INTRODUCTION

With the wide spreading usages of internet and increases in access to online contents, cybercrime is also happening at an increasing rate [1-2]. Intrusion detection is the first step to prevent security attack. Hence the security solutions such as Firewall, Intrusion Detection System (IDS), Unified Threat Modeling (UTM) and Intrusion Prevention System (IPS) are getting much attention in studies. IDS detects attacks from a variety of systems and network sources by collecting information and then analyzes the information for possible security breaches [3]. The network based IDS analyzes the data packets that travel over a network and this analysis are carried out in two ways. Till today anomaly based detection is far behind than the detection that works based on signature and hence anomaly based detection still remains a major area for research [4-5]. The challenges with anomaly based intrusion detection are that it needs to deal with novel attack for which there is no prior knowledge to identify the anomaly. Hence the system somehow needs to have the intelligence to segregate which traffic is harmless and which one is malicious or anomalous and for that machine learning techniques are being explored by the researchers over the last few years [6]. IDS however is not an answer to all security related problems. For example, IDS cannot compensate weak identification and authentication mechanisms or if there is a weakness in the network protocols.

Studying the field of intrusion detection first started in 1980 and the first such model was published in 1987 [7]. For the last few decades, though huge commercial investments and substantial research were done, intrusion detection technology is still immature and hence not effective [7]. While network IDS that works based on signature have seen commercial success and widespread adoption by the technology based organization throughout the globe, anomaly based network IDS have not gained success in the same scale. Due to that reason in the field of IDS, currently anomaly based detection is a major focus area of research and development [8]. And before going to any wide scale deployment of anomaly based intrusion detection system, key issues remain to be solved [8]. But the literature today is limited when it comes to compare on how intrusion detection performs when using supervised machine learning techniques [9]. To protect target systems and networks against malicious activities anomaly-based network IDS is a valuable technology. Despite the variety of anomaly-based network intrusion detection techniques described in the literature in recent years [8], anomaly detection functionalities enabled security tools are just beginning to appear, and some important problems remain to be solved. Several anomaly based techniques have been proposed including Linear Regression, Support Vector Machines (SVM), Genetic Algorithm, Gaussian mixture model, knearest neighbor algorithm, Naive Bayes classifier, Decision Tree [3,5]. Among them the most widely used learning algorithm is SVM as it has already established itself on different types of problem [10]. One major issue on anomaly based detection is though all these proposed techniques can detect novel attacks but they all suffer a high false alarm rate in general. The cause behind is the complexity of generating profiles of practical normal behavior by learning from the training data sets [11]. Today Artificial Neural Network (ANN) are often trained by the back propagation algorithm, which had been around since 1970 as the reverse mode of automatic differentiation [12].

The major challenges in evaluating performance of network IDS is the unavailability of a comprehensive network based data set [13]. Most of the proposed anomaly based techniques found in the literature were evaluated using KDD CUP 99 dataset [14]. In this paper we used SVM and ANN –two machine learning techniques, on NSLKDD [15] which is a popular benchmark dataset for network intrusion.