UNIVERSITI TEKNOLOGI MARA

AN IMMUNE-GENETIC ALGORITHM WITH TABU LOCAL SEARCH FOR NETWORK INTRUSION DETECTION SYSTEM

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MSc

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Internet provides almost unlimited connection nowadays and it is widely used in our daily life such as in industrial, IoT and consumer applications. Due to the nature of borderless connection, all parties face huge challenges in providing the best quality of services especially in terms of security. Even with the existing security measure such as firewalls, Intrusion Detection System (IDS) and antivirus to defend the network, the networks are still vulnerable and its resources can be compromised by the third party. This issue highlights the need to tackle the network intrusion problem efficiently. This research aim is to study the performance of an improvised Genetic Algorithm (GA) by formulating its problem-specific algorithm for network intrusion problem. The development and implementation of the proposed technique was involved the process of modifying the standard GA so that it is good and specific enough to tackle this network intrusion problem effectively. This research was conducted based on KDD Cup 1999 dataset which contains a standard dataset with wide range of intrusions gathered from military network. The performance of the proposed method and other existing techniques (Genetic Algorithm, Artificial Immune System and Immune-Genetic Algorithm) were analysed to evaluate and determine its efficiency in terms of maximum intrusion detection rate and the highest true positive rate. At the end of the experiment, the proposed technique has achieved 98.809% and 99.639% for intrusion detection rate and true positive rate respectively. The results of this study show that the proposed method which is the combination of Genetic Algorithm, Artificial Immune System (AIS) and local search has produced the desired results. This model has the good potential to be further investigated for other research areas. It is hoped that the study can contribute to the improvement of system performance in terms of intrusion detection in computer networks.

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