Chapter 9

Website Evaluation Using Interval Type-2 Fuzzy-Number-Based TOPSIS Approach

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ABSTRACT

In recent years, with the development of the internet, there has been an increase in interest in the internet thanks to other technological developments. In the face of increased user demand, educational institution websites have to maintain high quality of service for a sustainable success. The authors present the possibility degree based TOPSIS method with IT2F numbers as an extension of TOPSIS method to evaluate the educational institution websites. In contrast to precise numbers in TOPSIS method, the merit of fuzzy TOPSIS method is to handle the fuzzy numbers to evaluate the alternatives. Type-1 fuzzy numbers consider crisp membership degrees to express fuzzy numbers but IT2F numbers handle more uncertainties than type-1 fuzzy numbers. The subjective judgments of the decision makers are aggregated by using the IT2F number operations to determine the weights of these criteria. IT2TrF numbers-based TOPSIS phase is employed to rank alternatives based on criteria so that assessment process is completed. The proposed method is applied to evaluate the educational institution websites.

DOI: 10.4018/978-1-5225-8238-0.ch009
INTRODUCTION

Information storage is one of the basic attributes of corporation performance. Internet, which is indispensable for our daily activities, ensures storing large datasets. Internet affects marketing methods as handling relationships between consumers and corporations. Websites of big corporations present interactive experience to the consumers to help deciding between buying alternatives. Similarly, educational institutions must develop their websites to increase the content and quality of information for users. The future and current students can reach the desired information more easily. The quality of the institution websites also help to the institution's own teaching personnel looking for specific information related to the teaching process and scientific research (Pamučar et al., 2018).


We present the possibility degree based TOPSIS method with IT2F numbers as an extension of TOPSIS method. In contrast to precise numbers in TOPSIS method, the merit of fuzzy TOPSIS method is to handle the fuzzy numbers to evaluate the alternatives. Type-1 fuzzy numbers consider crisp membership degrees to express fuzzy numbers but IT2F numbers handle more uncertainties than type-1 fuzzy numbers. IT2F numbers ensure us with additional information to describe the fuzziness and the uncertainty of the real-life world. This study aims to extend the TOPSIS method by utilizing interval type-2 trapezoidal fuzzy (IT2TrF) numbers in order to model more uncertainties of the subjective judgments in complex problems. The aim of this study is to introduce a novel IT2F TOPSIS method based on possibility mean value and possibility degree. This study uses the approximate positive and negative ideal solutions with IT2TrF numbers to evaluate the alternatives. This
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