

Klasifikasi Kanker Serviks Menggunakan Metode Stacking Classifier Random Forest-Decision Tree-Support Vector Machine = Cervical Cancer Classification Using Stacking Classifier Random Forest-Decision Tree-Support Vector Machine

Antonius Ranga Hapsoro Wicaksono, author

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Abstrak

Kanker merupakan salah satu penyebab kematian utama di dunia, dengan 18,1 juta kasus dan 10 juta kematian pada 2020. Kanker serviks menempati urutan keempat secara global dan kedua di Indonesia. Tingginya angka kematian lebih banyak terjadi di negara berpenghasilan menengah ke bawah karena keterbatasan akses pada pencegahan. Deteksi dini kanker serviks sering sulit dilakukan hingga mencapai stadium lanjut. Salah satu metode deteksi dini adalah menggunakan machine learning. Penelitian ini mengaplikasikan algoritma stacking classifier yang menggabungkan decision tree, support vector machine, dan random forest sebagai first-level learner, serta logistic regression sebagai meta learner, untuk mengklasifikasi pasien kanker serviks. Dataset berasal dari 858 pasien di Hospital Universitario de Caracas, Venezuela. Data dibagi 70% untuk pelatihan dan 30% untuk pengujian, dengan lima percobaan acak. Model menghasilkan akurasi rata-rata 95,03%, precision 99,05%, sensitivity 95,49%, specificity 89,39%, dan G-mean 92,37%. Meskipun stacking ensemble menunjukkan performa yang baik, model tunggal menghasilkan kinerja yang sedikit lebih baik namun tidak signifikan.

.....Cancer is a leading cause of death worldwide, with 18.1 million cases and 10 million deaths in 2020. In Indonesia, there were 396,914 cases and 235,511 deaths. Cervical cancer is the fourth most common cancer globally and the second most common in Indonesia. Higher death rates occur in low- and middle-income countries due to limited access to preventive measures. Cervical cancer is often difficult to detect until it reaches an advanced stage. This research applies a machine learning approach, using a stacking classifier algorithm that combines decision tree, support vector machine, and random forest models as first-level learners, with logistic regression as the meta learner, to classify patients with and without cervical cancer. The dataset, from the UCI Repository, contains data from 858 patients at risk for cervical cancer at Hospital Universitario de Caracas in Venezuela. The data was split into 70% for training and 30% for testing, with five random trials. The model achieved an average accuracy of 95.03%, precision of 99.05%, sensitivity of 95.49%, specificity of 89.39%, and a G-mean of 92.37%. While the stacking ensemble model performed well, single-classifier models showed slightly better performance, though the difference was not significant.