

Bio-inspired for Features Optimization and Malware Detection

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Abstract

The leaking of sensitive data on Android mobile device poses a serious threat to users, and the unscrupulous attack violates the privacy of users. Therefore, an effective Android malware detection system is necessary. However, detecting the attack is challenging due to the similarity of the permissions in malware with those seen in benign applications. This paper aims to evaluate the effectiveness of the machine learning approach for detecting Android malware. In this paper, we applied the bio-inspired algorithm as a feature optimization approach for selecting reliable permission features that able to identify malware attacks. A static analysis technique with machine learning classifier is developed from the permission features noted in the Android mobile device for detecting the malware applications. This technique shows that the use of Android permissions is a potential feature for malware detection. The study compares the bio-inspired algorithm [particle swarm optimization (PSO)] and the evolutionary computation with information gain to find the best features optimization in selecting features. The features were optimized from 378 to 11 by using bio-inspired algorithm: particle swarm optimization (PSO). The evaluation utilizes 5000 Drebin malware samples and 3500 benign samples. In recognizing the Android malware, it appears that AdaBoost is able to achieve good detection accuracy with a true positive rate value of 95.6%, using Android permissions. The results show that particle swarm optimization (PSO) is the best feature optimization approach for selecting features.

Keywords: Android · Mobile devices · Bio-inspired algorithm · Features optimization · Machine learning