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A Proposed Optimized and Efficient Intrusion Detection System for Wireless Sensor Network

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Abstract : In recent years intrusions on computer network are the major security threat. Hence, it is important to impede such intrusions. The hindrance of such intrusions entirely relies on its detection, which is primary concern of any security tool like Intrusion Detection System (IDS). Therefore, it is imperative to accurately detect network attack. Numerous intrusion detection techniques are available but the main issue is their performance. The performance of IDS can be improved by increasing the accurate detection rate and reducing false positive. The existing intrusion detection techniques have the limitation of usage of raw data set for classification. The classifier may get jumble due to redundancy, which results incorrect classification. To minimize this problem, Principle Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Local Binary Pattern (LBP) can be applied to transform raw features into principle features space and select the features based on their sensitivity. Eigen values can be used to determine the sensitivity. To further classify, the selected features greedy search, back elimination, and Particle Swarm Optimization (PSO) can be used to obtain a subset of features with optimal sensitivity and highest discriminatory power. These optimal feature subset used to perform classification. For classification purpose, Support Vector Machine (SVM) and Multilayer Perceptron (MLP) used due to its proven ability in classification. The Knowledge Discovery and Data mining (KDD'99) cup dataset was considered as a benchmark for evaluating security detection mechanisms. The proposed approach can provide an optimal intrusion detection mechanism that outperforms the existing approaches and has the capability to minimize the number of features and maximize the detection rates.

Keywords : Particle Swarm Optimization (PSO), Principle Component Analysis (PCA), Linear Discriminant Analysis (LDA), Local Binary Pattern (LBP), Support Vector Machine (SVM), Multilayer Perceptron (MLP)
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