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"Processamento de Alarmes em Subestações de Energia Elétrica Utilizando Sistemas Inteligentes"

Modern Energy Management Systems receive a huge number of alarms and messages coming from remote sensors placed in system substations whenever a disturbance occurs. In such situations, these alarms reach the control center simultaneously and system operators have to analyze them in order to take decisions for recovering energy supply. Besides the huge amount of information to be processed, other problems such as protection systems failures, communication problems, corrupted data, etc. can make the diagnosis procedure a very difficult task. Alarm processing may be viewed as a pattern recognition problem, where the observed alarms have to be mapped to the corresponding class, which identifies the faulted equipment. The recognition process complexity is strongly correlated to the availability of relevant information for the problem under study. This work aims the development of a methodology based on artificial neural networks for alarm processing in electrical energy substations. First, a technique to perform the analysis of the available information set is proposed. Then, neural classifiers are constructed for detecting faults in equipments of a typical substation, being capable of performing good classifications even in the presence of protection devices failures or corrupted data. Diagnosis criteria, based on the neural classifiers responses, are also proposed. The methodology performance is evaluated through performance indices obtained from tests with a real substation.