

## **Automatic identification of very thin dairy goats using image technology.**

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Body condition score (BCS) of dairy goats is traditionally achieved by palpation of the lumbar and sternal fat deposits. To accomplish a reliable value with this method training is needed as is restraining of the animal. The AWIN project validated a scale for BCS by using some rump measures to identify very thin or very fat goats. This score is now used in the protocol for welfare assessment recently published. Further investigation, in cooperation with teams from the Technology Faculty of our university, developed a set of descriptors for rump's 3D surfaces, collected by an RGB-D camera. In this way automatic identification on farm of the extreme scores may be possible. A Heat Based Rump Descriptor (HBRD), using diffusion geometry concepts to address the difficulty in defining the region of interest and to handle the large variability in rump shapes, was conceived. HBRD uses heat diffusion to represent distances between points in two equivalent surfaces. The volume is assessed by having the surfaces differ only on the characteristic that we want to measure. The application of the descriptor shows that temperature in thinner animals converges faster to that of a planar rump. The preliminary results show that this method allows for correctly clustering very thin goats. So it seems possible to use a camera over the milking parlour corridor to identify goats with a low BCS that may be chronically ill or malnourished. Further investigation will also try to identify obese goats as these are more prone to diseases such as pregnancy toxaemia.

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