

KLASIFIKASI JENIS DAGING BABI MENGGUNAKAN CONVOLUTIONAL NEURAL NETWORK DAN VGG16

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ABSTRAK

Daging babi merupakan salah satu sumber protein hewani yang banyak dikonsumsi masyarakat, khususnya di Bali. Namun, praktik pencampuran dan pemalsuan antara daging celeng, bangkung, dan campuran masih sering terjadi sehingga berpotensi merugikan konsumen. Identifikasi jenis daging yang masih dilakukan secara manual berdasarkan pengamatan visual rentan terhadap kesalahan. Penelitian ini bertujuan untuk mengembangkan dan membandingkan model klasifikasi jenis daging babi menggunakan metode Convolutional Neural Network (CNN) dan VGG16. Dataset yang digunakan terdiri dari 300 citra asli, masing-masing 100 citra daging celeng, 100 citra daging bangkung, dan 100 citra daging campuran. Melalui teknik augmentasi data berupa rotation, flipping, zooming, shifting, dan brightness enhancement, jumlah data meningkat menjadi 6.300 citra. Model dilatih menggunakan variasi learning rate 0,0001 dan 0,0005 serta batch size 16 dan 32 selama 30 epoch. Hasil penelitian menunjukkan bahwa model VGG16 memberikan performa terbaik pada learning rate 0,0001 dan batch size 32 dengan training accuracy 96,67%, validation accuracy 95,56%, dan testing accuracy 93,33%. Sementara itu, model CNN memperoleh testing accuracy terbaik sebesar 86%. Hasil tersebut menunjukkan bahwa VGG16 lebih unggul dibandingkan CNN dalam mengklasifikasikan jenis daging babi berdasarkan citra digital. Penelitian ini diharapkan dapat mendukung proses identifikasi daging secara otomatis dan membantu meningkatkan perlindungan konsumen.

Kata Kunci: *Deep Learning*, Klasifikasi Citra, Daging Babi, *CNN*, *VGG16*

CLASSIFICATION OF PORK TYPES USING CONVOLUTIONAL NEURAL NETWORK AND VGG16

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ABSTRACT

Pork is one of the most widely consumed sources of animal protein, particularly in Bali. However, the practice of mixing and adulterating pork from young pigs (celeng), sow pigs (bangkung), and mixed meat products still occurs frequently, potentially causing financial losses to consumers. The identification of meat types is generally performed manually through visual inspection, making it prone to errors. This study aims to develop and compare pork classification models using Convolutional Neural Network (CNN) and VGG16 methods. The dataset consisted of 300 original images, including 100 images of celeng pork, 100 images of bangkung pork, and 100 images of mixed pork. Through data augmentation techniques such as rotation, flipping, zooming, shifting, and brightness enhancement, the dataset was expanded to 6,300 images. The models were trained using learning rates of 0.0001 and 0.0005, batch sizes of 16 and 32, and 30 training epochs. The results showed that the VGG16 model achieved the best performance with a learning rate of 0.0001 and a batch size of 32, obtaining a training accuracy of 96.67%, validation accuracy of 95.56%, and testing accuracy of 93.33%. Meanwhile, the CNN model achieved its highest testing accuracy of 86%. These findings indicate that VGG16 outperformed CNN in classifying pork types based on digital images. This study is expected to support the automatic identification of pork types and contribute to improving consumer protection.

Keywords: *Deep Learning, Image Classification, Pork Classification, CNN, VGG16*