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A Review on Picture Fuzzy Aggregation Operators

Abstract

Multiple Attribute Decision Making (MADM) is a fundamental concept in the scope of the decision sciences, serving as a structured method for evaluating and selecting the most appropriate alternative option from a pool of available alternatives. MADM methods have gained prominence over the years and are frequently applied in realworld scenarios. Nevertheless, decision-making in practical situations often involves information that is imprecise and uncertain, especially conflicting criteria or attributes. Therefore, Picture Fuzzy Sets (PFSs) and Aggregation Operators (AOs) have proven invaluable in effectively addressing decision challenges characterized by impression and uncertainty. During the past few years, various Picture Fuzzy Aggregation Operators (PFAOs) have been suggested and established but have not been thoroughly reviewed. The primary highlight of this research is to analyse as well as review the development and proposals surrounding PFAOs and their diverse applications within the decision-making paradigm. Regarding this, a review of 140 published articles from 2017 to 2022 appeared in 48 high-ranking journals cited from the "Scopus" and "Web of Science" databases. Other than that, all these articles have been classified by the nationalities of authors, publication year, published journal, research area, operators and methods. The findings of this study discovered that PFAOs have been increasingly applied for supporting decisions due to their frequent implications and applications in different managerial domains, either profit or non-profit organizations. This literature survey's significant contribution provides a platform for researchers to identify future dimensions of works as improvements for decision-making in picture fuzzy environments while also promoting future application of the approaches.

Keywords

Aggregation operator; Multiple-attribute decision making; Multiple-attribute group decision making; Picture fuzzy aggregation operators; Picture fuzzy sets