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Fraud Detection in Online Transactions Using Machine Learning and Data Analytics.

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Abstract: *With the growing dependence on digital transactions, financial institutions and e-commerce platforms face significant challenges in combating fraudulent activities. This research investigates the role of machine learning and data analytics in identifying fraud patterns in online transactions. Several regression and classification models were analyzed, including ensemble techniques like Random Forest, Gradient Boosting, and Extra Trees Regressor, alongside traditional methods such as Logistic Regression, Support Vector Machines (SVM), and K-Nearest Neighbors (KNN). The findings indicate that ensemble models consistently outperform conventional approaches, delivering higher accuracy and better R^2 scores. This study underscores the effectiveness of advanced ML techniques in fraud detection and highlights the necessity of real-time model optimization for enhanced security. Future research should focus on improving hyperparameter tuning and real-time deployment to further enhance fraud detection efficiency.*

Keywords: Fraud Detection, Machine Learning, Data Analytics, Online Transactions, Ensemble Models, Supervised Learning, Classification, Regression, Model Evaluation.