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Title	Classifier Performance Evaluation for Lightweight IDS Using Fog Computing in IoT Security
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Abstract	<p>In this article, a Host-Based Intrusion Detection System (HIDS) using a Modified Vector Space Representation (MVSR) N-gram and Multilayer Perceptron (MLP) model for securing the Internet of Things (IoT), based on lightweight techniques and using Fog Computing devices, is proposed. The Australian Defence Force Academy Linux Dataset (ADFA-LD), which contains exploits and attacks on various applications, is employed for the analysis. The proposed method is divided into the feature extraction stage, the feature selection stage, and classification modeling. To maintain the lightweight criteria, the feature extraction stage considers a combination of 1-gram and 2-gram for the system call encoding. In addition, a Sparse Matrix is used to reduce the space by keeping only the weight of the features that appear in the trace, thus ignoring the zero weights. Subsequently, Linear Correlation Coefficient (LCC) is utilized to compensate for any missing N-gram in the test data. In the feature selection stage, the Mutual Information (MI) method and Principle Component Analysis (PCA) are utilized and then compared to reduce the number of input features. Following the feature selection stage, the modeling and performance evaluation of various Machine Learning classifiers are conducted using a Raspberry Pi IoT device. Further analysis of the effect of MLP parameters, such as the number of nodes, number of features, activation, solver, and regularization parameters, is also conducted. From the simulation, it can be seen that different parameters affect the accuracy and lightweight evaluation. By using a single hidden layer and four nodes, the proposed method with MI can achieve 96% accuracy, 97% recall, 96% F1-Measure, 5% False Positive Rate (FPR), highest curve of Receiver Operating Characteristic (ROC), and 96% Area Under the Curve (AUC). It also achieved low CPU time usage of 4.404 (ms) milliseconds and low energy consumption of 8.809 (mj) millijoules.</p>