Title: Identifying DDoS attacks in 4G networks using artificial neural networks and principal component analysis

Authors: A.G. Nagesha; G. Mahesh; Gowrishankar

Addresses: Department of CSE, BMSCE, Bangalore, India ' Department of CSE, BMSIT&M, Bangalore, India ' Department of CSE, BMSCE, Bangalore, India

Abstract: Denial-of-service (DoS) attack is one in which attackers make certain queries by sending messages to the remote or target servers with an intention to stop or shutdown the servers. Those messages cause such an impact to the servers that it makes no response for the users. When this DoS attack is performed using number of systems that are compromised for attacking a single system, then it is called as distributed denial-of-service (DDoS) attack. In this paper, an artificial neural network (ANN) combined with principal component analysis (PCA) is used to identify the traffic as normal or a DDoS attack in 4G networks. The feature space dimension is reduced using PCA and the dimensionally reduced features are given as input to the feed forward neural network for training. The experiment is conducted using KDD dataset. The recognition accuracy of the proposed system is improved when compared to the existing systems using RBF networks, naive Bayes and random forest.

Keywords: DoS attacks; artificial neural networks; principal component analysis; 4G networks; KDD dataset.

DOI: 10.1504/IJNVO.2021.117753

International Journal of Networking and Virtual Organisations, 2021 Vol.25 No.1, pp.14 - 28

Received: 06 Jul 2020
Accepted: 09 Nov 2020
Published online: 17 Sep 2021