Abstract 40:

Individual detection and tracking of group-housed pigs in their home pen using computer vision

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Modern welfare definitions not only require that the Five Freedoms are met, but animals should also be able to adapt to changes (i.e. resilience) and reach a state that the animals experience as positive. Changes in individual activity showed potential in previous studies to reflect resilience. A computer vision (CV) based tracking algorithm for pigs could potentially measure individual activity. The aim of this study was to investigate a potential CV algorithm for pig detection and tracking for individual activity monitoring in pigs. This study used a tracking-by-detection method, where pigs were first detected using You Only Look Once v3 (YOLOv3) and in the next step detections were connected using the Simple Online Real-time Tracking (SORT) algorithm to track individual pigs. Two videos, of seven hours each, recorded in a barren and an enriched environment were used to test the tracking algorithm. Up to 4000 frames were annotated to train the detection model. In both environments, a mean average precision (mAP) over 99,5% was achieved and an Intersection of Union (IOU) over 85%, indicating a good accuracy of the detection algorithm. The tracking algorithm performed better in the enriched environment compared to the barren environment, likely due to the larger space per pig. Individual pigs were tracked on average for 22.3 minutes in the barren environment and 57.8 minutes in the enriched environment. Thus, individual activity could be estimated using this algorithm and therefore be able to measure resilience, but manual corrections are needed to maintain identity in longer videos.