

PERFORMANCE ANALYSIS OF DECISION TREE MODEL IN PREDICTING WOMEN'S BEHAVIOURAL ADOPTION OF MAMMOGRAPHY FOR EARLY BREAST CANCER DETECTION

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ABSTRACT

Breast cancer is leading cancer occurring to women globally. Early detection of breast cancer could result in reduced mortality and morbidity rate as well as cancer treatment cost. In this study, a data mining method called the decision tree is utilised to predict women's intention in adopting mammography for early breast cancer detection. The study is intended to investigate how using different validation, and optimisation techniques might have an impact on decision tree predictive performance. The application of data mining method is of the aim to produce predictive modelling that can make future predictions by learning from the previous data. The data from this study was collected amongst 500 women in Kuantan, Pahang using a validated self-developed questionnaire to elicit the health beliefs of women towards breast cancer and mammography as well as its' relation to their intention in practising mammography. By using RapidMiner software, data modelling was done using a decision tree to predict women's behavioural adoption towards mammography. The predictive performance of the tree was enhanced through several methods of validation and optimisation and further be analysed through its accuracy, sensitivity and specificity. The model was found to perform better when using a combination of method, namely the split validation, the threshold as well as weight and parameter optimisation. Based on the results, a finalised decision tree was created based on the model that give the best performance results. Despite many decision tree studies that relate to breast cancer, yet only a few studies have been carried out to determine the behavioural pattern of Malaysian women's towards breast screening. Knowing the women's behavioural adoption towards breast screening in relation to their beliefs and perception will be a promising approach in early-stage breast cancer detection.

Keywords: Breast Cancer, Mammography, Health Belief Model, Machine Learning, Decision Tree

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