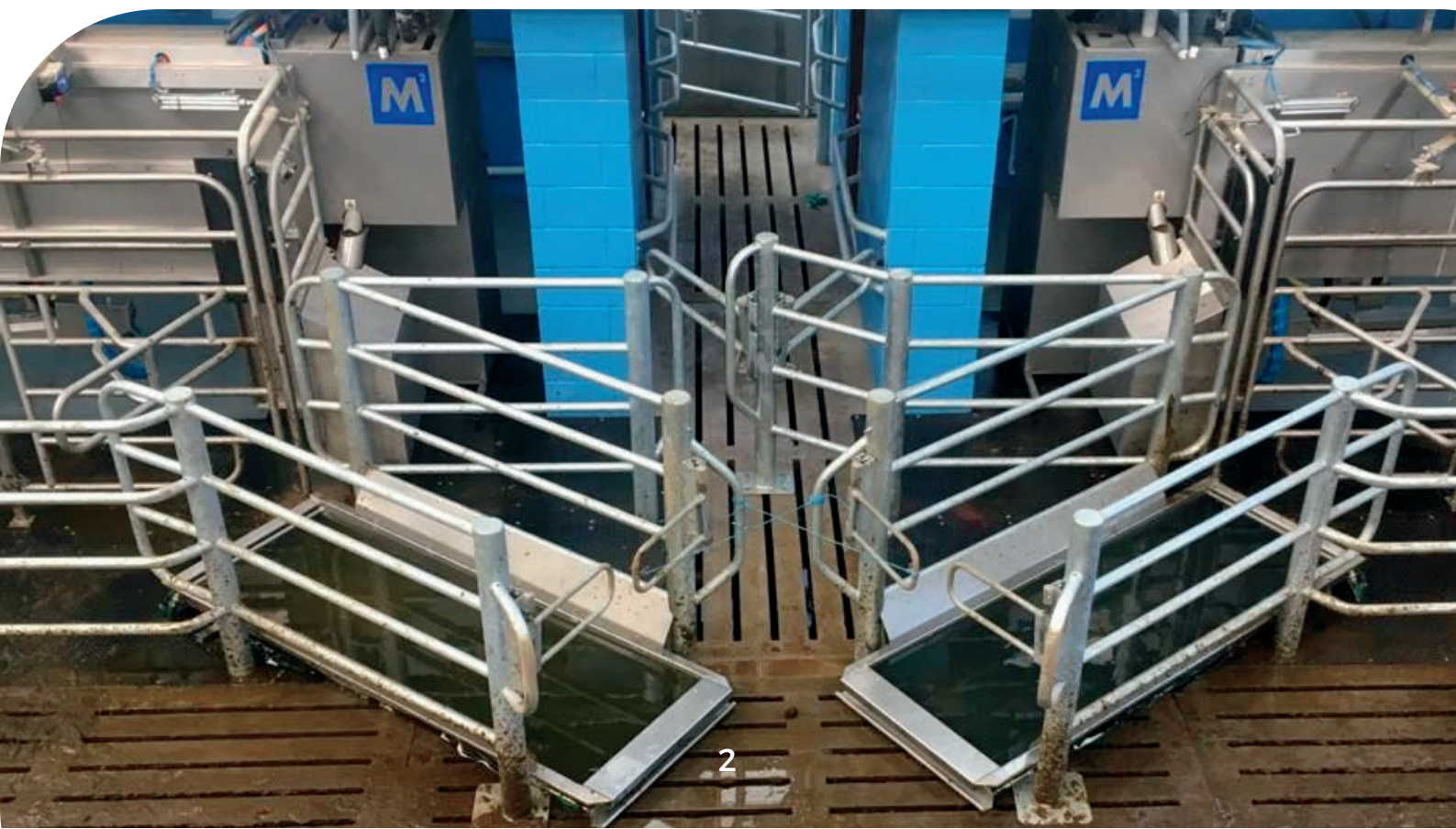
Their products include the Standard Hoof bath, the Excel Hoof bath, and the Robot Hoof bath, and they continue to collaborate with farmers across the

world to improve their products.

Hoofcount Director and Dairy Engineer, Anthony Marsh, was shortlisted for the British Farming Awards 2021, Agri Innovator of the year, and the Hoofcount team won 2 awards in 2019 and 1 in 2021 at the BIBAS.

## How Hoofcount is making a difference

This project presents a unique set of challenges to machine vision and machine learning. Object detection and image classification 'in the wild' has always been considered a significant but fascinating challenge in the relevant literature. The solution to this has commonly been to increase data quantity, quality, and variability for machine learning. However, this is impractical for this project as it is unrealistic to manually capture and annotate millions of images containing





a range of hoof issues with potentially subtle but highly variable visual appearance. Capturing data on working farms also presents us with unstructured environments and unpredictable behaviours of dairy cows, causing drastic changes in ambient illumination, presence of water and contamination on the animals and our equipment, huge variations in animal gait, as well as random occlusions of features of interest. This requires that we develop techniques that are robust to all the variables we expect to encounter on the farm, and that are able to automatically collect and process image data efficiently, which will enable the machine learning models we develop to improve in performance over time.

## How Agri-EPI has made a difference

Agri-EPI Centre – Agricultural Engineering, Precision and Innovation – is part of the UK Government’s Agri-Tech Strategy and aims to bridge the gap between industry and academia across the agri-food sector in the UK and globally. Agri-EPI Centre offers a host of benefits to businesses including access to cutting edge facilities, support for funding bids and investor finance and exclusive industry events.

Hoofcount's Anthony Marsh said being a member of Agri-EPI Centre has been a huge benefit in forming partnerships with UWE and in achieving a successful application for the Innovate UK project.

He said:  
Utilising the Agri-EPI dairy centre and

resources will give an excellent controlled centre for further development of the device with validated data capture.”

“When the project is completed the relationship with Agri-EPI and access to its wider network will be of huge benefit for realising the full potential of the commercialisation of the project.”

“Agri-EPI have been a pleasure to work with so far within this project and have successfully delivered on every aspect that we had anticipated.”

“Applying for funding and navigating our way through a project seemed extremely daunting for a small company. Agri-EPI guided us through the initial application and have supported us through the project keeping timings and communication all on target.”

**Anthony Marsh,  
Director, Hoofcount**

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