

ABSTRAK

Klasifikasi kanker paru berbasis citra medis memiliki peran penting dalam menunjang diagnosis dini dan pemantauan perkembangan penyakit. Metode konvensional seperti pemeriksaan manual citra histopatologi, *CT scan*, atau *X-ray* memiliki keterbatasan dalam hal subjektivitas interpretasi dan waktu analisis yang lama. *Vision Transformer* (ViT), sebagai arsitektur *deep learning* berbasis mekanisme *self-attention*, menawarkan keunggulan dalam memahami relasi spasial antar fitur secara lebih efektif dibandingkan pendekatan berbasis CNN. Penelitian ini mengadopsi pendekatan CRISP-DM yang mencakup enam tahap: pemahaman bisnis, pemahaman data, persiapan data, pemodelan, evaluasi, dan *deployment*. Dataset LC25000 digunakan dengan tiga kelas utama, yaitu *lung adenocarcinoma*, *lung squamous cell carcinoma*, dan *lung benign tissue*, masing-masing terdiri dari 5000 citra. Seluruh citra diubah ukurannya menjadi 224 piksel dan dibagi menjadi data latih dan uji dengan rasio 80:20. Model dilatih menggunakan TensorFlow dengan konfigurasi *hyperparameter* berupa *learning rate* 0.0001, *batch size* 16, dan 50 *epoch*. Hasil evaluasi menunjukkan bahwa model mencapai akurasi keseluruhan sebesar 98%, dengan nilai rata-rata *precision*, *recall*, dan *F1-score* sebesar 0.98. Model menunjukkan performa sempurna pada kelas *lung benign tissue* dengan *precision*, *recall*, dan *F1-score* sebesar 1.00, serta *F1-score* sebesar 0.97 pada kelas *lung adenocarcinoma* dan *lung squamous cell carcinoma*.

Kata Kunci: CRISP-DM, Klasifikasi kanker paru, *Vision Transformers*

ABSTRACT

Lung cancer classification based on medical imaging plays a crucial role in supporting early diagnosis and disease monitoring. Conventional methods such as manual examination of histopathological images, CT scans, or X-rays have limitations in terms of interpretation subjectivity and long analysis time. Vision Transformer (ViT), a deep learning architecture based on the self-attention mechanism, offers advantages in capturing spatial relationships between features more effectively compared to traditional CNN-based approaches. This study adopts the CRISP-DM framework, which includes six stages: business understanding, data understanding, data preparation, modeling, evaluation, and deployment. The LC25000 dataset was used, containing three main classes: lung adenocarcinoma, lung squamous cell carcinoma, and lung benign tissue, each consisting of 5,000 images. All images were resized to 224×224 pixels and split into training and testing sets with an 80:20 ratio. The model was trained using TensorFlow with hyperparameter settings of a 0.0001 learning rate, batch size of 16, and 50 epochs. Evaluation results show that the model achieved an overall accuracy of 98%, with average precision, recall, and F1-score of 0.98. The model demonstrated perfect performance on the lung benign tissue class, with precision, recall, and F1-score of 1.00, and achieved F1-scores of 0.97 for both lung adenocarcinoma and lung squamous cell carcinoma classes.

Keywords: CRISP-DM, Lung cancer classification, Vision Transformers.