Comparative Analysis of Machine Learning Models for Cervical Cancer Detection

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*Abstract: Cervical cancer remains a significant public health concern worldwide, emphasizing the critical need for early detection and diagnosis. In this study, we conducted a comprehensive comparative analysis of machine learning models to predict cervical cancer based on patient-specific features. Leveraging a dataset containing relevant clinical and demographic information, we explored the efficacy of six distinct algorithms: adaptive boosting, Gaussian Naïve Bayes, XGBoost, decision tree, support vector classifier, and gradient boosting. Through rigorous experimentation and evaluation, we assessed the performance of each model in terms of accuracy, precision, recall, F1-score, and area under the ROC curve. Our findings reveal varying degrees of predictive accuracy among the models, with some demonstrating superior performance over others. Furthermore, we discuss the strengths and limitations of each algorithm and provide insights into their practical implications for early detection and diagnosis of cervical cancer. This study contributes to the growing body of research in machine learning applications in healthcare and underscores the potential of such models to enhance clinical decision-making and improve patient outcomes.*

*Keywords: Cervical cancer, Machine learning, Comparative analysis, Prediction models, Adaptive boosting, Gaussian Naïve Bayes, XGBoost, Decision tree, Support vector classifier, Gradient boosting*

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