UNIVERSITI TEKNOLOGI MARA

ELECTRICITY LOAD PROFILE DETERMINATION BY USING FUZZY C-MEANS AND PROBABILITY NEURAL NETWORK

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ABSTRACT

Information from load profile is useful for electricity suppliers to plan their generation, improving their market strategies and load balancing. Consumers in the new liberalized market have the opportunity of choosing their electricity suppliers between several suppliers and the possibility to access to new products and services from them. Hence they need the knowledge of load profile to help them choose their electricity supplier. On the suppliers' side, power market becomes competitive and energy commercializers are becoming more interested in the development of new suitable strategies and products to be offered to each of their different user or to find new market opportunities. A lot of efforts have been made to investigate methodologies to form optimal efficiency in determining typical load profiles (TLPs), derived from various clustering and classification techniques. Methodologies proposed in previous work have disadvantages such as time consuming, expensive, poor performance over large scale simulation and produced overlapped data in the obtained TLPs. To overcome these problems this project proposes a methodology for determining consumers' TLPs by using fuzzy C-means (FCM) clustering method and probability neural networks (PNN) classification techniques. FCM is used in this study as it allows one data to belong to more than one group by assigning the membership function according to the distance of the data with the cluster center. This method will give the best result when clustering the overlapped data in load profile. PNN is a fast training process to do the classification activities. As compared with the backpropagation method in literature review, it gives better result when classifying large data sets. The objectives of this project are to use FCM as the clustering algorithm to establish TLPs. The optimal number of cluster for FCM is obtained through cluster validity analysis. Furthermore the best value of 'fuzzification' parameter, *m* of FCM will be determined. Next PNN is used to classify load profile according to its group. Results obtained show that FCM algorithm can be used as the clustering method to obtained TLPs and PNN is proven to be reliable to allocate the measured load profiles accurately according to their type of consumers.

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