CLASSIFICATION OF PREGNANCY DETECTION IN SHEEP ULTRASONOGRAPHY IMAGES USING THE CNN (COVOLUTINONAL NEURAL NETWORKS) MACHINE LEARNING METHOD

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ABSTRACT

Pregnancy detection in sheep is a crucial aspect of livestock management to enhance productivity and minimize potential losses. This study aims to develop a sheep pregnancy classification system based on Machine Learning using the Convolutional Neural Network (CNN) ResNet-152 architecture on ultrasound (USG) images. The dataset used in this study consists of 1,200 ultrasound images collected from the Gumukmas Multifarm in Jember. The data was then divided into 80% for training and 20% for testing. The data processing involved preprocessing, data augmentation, and normalization steps to improve the model's performance. The CNN ResNet-152 model was trained using TensorFlow with the Adam optimizer and a sigmoid activation function for binary classification (pregnant and non-pregnant). The test results indicate that the model achieves a high level of accuracy, with evaluation metrics such as precision, recall, F1-score, and confusion matrix demonstrating its reliability in detecting pregnancy. This study is expected to serve as an initial step in the development of artificial intelligence-based technology to improve livestock efficiency and support a more modern livestock industry.

Keywords: Pregnancy Detection, Machine Learning, Convolutional Neural Network (CNN), ResNet-152, Ultrasonography