ABSTRAK

Proses penghitungan dan pengelompokan bibit ikan nila di Dharma Nila Farm masih dilakukan secara manual sehingga membutuhkan waktu yang relatif lama dan berpotensi menimbulkan kesalahan. Penelitian ini bertujuan merancang bangun sistem penghitung dan estimasi ukuran bibit ikan nila yang berbasis *computer vision* untuk membantu meningkatkan efisiensi proses penghitungan. Sistem dikembangkan menggunakan Raspberry Pi 3 Model B, webcam, serta metode *You Only Look Once* (YOLO) yang dioptimalkan menggunakan NCNN agar dapat dijalankan pada perangkat dengan sumber daya terbatas. Estimasi ukuran dilakukan dengan mengonversi dimensi objek hasil deteksi dari satuan piksel menjadi milimeter menggunakan faktor konversi millimeter per *pixel* (mm/*pixel*). Pengujian dilakukan di Laboratorium Manufaktur dan Dharma Nila Farm. Hasil pengujian menunjukkan bahwa sistem mampu melakukan deteksi, penghitungan, dan estimasi ukuran bibit ikan nila secara otomatis. Kinerja sistem dipengaruhi oleh ukuran bibit, kepadatan objek, pergerakan ikan, kondisi pencahayaan, dan kemampuan pemrosesan perangkat. Berdasarkan hasil evaluasi, sistem memiliki potensi untuk meningkatkan efisiensi proses penghitungan bibit ikan dibandingkan metode manual, meskipun masih diperlukan pengembangan lebih lanjut pada aspek perangkat keras dan optimasi sistem.

Kata Kunci: *Computer Vision*, YOLO, NCNN, Raspberry Pi 3 Model B, Bibit Ikan Nila, Estimasi Ukuran.

ABSTRACT

At Dharma Nila Farm, the process of counting and sorting tilapia fry is currently performed manually, which is time-consuming and prone to errors. This study aims to design and build a computer vision-based system for counting and estimating the size of tilapia fry to help improve counting efficiency. The system was developed using a Raspberry Pi 3 Model B, a webcam, and the You Only Look Once (YOLO) method, which was optimized using NCNN to enable execution on resource-constrained devices. Size estimation is performed by converting the dimensions of detected objects from pixels to millimeters using a millimeter-per-pixel (mm/pixel) conversion factor. Testing was conducted at the Manufacturing Laboratory and Dharma Nila Farm. The results demonstrate that the system is capable of automatically detecting, counting, and estimating the size of tilapia fry. System performance is influenced by fry size, object density, fish movement, lighting conditions, and the device's processing capabilities. Evaluation results indicate that the system has the potential to improve the efficiency of the fry counting process compared to manual methods, although further development regarding hardware and system optimization is still required.

***Keywords**: Computer Vision, YOLO, NCNN, Raspberry Pi 3 Model B, Tilapia Fry, Size Estimation.*