UNIVERSITI TEKNOLOGI MARA

THE DEVELOPMENT OF BODY SIZING SYSTEM FOR SCHOOL-AGED CHILDREN USING THE ANTHROPOMETRIC DATA

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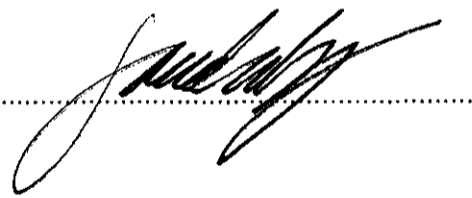
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ABSTRACT

The purpose of this study is to explore the variations of children's body shapes and sizes in order to develop a standard sizing system for children's wear using the anthropometric data. An anthropometric survey was conducted to measure 2050 male and female children within the age group of 7 to 17. The children is a representative of major ethnic groups in Malaysia namely the Malay, Chinese and Indian from both urban and rural areas in Selangor which is one of the states of Malaysia. Multivariate statistical techniques were used to analyze the data, including principal component analysis, k-means clustering, and decision tree technique. Four key dimensions were selected based on the PCA technique namely the height, chest, bust and hip girth which were revealed as the most significant variables. Consequently, these dimensions were used to divide the sample population into homogenous groups according to upper and lower body using cluster analysis technique. The cluster groups categorized the body shapes and sizes of the sample population. These cluster groups are then verified using the decision tree technique, which gave a profile of each cluster groups. The percentage of correctness of classification for each cluster group is high ranging between 80% to 90%. With the classified rules obtained from the decision tree technique, eight sizing systems were developed for female and male in two age groups; 7-12 and 13-17 to fit the upper and lower body. The body sizing system successfully accommodates more than 90% of the sample population. This body sizing system is validated using the aggregate loss of fit, which range between 2.5 and 3.2 cm lower than the ideal aggregate loss of 3.6 cm. This shows that the sizing system is accurate. The total sizes for each sample group ranges between 24 and 28, which is lower as compared to sizing systems used for children in other countries such as Korea and Taiwan. This study presents a sizing model for children's wear, which is recommended to be use for the benefits of both the customers and manufacturers.

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