

Accepted Manuscript

Title: A knowledge-based outranking approach for multi-criteria decision-making with hesitant fuzzy linguistic term sets

Author: Hamza Sellak Brahim Ouhbi Bouchra Frikh



PII: S1568-4946(17)30374-5
DOI: <http://dx.doi.org/doi:10.1016/j.asoc.2017.06.031>
Reference: ASOC 4300

To appear in: *Applied Soft Computing*

Please cite this article as: Hamza Sellak, Brahim Ouhbi, Bouchra Frikh, A knowledge-based outranking approach for multi-criteria decision-making with hesitant fuzzy linguistic term sets, *Applied Soft Computing Journal* (2017), <http://dx.doi.org/10.1016/j.asoc.2017.06.031>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A knowledge-based outranking approach for multi-criteria decision-making with hesitant fuzzy linguistic term sets

Hamza Sellak^{a,*}, Brahim Ouhbi^a, Bouchra Frikh^b

^a*National Higher School of Arts and Crafts (ENSAM), Industrial Engineering and Productivity Department, Moulay Ismail University (UMI), Meknes, Morocco*

^b*Higher School of Technology (EST), Computer Science Department, Sidi Mohamed Ben Abdellah University (USMBA), Fez, Morocco*

Abstract

The modeling and solving of multi-criteria decision-making (MCDM) problems under uncertainty is still a challenging topic. In real-life decision-making, using linguistic terms to represent experts' judgments is suitable and straightforward since precise quantitative values may often be unavailable or the cost for their computation is too high. The introduction of hesitant fuzzy linguistic term sets (HFLTSS) was motivated by the limitations of prior linguistic fuzzy models and need for richer linguistic tools. However, since their introduction, comparing HFLTSS is still one of the major concerns of researchers in this area. The existing approaches in the literature commonly rely on (1) labels and intervals from the linguistic terms as the central elements of an envelope-based approach or (2) linguistic scale functions as the basis of a distance-based approach. The two approaches retain certain shortcomings resulting information distortion and loss which may inevitably degrade their credibility. In this paper, the authors are involved in the recent proposal of combining outranking approaches with HFLTSS in an MCDM context. After reviewing the existing approaches, an outranking method based on a novel knowledge-based paradigm for comparing HFLTSS is developed. Alternatively, the paradigm's foundations are the introduced concepts of fuzzy preference relations and profiles considering uncertainty degrees in decision makers' assessments. The paradigm is then associated with a multi-criteria relational clustering (MCRC) algorithm that additionally extracts fuzzy preference relations between the resultant clusters. Last, an illustrative example is given to verify the appropriateness and efficacy of the developed approach and comparisons are made with other existing ones.

Keywords: hesitant fuzzy linguistic term sets (HFLTSS), multi-criteria decision-making (MCDM), outranking approach, knowledge-based comparison paradigm, uncertainty, multi-criteria relational clustering (MCRC)

1. Introduction

In decision theory, multi-criteria decision-making (MCDM) is one of the most significant research topics in the last decades [1]. In practice, MCDM methods have been widely applied in a number of fields supporting the decision makers (DMs) to rank or select the best alternatives when related assessments are precisely known [2]. Notwithstanding, ambiguity, experts' knowledge, and their subjective preferences might difficult the resolution process for a particular decision-making problem, often leading to biased and uncertain decisions. Thus, the modeling and solving of real-life MCDM problems under uncertainty is still a challenging topic [3–5].

*Corresponding author

Email addresses: h.sellak@edu.umi.ac.ma (Hamza Sellak), ouhbib@yahoo.co.uk (Brahim Ouhbi), bfrikh@yahoo.com (Bouchra Frikh)

Download English Version:

<https://daneshyari.com/en/article/6903845>

Download Persian Version:

<https://daneshyari.com/article/6903845>

[Daneshyari.com](https://daneshyari.com)