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A Comprehensive Analysis of Provider Fraud Detection through Machine Learning

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Abstract: *This research paper presents a comprehensive analysis of healthcare provider fraud detection and analysis using machine learning, drawing insights from diverse literature surveys. The study employs a systematic approach to evaluate methodologies and insights from various academic fields. Leveraging the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, the research synthesizes findings from 27 relevant studies out of 450 articles. The focus lies on characterizing healthcare fraud, emphasizing addressing the limitations and gaps identified in existing literature. The paper introduces a Sequential Forward Selection (SFS) method and SMOTE oversampling for fraud detection, utilizing K-Nearest Neighbors, Artificial Neural Network, Linear Discriminant Analysis, and Gradient Boosting Machine, Classification using a bagging classifier and a stacking meta-estimator. It is recommended to use the Stacking aggregator because it is statistically significant. This study intends to offer insightful information to researchers, legislators, and healthcare practitioners by resolving issues with and gaps in existing methodologies.*

Keywords: Fraud Detection, Machine Learning, Healthcare

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