

RANKING RUNNING SHOES BY USING FUZZY TOPSIS

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ABSTRACT - Running is a popular physical activity that offers numerous health benefits and is enjoyed by all ages of people and fitness. However, choosing proper and suitable running shoes is crucial and not easy because there are many criteria that need to be considered and human's feelings and perception is ambiguous. This research aims to rank or select running shoes based on several criteria that need to be considered. The criteria considered in this study were six criteria namely stability, durability, comfort, motion control, flexibility, and design. Other than that, this study also aims to compare fuzzy multicriteria decision making ranking with runner's original ranking. This study presented a fuzzy multi-criteria decision making (MCDM) method which is fuzzy Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) and an experienced runner has been chosen as a decision maker in this study. Based on the results of this study, Zoomfly is the best running shoes compared to 3 others which are Phantom, Aerobounce, and Ultraboost that are top one in the ranking according to the decision maker. The result of this study also showed the similarity in fuzzy TOPSIS running shoes ranking with runner's original running shoes ranking. This study proved that Fuzzy TOPSIS is a good method for ranking alternatives hence can help runners to make a better decision and compare which brand are preferable in running shoes.

Keywords: Fuzzy TOPSIS, decision making, running shoes

1. INTRODUCTION

It is important for runners to make informed decisions based on their own needs and characteristics in order to choose the best running shoes for themselves. The purpose of this study is to help runners choosing their suitable running shoes. This study was collected data from a decision maker who is runner that has experienced with running since childhood. There are six criteria that runners should considered when selecting running shoe which are stability, durability, comfort, flexibility, motion control, and design. The specific objective for this study is to rank running shoes by using Fuzzy TOPSIS and to compare fuzzy multicriteria decision making ranking with runner's original ranking.

2. METHODOLOGY

The data was collected by decision maker who has many experienced in running. This study will using Fuzzy Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) as a method. Fuzzy TOPSIS offers a solution for decision-makers when dealing with real-world data, which are typically multi-attribute and entail a complicated decision-making process. The Fuzzy Positive Ideal Solution (FPIS), which is chosen as the best option in the TOPSIS technique, is one which is both the closest to and the furthest from the Fuzzy Negative Ideal Solution (FNIS). FPIS comprises the optimal performance values for each alternative, whereas FNIS comprises unfavorable performance values. In order to determine the closeness coefficient for each alternative, we need to identify the distance from each alternative and the FPIS and FNIS. The alternative that has the highest closeness coefficient will be number one ranking of running shoes for decision maker.

3. RESULTS AND DISCUSSION

There are two result that we can conclude for this study. The first result shown that, A3 (Zoomfly) has the highest closeness coefficient value which is 0.420. Thus, A3 (Zoomfly) is the most preferred running shoes by Imran. Other than that, this study also aimed to compare fuzzy multicriteria decision making ranking with runner's original ranking. From this, it shows that fuzzy TOPSIS ranking is the same as Imran's ranking for all running shoes. This shows that Fuzzy TOPSIS result is aligned with Imran's perception about his running shoes. Based on this research, the results of this study shows that Fuzzy TOPSIS is a good method for ranking alternatives based on several criteria.

4. NOVELTY OF RESEARCH / PRODUCT

There have been a few research that have using fuzzy TOPSIS. According to the paper by (Aziz et al.,2021), this paper presented fuzzy TOPSIS to rank the best online shopping website. The findings showed that, fuzzy TOPSIS provides flexibility in decision-making as it allows for the inclusion of both quantitative and qualitative criteria. This study benefits runners by allowing them to identify the best running shoes for them. Aside from that, this study benefits brands because each brand's specialty must make runners choose their favourite sport shoes. By applying this approach, the researcher has proved that Fuzzy TOPSIS method has its vital role in reducing the selection.

5. CONCLUSION

Fuzzy TOPSIS is an effective method for ranking the selection of running shoes. Selecting the right running shoes is a crucial task due to the various criteria involved and the subjective nature of individual preferences. For future researcher, one of the improvements that can suggested is researcher can add another decision maker, adding more criteria and alternative. For example, researcher can add more brands and another model for shoe selection. A future study could focus on comparing the outcomes of two runners in selecting the optimal running shoes from different brands. Utilizing Fuzzy TOPSIS, which has been identified as the most effective method for ranking running shoes, would be preferable for this comparison.

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