An MCDA Model To Rank Alternatives That Does Not Use Weights

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Abstract

A set of ranking problems that have a truth model is used to test the accuracy of the weighted sum model (WSM). WSM is found to generate rankings that correlate poorly, and sometimes randomly, with the truth model, no matter the choice of weights.

The Intrinsic Value (IVAL) model, a multi criteria decision analysis (MCDA) model that does not use weighting factors, was thus developed. Rather than using weights, IVAL mimics the human decision-making thought process. Correlation of IVAL with the truth model is exceptional (0.95 – .99+) in all cases examined.

Because there are no weights, there is no need with IVAL for pairwise comparison or other complex processes that generate relative weights. For example, there is no need for a structure like House of Quality, used in Quality Function Deployment (QFD).

Because IVAL ratings have such high fidelity, techniques to improve initial outcomes, such as backscatter, used in deep neural networks, may not be necessary.

The IVAL model easily incorporates criteria dependencies and hierarchical processes. It requires only very simple code that could easily replace just the WSM portion of code used in many current MCDA models. It would be interesting to see the results of doing this.

Keywords

criterion space
multi criteria decision analysis (MCDA)
multiple criteria hierarchy
ranking process
utility function
weighted sum model (WSM)

Graphical Abstract

https://github.com/matrixbud/Multi-Criteria-Decision-Analysis-MCDA-/blob/main/GraphicalAbstract1.jpg

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