Mining method selection by multiple criteria decision making tool
by M.R. Bitarafan and M. Ataei

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Two different methods of fuzzy multiple criteria decision making have been proposed to solve the problem of mining method selection in the paper titled 'Mining method selection by multiple criteria decision making tool, by Bitarafan and Ataei. This problem is really important and also difficult to solve because of the need of handling many criteria simultaneously in the process of decision making.

Bitarafan and Ataei have selected 15 criteria for the case study in their paper and those criteria have not been clustered/grouped yet. The number of selected criteria is only 15, although there are more criteria that should be handled in a real case, because they have used Saaty's method in the section 'Fuzzy multiple attribute decision making' in their paper.

Saaty's method considers the pairwise comparison of criteria and uses random indexed which have already been derived and published. Available random indexes, however, have been derived for maximum 15 criteria so far.

On the other hand, Saaty and Ozdemir[1], and Ozdemir[2], in their papers, explicitly expressed that the total number of criteria to be handled simultaneously should be maximum seven plus two (= 9) because of the general limitations on human performance. Those limits are widely known in the literature[2] as 'memory span', 'attention span', 'central computing space', 'channel capacity', and so on. They also expressed that if the pairwise comparison matrixes are formed without taking into consideration the limits, inconsistency will probably occur. Also, even the matrix is consistent; it will probably be not valid.

For validation, consistency and redundancy, the best number of criteria should be maximum seven, which is emphasized by Ozdemir[2]. 'We conclude that so serve both consistency and redundancy, it is best to keep the number of elements at seven or less. It appears that George Miller's seven plus or minus two is indeed a limit, a channel capacity, on our ability to process information.'

If there are more than seven criteria to be handled, Saaty and Ozdemir have expressed that the criteria should be clustered and the maximum number of clusters and subcriteria in every cluster should be limited to seven.

Because of the reasons and references given above, the pairwise comparison matrix (15×15) given by Bitarafan and Ataei looks very suspicious. The consistency of a matrix with the dimensions of 15×15 like their one can be possible only by adjusting the weights with specific/special values. Besides, the solution found by using their matrix in the solving process of the case study also looks suspicious.

We suggest that the total number of criteria to be handled for any pairwise comparison matrix should be limited to seven or less if Saaty's method is selected.

References

1. SAATY, T.L. and OZDEMIR, M.S. Why the Magic Number Seven Plus or Minus Two, *Mathematical and Computer Modelling*, 2003, vol. 38, pp. 233–244.

2. OZDEMIR, M.S. Validity and inconsistency in the analytic hierarchy process, *Applied Mathematics and Computation*, 2005, vool. 161, pp. 707–720. ◆

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