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网络、通信、安全

基于PSO算法的模糊神经网络的网络异常检测

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摘要 在网络异常检测中，为了提高对异常状态的检测率，降低对正常状态的误判率，提出一种基于粒子群优化算法训练模糊神经网络进行网络异常检测的新方法。在对模糊神经网络训练中采取PSO算法和梯度下降算法相结合的方法，充分发挥PSO全局寻优的能力和梯度下降局部细致搜索优势。实验数据采用KDD CUP99数据集，实验结果表明，该学习算法与传统的梯度下降法（GD）相比，收敛速度快，具有更好的全局收敛性，提高了异常检测的准确性，同时该方法对于新的异常也有较高检测率。

关键词 粒子群优化算法 梯度下降 模糊神经网络 网络异常检测
分类号

Fuzzy Neural Network model based on Particle Swarm Optimization for network anomaly detection

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Abstract
In order to improve the detection rate for anomaly state and reduce the false positive rate for normal state in the network anomaly detection，a novel method of network anomaly detection based on constructing Fuzzy Neural Network（FNN） using Particle Swarm Optimization（PSO） algorithm is proposed.The FNN is trained by the hybrid algorithm which is based on PSO and gradient descent.The model makes full use of the global optimization of PSO and local accurate searching of BP.The well-known KDD cup 1999 intrusion detection data set is used as the experimental data.Experimental result on KDD 99 intrusion detection datasets shows that this learning algorithm has more rapid convergence，better global convergence ability compared with the traditional Gradient Descent（GD） algorithm，and the accuracy of anomaly detection is enhanced.It also shows the remarkable ability of this novel algorithm to detect new type of attacks.

Key words Particle Swarm Optimization（PSO） Gradient Descent（GD） Fuzzy Neural Network（FNN） network anomaly detection

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