

ABSTRAK

MUHAMAD SAFITRA. Sistem Klasifikasi Siput Gonggong Berbasis *Convolutional Neural Network* (CNN) VGG16 Studi Kasus Senggarang. Dibimbing oleh NURFALINDA dan HENKY IRAWAN.

Kawasan pesisir Senggarang, Tanjung Pinang, menjadikan siput laut gonggong (*Laevistrombus canarium*) sebagai ikon kuliner dan sumber ekonomi penting. Identifikasi manual gonggong sulit dilakukan karena kemiripan morfologinya dengan spesies lain (*Canarium urceus*, *Dolomena turturella*, *Maculastrombus mutabilis*) dan rentan terhadap subjektivitas. Kesalahan identifikasi berpotensi menurunkan kualitas produk serta mengganggu keseimbangan ekosistem. Penelitian ini bertujuan mengembangkan sistem klasifikasi otomatis gonggong dengan membangun model *Convolutional Neural Network* (CNN) dari nol (from *scratch*) berbasis arsitektur VGG16.

Pengembangan model menggunakan dataset citra digital spesimen. Arsitektur CNN dirancang dengan meniru konfigurasi dasar VGG16 (lapisan konvolusi, *max-pooling*, dan *fully connected*) serta dimodifikasi dengan teknik *Dropout* dan data augmentation untuk mencegah *overfitting*. Evaluasi dilakukan dengan variasi hyperparameter seperti *Batch size* (8, 16, 32, 64) dan *learning rate* (0.0005, 0.00005, 0.000005). Hasil eksperimen menunjukkan bahwa *learning rate* merupakan parameter paling krusial. Model mencapai kinerja terbaik pada kombinasi *Batch size* 16 dan *learning rate* 0.00005 dengan akurasi validasi sebesar 97.55%. Hasil ini membuktikan bahwa model CNN yang dibangun dari nol dapat mencapai akurasi yang sangat tinggi dalam mengidentifikasi gonggong, serta lebih efektif dan konsisten dibandingkan identifikasi manual. Sistem ini diharapkan dapat mendukung ekonomi lokal dan konservasi sumber daya perairan di Senggarang.

Kata Kunci: Gonggong, *Laevistrombus canarium*, Klasifikasi Citra, *Convolutional Neural Network* (CNN), VGG16, Identifikasi Spesies, Senggarang.

ABSTRACT

MUHAMAD SAFITRA. Gonggong Classification System Based on Convolutional Neural Network (CNN) VGG16: A Case Study in Senggarang. Supervised by NURFALINDA and HENKY IRAWAN.

The coastal area of Senggarang, Tanjung Pinang, has made the gonggong sea snail (*Laevistrombus canarium*) a culinary icon and an important economic resource. Manual identification of gonggong is challenging due to its morphological similarities with other species (*Canarium urceus*, *Dolomena turturella*, *Maculastrombus mutabilis*) and is susceptible to subjectivity. Misidentification can potentially reduce product quality and disrupt ecosystem balance. This research aims to develop an automatic gonggong classification system by building a Convolutional Neural Network (CNN) model from scratch based on the VGG16 architecture.

Model development used a dataset of digital specimen images. The CNN architecture was designed by mimicking the basic VGG16 configuration (convolutional layers, max-pooling, and fully connected layers) and was modified with Dropout and data augmentation techniques to prevent overfitting. Evaluation was conducted with variations of hyperparameters such as Batch size (8, 16, 32, 64) and learning rate (0.0005, 0.00005, 0.000005). Experimental results indicate that learning rate is the most crucial parameter. The model achieved its best performance with a combination of Batch size 16 and a learning rate of 0.00005, yielding a validation accuracy of 97.55%. This result proves that the CNN model built from scratch can achieve very high accuracy in identifying gonggong, and is more effective and consistent compared to manual identification. This system is expected to support the local economy and the conservation of aquatic resources in Senggarang.

Keywords: Gonggong, Image Classification, Convolutional Neural Network (CNN), VGG16, Species Identification, Senggarang.