

## ABSTRAK

Meningkatnya penggunaan perangkat digital dalam aktivitas sehari-hari menyebabkan mahasiswa berisiko mengalami digital burnout, yaitu kondisi kelelahan fisik, mental, dan emosional akibat penggunaan teknologi digital secara berlebihan. Penelitian ini bertujuan untuk membangun model *machine learning* menggunakan algoritma Decision Tree untuk mendeteksi dini digital burnout pada mahasiswa Universitas Malikussaleh, mengidentifikasi faktor yang paling berpengaruh, serta mengimplementasikan model ke dalam aplikasi berbasis web. Penelitian menggunakan pendekatan kuantitatif dengan data primer yang diperoleh melalui kuesioner *self-report* dari 101 mahasiswa. Tahapan penelitian meliputi *data cleaning*, *feature engineering*, *encoding*, pembagian data latih dan data uji dengan rasio 80:20, penyeimbangan data menggunakan SMOTE, pembangunan model Decision Tree, serta evaluasi menggunakan *confusion matrix*, accuracy, precision, recall, dan F1-score. Hasil penelitian menunjukkan bahwa model Decision Tree mampu mengklasifikasikan tingkat digital burnout ke dalam kategori rendah, sedang, dan tinggi dengan akurasi sebesar 90,48%. Analisis *feature importance* menunjukkan bahwa variabel Gangguan Akademik (X4) dan Dampak Psikologis Digital (X5) merupakan faktor yang paling berpengaruh terhadap proses klasifikasi. Model yang dihasilkan juga berhasil diimplementasikan dalam aplikasi berbasis Streamlit sebagai media deteksi dini. Dengan demikian, algoritma Decision Tree terbukti efektif dalam mendeteksi digital burnout pada mahasiswa dan berpotensi mendukung upaya pencegahan secara lebih dini.

Kata Kunci: Digital Burnout, Decision Tree, Machine Learning, Self-Report, SMOTE.

## **ABSTRACT**

*The increasing use of digital devices in daily activities has raised the risk of digital burnout among university students, a condition characterized by physical, mental, and emotional exhaustion resulting from excessive use of digital technology. This study aims to develop a Decision Tree-based machine learning model for the early detection of digital burnout among students at Malikussaleh University, identify the most influential factors contributing to digital burnout, and implement the model into a web-based application. This study employed a quantitative approach using primary data collected through a self-report questionnaire administered to 101 university students. The research process included data cleaning, feature engineering, data encoding, splitting the dataset into training and testing sets with an 80:20 ratio, balancing the dataset using the Synthetic Minority Oversampling Technique (SMOTE), developing the Decision Tree model, and evaluating its performance using a confusion matrix, accuracy, precision, recall, and F1-score. The results indicate that the Decision Tree model successfully classified digital burnout into low, moderate, and high categories, achieving an accuracy of 90.48%. Feature importance analysis revealed that Academic Disruption (X4) and Psychological Impact of Digital Technology (X5) were the most influential factors in the classification process. The developed model was also successfully implemented as a Streamlit-based web application for early detection. In conclusion, the Decision Tree algorithm proved to be effective in detecting digital burnout among university students based on self-reported data. The developed model demonstrated high classification performance and has the potential to support early identification of digital burnout, thereby assisting students and higher education institutions in implementing preventive measures more effectively.*

**Keywords:** Digital Burnout, Decision Tree, Machine Learning, Self-Report, SMOTE.