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(in English)



Quantitative and Qualitative Multicriteria Decision Modelling and Performance Assessment under Uncertainties – The Evidential Reasoning Approach

Dr. Jian-Bo Yang

In real world decision situations, one often needs to deal with decision problems having multiple criteria with both numerical data and qualitative information under uncertainty. It is essential to properly represent and process uncertain information for rational decision analysis. The Evidential Reasoning (ER) approach has been developed to support such multiple criteria decision analysis. In this presentation, the ER approach will be introduced, which is based a distributed assessment framework and the weighted evidence combination rule of the Dempster-Shafer theory. The Intelligent Decision System (IDS) has been developed to facilitate the application of the ER, which is a Windows-based software package. Both the ER approach and the IDS software have been applied to various areas such as engineering design evaluation, organizational self-assessment, safety and risk assessment, supplier assessment and customer survey analysis. In this presentation, the main features of ER and IDS will be demonstrated and explained using several case studies, including supplier assessment, organizational self-assessment in quality management, and customer satisfaction survey analyses in manufacturing industry, which form part of the research projects led by the presenter and funded by the UK government and the EC. It is hoped to show that the ER approach can be used not only to deal with problems that traditional methods can solve, but also to model and analyze more complicated decision problems that traditional methods are incapable of handling. In the last part of the presentation, the recent extensions of the ER based research will be discussed mainly to knowledge based complex system modeling, simulation and applications.

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