1. High-accuracy image segmentation for lactating sows using a fully convolutional network

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Abstract: In this paper, a new method for lactating sow image segmentation from the overhead views of commercial pens is proposed. The method includes two main steps. The first step is the segmentation of the lactating sows from the top-view images using a fully convolutional network (FCN). The second step is the refinement of the coarse output of the FCN using the probability map from the final layer of the FCN and Otsu's thresholding from the hue, saturation, and value colour information. Our segmentation model was trained using 3811 images which were randomly selected from the images of seven pens, and tested on 1085 images which were randomly selected from the images of the remaining 21 pens. The present method provided improved segmentation results compared with SDS, Otsu, MoG, and traditional FCNs. Our method attained a 96.6% mean accuracy rate and 93.0% mean intersection over union. The experiment revealed that our method was suitable for accurate and fast-image segmentation for lactating sows, laying a foundation for the precision husbandry of individual lactating sows. [All rights reserved Elsevier]. (39 refs)

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