AN ARTIFICIAL NEURAL NETWORK FOR INTERNET TRAFFIC CLASSIFICATION

Nikitina L., Abanoub Mohareb Boshra Hella
National Technical University «Kharkiv Polytechnic Institute», Kharkiv

Network traffic is a complex dynamic process. It is generated by different protocols and represents as a combination of many flows with multiple interrelated characteristics. Ensuring the normal and secure operation of networks requires effective methods for monitoring, analyzing and evaluating network performance. Accurate network traffic identification allows operators to more accurately predict traffic parameters and requirements for it, the security service to identify anomalous behavior, and researchers to develop more adequate traffic models.

In this paper, we present a traffic classifier that can provide sufficiently high accuracy for various traffic types. The overall goal of the study was to model and classify network traffic using ANNs. To achieve this goal, the following tasks were solved: studying the characteristics of network traffic packets, studying methods and techniques for classifying network traffic. The developed ANNs were trained and tested. In our study, we used training data sets with categories obtained from the packages without access to the contents of the packages. Traffic classification was performed using known traffic patterns.

The subject of interest of this work was to compare the results of classifying network flows using ANNs of different architectures. After studying existing ANN architectures, we decided to select feedforward, competitive, and LVQ ANNs to solve the network traffic classification problem. To train the ANN, we identified characteristic traffic discriminators for classifying web flows, email flows, P2P, multimedia, and FTP. Input data sets have been previously prepared. During the experiments, we tested the created ANNs and checked their adequacy. For ANN design and simulation, we chose MATLAB Neural Network Toolbox. The results obtained give 95% correct results in the case of Feed Forward Back Propagation and LVQ architectures.