A WATER USAGE FORECASTING AT SURABAYA REGIONAL WATER COMPANY USING ADAPTIVE NEURO FUZZY INFERENCE SYSTEM

Nama Mahasiswa : Nasrul Amir
NRP : 5104 109 614
Jurusan : Teknik Informatika FTIf-ITS
Dosen Pembimbing : Ahmad Saikhu, S.St., M.T.

Abstract
Planning has a crucial role in management. Almost all of management activity has been managed in advance. Important tool to make planning more effective and efficient is forecasting. Because it helps you to know what will happenend in a planned time.

Adaptive Neuro-Fuzzy Inference System is one of forecasting method that combines functions in a fuzzy logic and neural network, so more perfect algorithm can be gotten. Adaptive Neuro-Fuzzy Inference System also involve the use of Fuzzy C-Means Algorithm for grouping data, and hybrid learning algorithm that consist Least Square Estimation and Gradien Descent for fixing the parameters of Adaptive Neuro-Fuzzy Inference System.

the result of experiments using 4 model data input prove that the smallest average error from the prediction of each customer's water usage in PDAM Surabaya generated by different input models. The best result for zone 1, zone 2 and zone 3 is using model 5. The best prediction result for zone 4 and zone 5 is using model 3. best MAPE for zone 1 is 3.78, zone 2 is 4.32, zone 3 is 3.69, zone 4 is 3.92 and zone 5 is 3.3.

Mape calculation's result shows that our forecasting method, Adaptive Neuro Fuzzy Inference System model of Takagi-Sugeno FIS successfully implemented for forecasting time series data on water usage in the case of PDAM Surabaya.

Key Words: Fuzzy C-Means, ANFIS, LSE, Gradien Descent