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Title: Qualitative Multi-Criteria Decision Modelling for Research and Applications

Abstract

The purpose of this presentation is to highlight the utility of Multi-Criteria Decision Modelling (MCDM) in solving complex, real-world decision problems encountered across all fields of human activity, from academic research to business and public organizations. We shall base the presentation on DEX (Decision EXpert), a hierarchical, qualitative and rule-based MCDM method. While traditional MCDM often relies on quantitative data, DEX excels in handling complex problems where criteria are inherently qualitative, subjective, or difficult to measure numerically. First, we will begin with a concise overview of DEX, its integration within the broader MCDM landscape, and the software tools used to develop DEX models. The main focus of the presentation will be on applications of the methodology. In addition to addressing practical real-life decision problems, MCDM applications can substantially contribute to various research disciplines; in this presentation, we will illustrate this with examples from management, medicine and agronomy. Addressed decision problems include both one-time decisions (e.g., product selection, employee scouting) and recurring decisions, possibly embedded in decision support systems (e.g., loan allocation, medical therapy prescription). Finally, we will briefly cover recent research related to DEX itself, presenting two novel techniques, the target analysis and ranking of decision alternatives, which enhance the method's analytical capabilities.

Author's CV

Marko Bohanec received his Ph.D. in Computer Science in 1991 from the University of Ljubljana. He is a leading Slovenian researcher in the field of decision support models and systems. His current positions are Scientific Councilor at the Department of Knowledge Technologies, Jožef Stefan Institute, Slovenia, and Full Professor of Computer Science at the University of Nova Gorica, Slovenia. His research interests include decision making, decision analysis, decision support, decision modelling, artificial intelligence, expert systems, machine learning and data mining. He is a co-author of the method DEX and computer software DEXi, which are used worldwide for developing qualitative hierarchical decision models. In the last decade, he has been involved as a decision support expert in European projects on the production, distribution, and quality control of food and feed (projects ECOGEN, SIGMEA, Co-Extra, DECATHLON, TRUE), disease management in health-care (PD_manager, HeartMan), nuclear safety (NARSIS), and sustainable mobility (SmartMOVE).