CHAPTER I

INTRODUCTION

I.1 Background

Currently the need for data communications and the Internet is something that is fundamental, especially for business enterprises to share information. Various technological innovations in packaging information offered along with improving the quality of services such as data communication services any to any connection IP-based multi-protocol label switching (MPLS), Ethernet-based services and internet services which is one of the media that are important to the community, both for telecommunications, looking for information or for social networking.

Levels of capacity needs in each region are different region then it takes a mature network analysis. Network analysis is usually used for three things such as: problem solving (troubleshooting) on the network, Performance optimization/ performance networking, planning and testing (planning / testing) network.

Traffic of a data communication network is a factor that affects the performance of communication performance data itself. Traffic is the use that can be measured within a certain time period (how long, when). Network traffic data is an important indication to optimize the performance, reliability and design network of data communication. Data traffic is time series data in the form of seasonal, ie patterns that tend to repeat significant at certain seasonal periods

In the telecommunications services required prediction / forecast network capacity requirements to the quality of telecommunication services can be maximized. Forecasting is the estimation of something that will happen in the future based on existing data in the present and the past (historical data). Forecasting the density of traffic for the foreseeable future is an important factor for the procurement strategy or development tools that support the availability of services at the right time and location[2]. By knowing the amount of traffic of a data communication network in the future it can be expected that the capacity should be provided on the network in the future. Forecasting traffic can also help to detect anomalies in the network[2]. Attacks on network security such as Denial of Services, viruses and even irregular amounts of SPAM in theory can be detected by comparing real traffic with traffic forecasting results

by using a forecasting algorithm. Early detection of this anomalous situation will lead to a more reliable network service

Research related to the prediction of traffic in a network has been predicting Internet traffic TCP / IP from an internet service provider with the method of Neural Network Ensembles (NNE) which is a merger of several neural network is compared with the methods of Time Series Forecasting (TSF). The data taken is the real time traffic data (every five minutes) and short-term (hourly) over a period of 24 hours in realtime. The result shows that the forecasting approach with NNE methods more competitive with lower error. For real-time forecasting error obtained only by 1-3% for forecasting traffic five minutes ahead and error of 11-17% for forecasting the next two hours (Paulo Cortez, Miguel Rio, Miguel Rocha and Pedro Sousa, 2006).

One of the training methods and neural network models is the method of Radial Basis Function Network (RBFN). This method is a hybrid method of the two methods on the Neural Network training method of guided and unguided training. Where the incorporation of these methods to address or resolve a system that has a high degree of nonlinearity.

Research using Radial Basis Function method combined with the method of genetic algorithms has been done to predict the load on a power system with a resulting increase in accuracy compared with the traditional method of prediction of 3:05% to 5:38%. (The Zhangang, Che Yanbo, K.W. Eric Cheng, 2007). The possibility of using artificial neural network for predicting of TCP/IP packet network user traffic characteristic was also presented which successfully proved that Radial Basis Function with proper selection of network type, training algorithm and training data set allows to achieve satisfactory result even in case of dynamic, rapidly changing packet traffic source (Arkadiusz Zaleski, Tomasz Kacprzak, 2010)

This research will process data communication traffic data and then analyze the needs of Internet traffic on a network by using Artificial Neural Network Radial Basis Function particular method. This study will analyze, design and implement the configuration to get the best neural network in its use for classifying the data.

I.2 Problem Formulation

Based on the above formulation of the problem can be made as follows:

1. There is a need for telecommunications service providers to perform traffic forecasting in future
2. How to make a forecasting method of data traffic in the future by using artificial neural networks Radial Basis Function Network Method
3. How does the analysis of the accuracy of traffic forecasting system with Radial Basis Function method can be used in forecasting traffic data.

I.3 Objective

1. Creating an information system that can predict the amount of traffic on the data communication by designing a neural network that can provide the introduction level of MSE (Root Meant Square Error)
2. Knowing the level of data traffic needs in the future by predicting changes in traffic using Neural Network Radial Basis Function method.

I.4 Hypotheses

In the operation of telecommunications networks the method of prediction / forecasting the amount of traffic on the data communications will help determine the need for network capacity and help to detect anomalies in the network so that the delivery time to the customer service will be shorter and the quality of telecommunication services can be maximized.

I.5 Scope of Work

Forecasting traffic in this study is limited as follows:

1. Discussing the data traffic on the internet network of PT Telkom's customer. That is Indonesia University.
2. The traffic data captured includes inbound and outbound traffic taken from 1 January 2014 to 31 December 2014

3. Prediction of traffic in data communications using Artificial Neural Networks (neural network) with a radial basis function method as appropriate to complete a system that has a high degree of nonlinearity.

4. Forecasting is daily regardless of the feast .

5. Analysis performed only based on the data obtained in the traffic data collection

I.6 Research Methodology

The method used in this study are as follows :

1. Place and Time

   The study was conducted at the Telkom Office, Multimedia Tower Building Jakarta and at mathlab laboratory of Telkom University, Bandung over a period of 6 months from March 2015 until Agt 2015

2. Studi literature

   To learn the basic theory of literature related to :
   - Data Communication
   - Theory of Traffic
   - Neural Network

3. System Design

   Data designing, inputing and processing through The neural network. Pengumpulan

4. Preparation and Testing System

   This is the stage of the manufacturing system and then conducted tests on the system to see the the accuracy of the system that has been designed

5. Analysis the result of datas which have been processed through Artificial Neural Networks Radial basis function method.

6. Making conclusions about the results.