

ABSTRAK

KHAIRUNNISA MUNAWWARAH. Penerapan Metode *K-Nearest Neighbors* (*K-NN*) Dan *Particle Swarm Optimization* (*PSO*) Dalam Identifikasi Keanekaragaman Kerang (*Bivalvia*) Di Pantai Trikora Pondok Santai Family. Dibimbing oleh NURFALINDA dan MARISHA PERTIWI.

Kerang dengan kelas *Bivalvia* di Pantai Trikora Pondok Santai Family memiliki beragam jenis kerang. Peneliti menerapkan teknik *Purposive Sampling* untuk mempersingkat waktu pada pengambilan sampel kerang di lokasi penelitian. Studi ini bertujuan untuk menguji efektivitas metode *K-Nearest Neighbors* (*K-NN*) dan integrasinya dengan *Particle Swarm Optimization* (*PSO*) dalam klasifikasi gambar cangkang kerang. Menggunakan gambar kerang sebanyak 1.100 data yang diperoleh melalui pengamatan lapangan selanjutnya menggunakan 4 rotasi untuk memperkaya data dan total data menjadi 4.400 data, kemudian diproses melalui tahap-tahap *resize*, *grayscale*, *gaussian filtering*, dan *thresholding*. Fitur warna dan bentuk diekstraksi kemudian metode *PSO* digunakan untuk memilih fitur bentuk. Hasil menunjukkan bahwa kombinasi *PSO* dan *K-NN* mencapai akurasi 97.56%, lebih tinggi daripada *K-NN baseline* yang mencapai akurasi sebesar 96.89%. Hasil penelitian ini disajikan dalam bentuk aplikasi website dan poster edukatif yang berfungsi sebagai sarana memudahkan penyampaian informasi kepada masyarakat tentang konsumsi kerang yang aman pada lokasi Pantai Trikora Pondok Santai Family.

Kata kunci: *Bivalvia*, Klasifikasi Citra, *K-Nearest Neighbors*, *Particle Swarm Optimization*, Seleksi Fitur.

ABSTRACT

KHAIRUNNISA MUNAWWARAH. Penerapan Metode K-Nearest Neighbors (K-NN) Dan Particle Swarm Optimization (PSO) Dalam Identifikasi Keanekaragaman Kerang (Bivalvia) Di Pantai Trikora Pondok Santai Family. Supervised by NURFALINDA dan MARISHA PERTIWI.

Shellfish belonging to the Bivalvia class at Trikora Pondok Santai Family Beach come in a variety of types. Researchers applied the Purposive Sampling technique to shorten the time required for sampling shellfish at the research site. This study aims to test the effectiveness of the K-Nearest Neighbors (K-NN) method and its integration with Particle Swarm Optimization (PSO) in classifying shellfish shell images. Using 1,100 shell images obtained through field observations, 4 rotations were then used to enrich the data, bringing the total data to 4,400. The data was then processed through the stages of resizing, grayscale, Gaussian filtering, and thresholding. Color and shape features were extracted, and the PSO method was used to select shape features. The results show that the combination of PSO and K-NN achieved an accuracy of 97.56%, higher than the K-NN baseline, which achieved an accuracy of 96.89%. The results of this study are presented in the form of a website application and educational posters that serve as a means of facilitating the dissemination of information to the public about safe shellfish consumption at Trikora Pondok Santai Family Beach.

Keywords: Bivalvia, Image Classification, K-Nearest Neighbors, Particle Swarm Optimization, Feature Selection

