

ABSTRAK

Penelitian ini bertujuan untuk merancang dan mengimplementasikan sistem pakar berbasis *web* serta menganalisis kinerja algoritma *Machine Learning Decision Tree* dalam mendiagnosis kelainan refraksi mata. Sistem dikembangkan sebagai *platform* diagnosis awal untuk membantu masyarakat dalam mengenali gangguan penglihatan, meliputi miopi, hipermetropi, astigmatisme, dan presbiopi. Data penelitian dikumpulkan melalui kuesioner *Google Form* yang diisi oleh 505 responden. Data tersebut kemudian melalui tahap *preprocessing* dan pelabelan sebelum dibagi menjadi 404 data latih dan 101 data uji menggunakan rasio pembagian 80:20. Sistem dibangun menggunakan bahasa pemrograman *Python* dengan *framework Flask* dan diuji menggunakan *confusion matrix* dengan metrik akurasi, *precision*, *recall*, dan *F1-score*. Hasil penelitian menunjukkan bahwa algoritma *Decision Tree* menghasilkan tingkat *accuracy* 89,11%, *precision* 0,88, *recall* 0,89, dan *F1-score* 0,88 dengan performa terbaik pada klasifikasi miopi. Sistem mampu menampilkan hasil diagnosis, menyimpan riwayat pemeriksaan, serta menghasilkan laporan diagnosis dalam bentuk *PDF*. Dengan demikian, sistem pakar yang dikembangkan dinyatakan layak dan efektif digunakan sebagai alat bantu diagnosis awal kelainan refraksi mata berbasis *web*.

Kata Kunci : Sistem Pakar, Kelainan Refraksi Mata, *Machine Learning, Decision Tree, Website*

ABSTRACT

This study aims to design and implement a web-based expert system and to evaluate the performance of the Decision Tree machine learning algorithm in diagnosing refractive eye disorders. The system is developed as an initial diagnostic platform to assist users in identifying vision problems, including myopia, hypermetropia, astigmatism, and presbyopia. Research data were collected through a Google Form questionnaire completed by 505 respondents. After preprocessing and labeling, the dataset was divided into 404 training data and 101 testing data using an 80:20 split ratio. The system was developed using the Python programming language with the Flask framework and evaluated using a confusion matrix with accuracy, precision, recall, and F1-score metrics. The results indicate that the Decision Tree algorithm achieved an accuracy rate of 89.11%, precision 0,88, recall 0,89, dan F1-score 0,88 with the best performance observed in the classification of myopia. The system is capable of displaying diagnostic results, storing examination history, and generating diagnostic reports in PDF format. Therefore, the developed expert system is considered feasible and effective as a web-based tool for the early diagnosis of refractive eye disorders and can support the utilization of technology in eye health services.

Keywords: *Expert System, Refractive Eye Disorders, Machine Learning, Decision Tree, Web-Based Application*