Graduate School of Science and Technology Master's Thesis Abstract

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Thesis title	Dealing with Imbalanced Classes in Bot-IoT Dataset		

Abstract

With rapidly spreading IoT devices, a network intrusion detection system (NIDS) has an important role to detect and protect various types of attacks in the IoT network. To evaluate the robustness of the NIDS in the IoT network, the existing work proposed a realistic botnet dataset in the IoT network (Bot-IoT dataset) and applied it to the machine learning based anomaly detection. This dataset contains imbalanced normal and attack packets because the number of normal packets is much smaller than that of attack ones. The nature of imbalanced data may make it difficult to correctly identify the minority class. In this thesis, to address the class imbalance problem in the Bot-IoT dataset, we propose a binary classification method with synthetic minority over-sampling techniques (SMOTE). The proposed classifier aims at detecting the attack packets and overcoming the class imbalance problem with the help of SMOTE algorithm. Through numerical results, we demonstrate the fundamental characteristics of the proposed classifier and the impact of imbalanced data on the classifier performance.