ABSTRACT

Fraud is a common phenomenon faced by many services and causes a considerable financial impact on all service providers. One of the sectors that are particularly vulnerable to fraud case is the telecommunication sector because it is technology-intensive sectors. The rapid development of technology and equipment, the programming languages, the ease of its use and connectivity have increased the potential incidence of fraud using new methods. On the other hand, the exponential growth of telecommunication data makes the fraud handling unable to be handled manually by some dedicated resources . It must be supported by a monitoring tool.

One of the services in the telecommunications sector to handle fraud incident is the service International Direct Dial (IDD) Call. Although these services can be replaced by many applications based on Voice Over Internet Protocol (VOIP) in the smartphone, laptop or Personal Computer (PC) , the quality of internet broadband in Indonesia degrades the quality of the service. This enlarges the use IDD Call, especially for important events which require good quality of international call conversation. IDD call service in PT Telkom Indonesia is divided into two categories : the clear channel and VOIP services. Using clear channel is to use the dedicated international voice network to have reliable quality but higher price. While using VOIP services is to use a channel that has a lower price, but lower quality than using the clear channel. This research conducted by using real data set from PT Telkom Indonesia's Call Data Record (CDR).

Many data mining methods have been implemented for fraud handling, including classification, clustering, difference measurement or a combination thereof. In this research used hybrid NBTree and Kullback Leibler divergence to detect fraud suspect on IDD call service. Kullback Leibler divergence has proven in applications including fraud detection, similarity measurement, feature selection, etc. NBTree, in general, has an outperform than Decision Tree and Naive Bayesian in accuracy and tree size. NBTree also has the ability to handling large size data. Combining all the benefits of both methods can provide better accuracy and F1Measure compared with previous methods : Naive Bayesian Classifier, hybrid Naive Bayesian – Kullback Leibler divergence and Support Vector Machine (SVM) with the average increased the accuracy values and F1Measure values were 0,028% and 11,524%. This increase was followed by 2.253.448 second increased fraud duration identified or similar with Rp 133.921.130,00 revenue. Ultimately it can decrease the cost from Rp 114.298.921,00 becomes Rp 18.402.803,00 and the benefit of using the proposed method is Rp 3.330.000,00 or similar with 333 True Negative cases.