UNIVERSITI TEKNOLOGI MARA

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

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Thesis submitted in fulfilment of the requirement for the degree of Master of Science

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April 2015
ACKNOWLEDGEMENTS

First and foremost, I am grateful to Allah SWT for giving me the opportunity and strength to complete this thesis. Without the blessing and compassion, the completion of this thesis would be impossible.

I would like to express my special appreciation and thanks to my advisor Assoc. Prof Dr Zuhaina Zakaria, who have been a tremendous mentor for me. I would like to thank you for encouraging my research. Her support, advices, guidance, valuable comments, suggestions and provisions have been priceless and have helped me in the completion and success of this study. Indeed, without her guidance, I would not be able to put the study together.

A special thanks to my beloved husband, Mahathir Norman. I can’t be grateful enough for his unconditional support and for the sacrifices that he has made on my behalf.

Last but not least, I would like to thank my parent, Anuar Abdul Jalil and Rossazannah Omar for the support they provided me through my entire life. Without their countless prayers and morale support, I would have not been able to finish this course.
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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