Abstract

The thesis aims to investigate the viability of a real-time sheep vocalisation detection system.

In order to achieve this objective, the different aspects of a real-time audio pattern recognition system were identified, and a thorough review of the literature was conducted. Based on this information, a number of novel approaches to audio detection were selected, including Discrete Wavelet Transforms, low-computational statistical features, and a Support Vector Data Description.

To truly test the objective, software was developed in the C++ programming language, theoretically capable of performing the intended function: the methods used to achieve this are outlined.

In order to test the detection accuracy of the system under different conditions, four experiments were conducted, and the results are presented.

The results obtained lend considerable strength to the assertion that real-time sheep vocalisation detection is possible: high detection accuracy was measured in 3 experiments. The performance of some of the key components was explored, with results indicating that they are all viable options for real-time audio analysis, mirroring the findings of other research found in the literature. In some areas, the system's performance was reduced, and these findings highlight areas for future research.

As this system also relates to livestock welfare and management, Precision Livestock Farming principles are discussed, with particular attention paid to topics pertaining to sheep, and to the benefits the proposed system would offer to industry.