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COMPUTER AIDED EVALUATION AND SELECTION OF AUTOMOBILE VEHICLES BY FUZZY MADM METHOD

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This paper presents an efficient approach for the optimum selection of an automobile vehicle, specifically to aid the particular road operation/application. This computer aided evaluation methodology is based on FUZZY MADM [Fuzzy Multiple Attribute Decision Making] method, an improved version of the conventional MADM method.

The various conflicting attributes have been classified under the various characteristics of the vehicle. These attributes are first evaluated either in the real value or in linguistic terms. In this 4-stage selection process, the fuzzy set theory is used to take care of the fuzzy nature of the attributes. Those attributes, evaluated in linguistic terms, have been converted into fuzzy numbers and then to corresponding crisp values. Thereby, this approach is able to handle both the crisp data and fuzzy data at the same time.

The second step is the 'elimination search' in which the number of alternative vehicles, have been reduced to a manageable limit. The third step is the evaluation and ranking of those shortlisted alternative vehicles, by using conventional MADM method, namely TOPSIS [Technique for Order Preference by Similarity to Ideal Solution] procedure. A computer software has been development for the methodology in user-friendly manner. Final selection has been made from the ranklist obtained from TOPSIS procedure, for optimum vehicle. The evaluation and selection procedure is explained with an illustrative example and compared with that of the conventional MADM method.

Key words: fuzzy MADM method, expert system, automobile vehicle attributes, selection of vehicles.

KOMPJUTERSKA SELEKCIJA AUTOMOBILA

U ovom radu ja data efikasna metoda za optimalnu selekciju automobila, s naročitim osvrtom na put. Metodologija je bazirana na FUZZY MADM metodi, poboljšana verzija MADM metode (određivanje višestrukih atributa).

Brojni atributi koji su u suprotnosti sa aspekta zahteva izbora vozila su klasifikovani u različite grupe karakteristika vozila. Ovi atributi su u formi ili realnih brojeva ili opisnih polja. FUZZY teorija je implementirana u četvorostepeni proces selekcije, da bi se odredila priroda atributa. Atributi se transformišu u komponentalne vrednosti, tako da su dati u oba oblika (celovit - fuzzy i komponentalni - crisp).

Drugi korak predstavlja eliminaciju broja alternativnih vozila. Treći korak je rangiranje ove skraćene liste, korišćenjem konvencionalnog MADM metoda, tj. TOPSIS procedure (TOPSIS - tehnika slaganja prvenstava - idealizacija rešenja). Softver je veoma jednostavan za korisnika. Konačan izbor sledi iz rang-liste dobijene TOPSIS procedurom, za optimalno vozilo. Coe postupak je ilustrovan primerom a napravljeno je i poređenje sa klasičnim MADM metodom.

Ključne reči: fuzzy metod, ekspertni sistem, atributi automobila, selekcija vozila.