ABSTRAK

Yasir, Sahra Fatimah. 2025. *Identifikasi Jenis Lamun menggunakan Algoritma Faster Region – Convolutional Neural Network (Faster R-CNN)* Studi Kasus: Desa Pengudang, Pulau Bintan, Kepulauan Riau, Skripsi. Tanjungpinang: Program Studi Teknik Informatika, Fakultas Teknik dan Teknologi Kemaritiman, Universitas Maritim Raja Ali Haji. Pembimbing I: Nola Ritha, S.T., M.Cs. Pembimbing II: Dr. Dony Apdillah, S.Pi., M.Si.

Lamun merupakan ekosistem laut penting yang membutuhkan monitoring untuk konservasi berkelanjutan. Penelitian ini mengimplementasikan algoritma *Faster* R-CNN untuk deteksi otomatis empat jenis lamun (*Cymodocea rotundata, Enhalus acoroides, Syringodium isoetifolium, dan Thalassia hemprichii*) menggunakan dataset *in situ* dari perairan Desa Pengudang. Model dilatih dengan variasi *batch size* (4, 8, 16) selama 50 *epoch* dan teknik *preprocessing* kombinasi CLAHE, *enhancement* LAB, dan *sharpening* untuk optimasi kualitas gambar. Evaluasi menggunakan metrik *mean Average Precision* (mAP) dengan *threshold* IoU 0.50:0.95 pada dataset validasi 20% dan pengujian melalui aplikasi *mobile* KenaliLamun. Hasil menunjukkan model dengan *batch size* 4 memberikan performa terbaik dengan mAP 38.69%, diikuti *batch size* 8 (38.46%) dan *batch size* 16 (37.00%). Teknik *preprocessing* optimal meningkatkan akurasi signifikan dari 17.97% menjadi 38.69%. Pengujian per jenis lamun menunjukkan *Enhalus acoroides* terdeteksi paling konsisten, diikuti *Thalassia hemprichii* dan *Syringodium isoetifolium* yang mengalami beberapa kegagalan deteksi, sementara *Cymodocea rotundata* menunjukkan performa terendah dengan banyak kesalahan klasifikasi. Model menghadapi tantangan membedakan lamun dengan tanaman dominan hijau lainnya (akurasi 50%), kondisi pencahayaan tidak merata, dan kompleksitas background gambar *in situ* yang mempengaruhi performa deteksi.

Kata kunci: Lamun, Faster R-CNN, deteksi otomatis, objek deteksi, preprocessing, in situ, mAP

ABSTRACT

Yasir, Sahra Fatimah. 2025. *Seagrass Species Identification Using Faster Region – Convolutional Neural Network (Faster R-CNN) Algorithm, Case Study: Pengudang Village, Bintan Island, Riau Islands,* Undergraduate Thesis. Tanjungpinang: Department of Informatics Engineering, Faculty of Engineering and Maritime Technology, Universitas Maritim Raja Ali Haji. Advisor: Nola Ritha, S.T., M.Cs. Co-advisor: Dr. Dony Apdillah, S.Pi., M.Si.

Seagrass represents an important marine ecosystem requiring monitoring for sustainable conservation. This research implements the Faster R-CNN algorithm for automatic detection of four seagrass species (Cymodocea rotundata, Enhalus acoroides, Syringodium isoetifolium, and Thalassia hemprichii) using in situ datasets from Pengudang Village waters. The model was trained with batch size variations (4, 8, 16) for 50 epochs and preprocessing techniques combining CLAHE, LAB enhancement, and sharpening for image quality optimization. Evaluation utilized mean Average Precision (mAP) metrics with IoU threshold 0.50:0.95 on 20% validation dataset and testing through the KenaliLamun mobile application. Results demonstrate that the model with batch size 4 achieved optimal performance with mAP 38.69%, followed by batch size 8 (38.46%) and batch size 16 (37.00%). Optimal preprocessing techniques significantly improved accuracy from 17.97% to 38.69%. Per-species testing showed Enhalus acoroides was detected most consistently, followed by Thalassia hemprichii and Syringodium isoetifolium, which experienced several missed detections, while Cymodocea rotundata showed the lowest performance with a higher number of misclassifications. The model faces challenges in distinguishing seagrass from other dominant green plants (50% accuracy), uneven lighting conditions, and complex in situ image backgrounds affecting detection performance.

Keywords: Seagrass, Faster R-CNN, automatic detection, object detection, preprocessing, in situ, mAP