SUMMARY

Application of Artificial Neural Network method at the factors that influence the occurrence of pulmonary tuberculosis

Pulmonary TB disease is most infectious diseases in Indonesia and caused many deaths. Many factors can influence the occurrence of pulmonary TB infection include age, gender, educational level, occupation, smoking habits, socioeconomic, home ventilation, chronic illness, and contact with situation pulmonary tuberculosis people. Artificial neural network analysis method is expected to classify household members who are at risk for pulmonary tuberculosis occurred so it can help determine policy in decrease to reduce the incidence of pulmonary tuberculosis. Method of artificial neural network approach is used because this method has better classification ability than the method of discriminant or logistic regression classification is often used in classification.

The purpose of this study is to analyze the accuracy of the classification to the factors that influence the occurrence of pulmonary tuberculosis infection. This type of research is non-reactive of unobstruktif research, with a research sample derived from data RISKESDAS in 2010 by taking the data of household members living with pulmonary tuberculosis sufferers in the province of West Papua, The West Papua because province was the region with the highest tuberculosis rate that is equal to 3%. The research variables were age, sex, educational level, occupation, smoking habits, socio-economic situation and the presence of ventilation in the house which is a predictor variable, while the response variable / target is the risk of pulmonary TB infection. Members of households categorized as at risk or not based on the total score obtained from the score predictor variable. The sample research was of household members living with pulmonary tuberculosis patients by 70 respondents.

Before doing the analysis of neural networks in advance the distribution of data into training and testing data. From the 70 data is divided into 70% training data and 30% testing data. Method of analysis using backpropagation artificial neural network. Used the standard backpropagation training is guided training and use sigmoid binary activation function for hidden layer and output layer. Network architecture uses three layers with added momentum. Training data on the network done by trial and error for the equal of nodes in the hidden layer with a choice of the equal of nodes between 1 to 10. Having found the value of the minimum MSE and the equal of iterations, then performed the experiment by adding the value of learning rate in backpropagation standard. Adding value lerning rate done by trial and error with the variation value between 0.1 to 0.9.

Training results from the training data shows the MSE values of 1.14732 e-005 achieved in the epoch 11 with the parameters used learning rate 0.25, and target error 0.0001. Architecture of artificial neural network consists of an input layer with 7

nodes, one hidden layer with 10 hidden nodes, and an output layer with 1 node. Where architecture is produced 100% accuracy of classification objects can be classified appropriately.

Results of testing a network that has been trained with new data that have not been trained in the MSE value of 1.4287e-008 obtained achieved in the six epoch and the calcification 100% data can be recognized so that all data can be classified according to the desired target. To develop this method can be carried out trials with the combination of hidden variables and nodes are more varied and more detail in the testing data.

ABSTRACT

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One method of classification is often used is discriminant analysis and logistic regression. In the discriminant analysis are the assumptions that must be met by the data, and not all data can meet the assumption. While logistic regression requires complete data, sensitive to outliers and the results of the classification be the probability that the outcome less than the maximum. Because we need analytical methods with good classification accuracy. Artificial neural network method is a method that can be used for classification with good accuracy. The purpose of this research was to determine architecture neural network that the maximum and know the size of the ability of artificial neural networks in classifying data. Based on the results of research using neural networks with backpropagation method of training data obtained maximum results. The architecture neural network that is obtained, consisting of 1 input layer with 7 nodes, 1 hidden layer with 10 hidden nodes, and 1 output layer with 1 node. That architecture resulted in classification accuracy with MSE values of 1.14732 e-005 is reached at epoch 11 with learning rate parameters used in 0:25, and the target error 0.0001. These results indicate that no data object is wrong in classifying 100% of objects can be classified correctly. Tests carried out with the new data network that produces MSE value of 1.4287 e-008 achieved at 6 epochs and 100% of data can be recognized with appropriate data classification target.

Keywords: Artificial neural network, backpropagation, factors affecting pulmonary TB infection.