

## ABSTRACT

The increasing of use the network on computer especially for data and information that are important and has a large scale, on the other hand it can caused a problem that are the intrusions on the network. Intrusion Detection System (IDS) is the process of monitoring the activity that occur on the system or the network and can analyze whether there is a normal activity or an intrusion. In this final task, supervised anomaly detection on Intrusion Detection System (IDS) using the method of Artificial Neural Network (ANN) of the modified backpropagation on KDD CUP 1999 intrusion detection dataset to detect intrusion and normal data with the performance of each class and the average of f-measure. The main problem is the backpropagation takes a relatively long time to achieve a convergence.

Using Fletcher Reeves Conjugate Gradient algorithms to achieve a convergences in a faster time, because it gives a less number of epoch. Then using 4 (four) of technique of line search in the training process on modified backpropagation is expected to give a better result for classification to detect intrusion and the time is more efficient because it can minimize the search direction with parameter  $\alpha$ ,  $\beta$  and direction. Then analyzed on 4 (four) of line search based on the number of epoch, MSE and the average of f-measure.

Based on the results, on training using 16000 record have a better results, using the average of f-measure for performance system. The Brent's Search given the average of f-measure is 41.99%, the Charalambous's Search given the average of f-measure is 47.67%, the Golden Section Search given the average of f-measure is 44.15% and the Hybrid Bisection-Cubic Search given the average of f-measure is 54.13%. Hybrid Bisection-Cubic Search is a best line search to use on modified backpropagation in this case. Because it has the minimum of number of epoch, the best MSE and the best accuracy of testing in classification classes. This is caused on the hybrid bisection-cubic search has a lot of calculation at each step therefore it can gives a good convergence.

Based on the results, the performance already quite promising compared to standard backpropagation with average of f-measure is 42.04% and the number of epoch reached the maximum that is 1001 epoch and have yet to achieve convergence.

**Keyword:** Backpropagation, Conjugate Gradient Fletcher Reeves, Line Search, Intrusion Detection System, Anomaly Detection, Artificial Neural Network.