

RINGKASAN

Telah dilakukan penelitian mengenai klasifikasi penyakit kanker kulit berdasarkan citra dermoskopi dengan menerapkan metode *Gray Level Co-occurrence Matrix* (GLCM) sebagai teknik ekstraksi fitur tekstur, serta membandingkan kinerja empat algoritma *machine learning*, yaitu *Support Vector Machine* (SVM), *K-Nearest Neighbor* (K-NN), *Decision Tree*, dan *Random Forest*. Tujuan penelitian ini adalah untuk mengidentifikasi jenis kanker kulit, yaitu *benign* dan *malignant* melalui ciri tekstur pada citra. Dataset diperoleh dari platform Kaggle yang dikelola oleh *International Skin Imaging Collaboration* (ISIC), yang dibagi menjadi 2.637 citra untuk data latih dan 660 citra untuk data uji. Tahapan metodologi meliputi *pre-processing* (konversi citra ke *grayscale*, normalisasi, dan *resizing*), segmentasi, *post-processing*, serta ekstraksi fitur GLCM menggunakan parameter kontras, energi, entropi, dan homogenitas. Hasil evaluasi dari keempat algoritma yang diuji menunjukkan bahwa algoritma *Random Forest* memiliki performa terbaik dengan akurasi 92,72%, *precision* 94,44%, *recall* 92,39%, dan F1-Score 93,40%, karena kemampuannya dalam menangani variasi data secara stabil dan mengurangi *overfitting*. Sebaliknya, *Support Vector Machine* (SVM) menunjukkan performa terendah dengan akurasi 66,06%, *precision* 84,44%, *recall* 64,40%, dan F1-Score 73,07%, akibat kurang optimal dalam menangani data dengan distribusi kompleks dan kelas yang saling tumpang tindih. Berdasarkan hasil tersebut, *Random Forest* direkomendasikan sebagai salah satu algoritma yang paling optimal untuk mendeteksi kanker kulit berdasarkan citra dermoskopi sebagai berpotensi mendukung akurasi pengambilan keputusan medis dalam perawatan pasien lebih lanjut.

SUMMARY

The research was conducted to classify skin cancer based on dermoscopic images by applying the Gray Level Co-occurrence Matrix (GLCM) method as a texture feature extraction technique, and comparing the performance of four machine learning algorithms: *Support Vector Machine* (SVM), *K-Nearest Neighbor* (K-NN), *Decision Tree*, and *Random Forest*. The aim of this study is to identify the types of skin cancer, namely *benign* and *malignant*, through texture features in the images. The dataset was obtained from the Kaggle platform managed by the International Skin Imaging Collaboration (ISIC), consisting of 2,637 images for training data and 660 images for testing data. The methodology includes pre-processing (converting images to grayscale, normalization, and resizing), segmentation, post-processing, and GLCM feature extraction using contrast, energy, entropy, and homogeneity parameters. Evaluation results from the four algorithms tested show that the *Random Forest* algorithm performed the best with an accuracy of 92.72%, *precision* of 94.44%, recall of 92.39%, and F1-Score of 93.40%, due to its ability to handle data variations stably and reduce overfitting. Conversely, the *Support Vector Machine* (SVM) demonstrated the lowest performance, with an accuracy of 66.06%, precision of 84.44%, recall of 64.40%, and F1-Score of 73.07%, due to its suboptimal capability in handling complex data distributions and overlapping class boundaries. Based on these results, *Random Forest* is recommended as one of the most optimal algorithms for detecting skin cancer from dermoscopic images and has the potential to support the accuracy of medical decision-making in patient treatment.