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Abstract

This study explores the application of logistic regression to intrusion detection, framing it as a binary classification problem within the context of Internet of Things (IoT) environments. We investigate various regularization techniques—lasso, ridge, and elastic-net—to assess their effectiveness in model performance enhancement, complemented by a dimensionality reduction approach using Principal Component Analysis (PCA). Utilizing a comprehensive real-time IoT dataset, the models demonstrate high accuracy, with the best performing model, which integrates ridge regularization and the Newton-CG solver, achieving an accuracy of 98.6%. Additionally, models employing PCA to reduce feature dimensionality also showed promising results with accuracy of 98.8%, maintaining high accuracy while reducing computational complexity.