

ABSTRACT

Real-time livestock behavior monitoring plays a crucial role in enhancing animal welfare and optimizing farm productivity. Conventional manual observation methods tend to be inefficient, prone to errors, and labor-intensive. This research proposes a real-time classification system for horned sheep behavior based on image processing using a transfer learning approach with the YOLOv8 segmentation model. The system is optimized for top-view camera placement in individual pens (one sheep per pen), improving visibility and minimizing occlusion. The dataset consists of over 12,000 annotated images, which were expanded through augmentation to improve training effectiveness. Test results indicate that the system can classify behaviors — standing, lying down, and sleeping — with an accuracy exceeding 90% for all categories and an average detection latency of under one second. Experimental evaluations demonstrate the model’s robustness under various lighting and environmental conditions. This approach enables efficient, scalable behavior monitoring without requiring additional sensors, offering a practical solution for smart farming management and early detection of potential health issues.

Keywords: Deep Learning, Classification, Transfer Learning, Behavior, Sheep