Forecasting of natural gas consumption with neural network and neuro fuzzy system

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The prediction of natural gas consumption is crucial for Turkey which follows foreign-dependent policy in point of providing natural gas and whose stock capacity is only 5% of internal total consumption. Prediction accuracy of demand is one of the elements which has an influence on sectored investments and agreements about obtaining natural gas, so on development of sector. In recent years, new techniques, such as artificial neural networks and fuzzy inference systems, have been widely used in natural gas consumption prediction in addition to classical time series analysis. In this study, weekly natural gas consumption of Turkey has been predicted by means of three different approaches. The first one is Autoregressive Integrated Moving Average (ARIMA), which is classical time series analysis method. The second approach is the Artificial Neural Network. Two different ANN models, which are Multi Layer Perceptron (MLP) and Radial Basis Function Network (RBFN), are employed to predict natural gas consumption. The last is Adaptive Neuro Fuzzy Inference System (ANFIS), which combines ANN and Fuzzy Inference System. Different prediction models have been constructed and one model, which has the best forecasting performance, is determined for each method. Then predictions are made by using these models and results are compared.

Keywords: ANN, ANFIS, ARIMA, Natural Gas, Forecasting