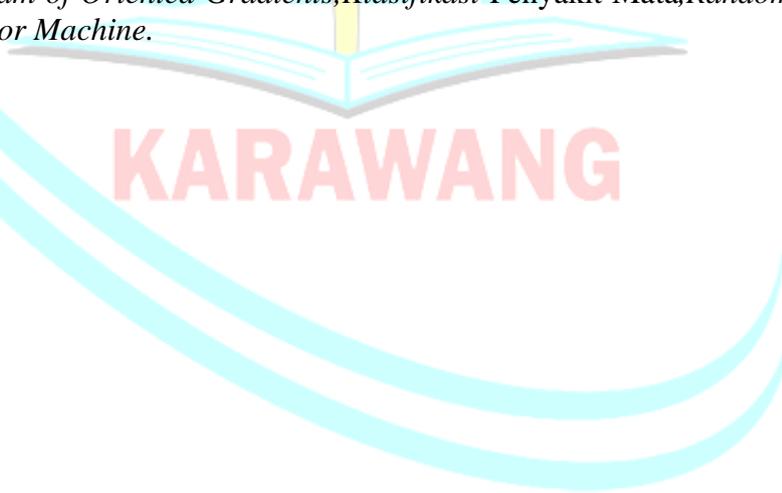# ABSTRAK

Penyakit mata seperti katarak dan *diabetic retinopathy* merupakan penyebab utama gangguan penglihatan yang dapat berakhir pada kebutaan jika tidak dideteksi sejak dini. Penelitian ini bertujuan untuk menganalisis kinerja dua algoritma klasifikasi, yaitu *Support Vector Machine* (SVM) dengan kernel RBF dan *Random Forest,* dalam mengkategorikan citra mata. *Dataset* yang digunakan berasal dari *Kaggle* dengan total 900 citra, yang terbagi seimbang menjadi tiga kelas: 300 katarak, 300 diabetic retinopathy, dan 300 normal. Proses data meliputi preprocessing (*resizing* dan augmentasi), ekstraksi fitur menggunakan *Histogram of Oriented Gradients* (HOG), serta pembagian data menjadi 80% untuk pelatihan dan 20% untuk pengujian. Evaluasi model dilakukan menggunakan *confusion matrix* dengan metrik akurasi, presisi, recall, dan F1-score. Hasil penelitian menunjukkan bahwa algoritma SVM mencapai akurasi sebesar 97%, presisi 96%, recall 96%, dan F1-score 96%. Sementara itu, algoritma *Random Forest* menghasilkan akurasi sebesar 91%, presisi 90%, recall 90%, dan F1-score 90%. Berdasarkan hasil tersebut, SVM terbukti lebih unggul dibandingkan *Random Forest* dalam mengklasifikasikan citra mata. Penelitian ini memberikan gambaran bahwa pemilihan algoritma yang tepat sangat berpengaruh terhadap kualitas prediksi, serta dapat menjadi dasar pengembangan sistem pendukung keputusan di bidang kesehatan, khususnya dalam deteksi dini penyakit mata.

Kata Kunci: *Histogram of Oriented Gradients,Klasifikasi* Penyakit Mata*,Random Forest, Support Vector Machine.*

ABSTRACT

Eye diseases such as cataracts and diabetic retinopathy are the leading causes of visual impairment that may lead to blindness if not detected early. This study aims to analyze the performance of two classification algorithms, namely Support Vector Machine (SVM) with RBF kernel and Random Forest, in categorizing eye images. The dataset used was obtained from Kaggle with a total of 900 images, evenly distributed into three classes: 300 cataracts, 300 diabetic retinopathy, and 300 normal. The data processing stages included preprocessing (resizing and augmentation), feature extraction using Histogram of Oriented Gradients (HOG), and data splitting into 80% for training and 20% for testing. Model evaluation was carried out using a confusion matrix with accuracy, precision, recall, and F1-score metrics. The results showed that the SVM algorithm achieved an accuracy of 97%, with precision, recall, and F1-score of 96% each. Meanwhile, the Random Forest algorithm obtained an accuracy of 91%, with precision, recall, and F1-score of 90% each. Based on these findings, SVM proved to be superior to Random Forest in classifying eye images. This study highlights that the choice of algorithm significantly influences prediction quality and can serve as a foundation for developing decision support systems in the healthcare sector, particularly for early detection of eye diseases.

Keywords: Classification, Eye Diseases, Histogram of Oriented Gradients, Random Forest, Support Vector Machine.