ELECTRE METHODS (PART III)

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Contents

Recent developments

1. Pure inference based approaches after the work by Mousseau and Słowiński (1998) (Software: ELECTRE TRI-Assistant):
   - inferring only the weights (Mousseau et al, 2001);
   - inferring veto (Mousseau and Dias, 2006); and,
   - inferring category bounds (Ngo The and Mousseau, 2002).
   - Some manageable disaggregation procedures for valued outranking relations (Mouuseau and Dias, 2006);
   - Inconsistent judgements (Mousseau et al., 2006a; Mousseau et al., 2006b) or an inadequate preference model (Figueira, 2009).

Recent developments

2 The inference-robustness based approach for inferring weights and derive robust conclusions in sorting problems (Dias et al., 2002). Software: IRIS.

3 The pseudo-robustness based approach dealing with simulation methods mainly for ranking and sorting problems (Tervonen et al., 2008, 2009). Software: SMAA-III, SMAA-TRI.

4 New robustness analysis concepts (Aissi and Roy, 2009; Roy, 2009). These papers are more general, but some techniques can be applied to ELECTRE methods.

New approaches

1. Bi-polar outranking relations implemented in RUBIS software (Bisdorff et al., 2007, 2008).
2. The weights of the interaction coefficients and the modifications in the concordance index (Figueira et al., 2009).
3. Handling with the reinforced preference and the counter-veto effects (Roy and Słowiński, 2009).
4. ELECTRE TRI-C, TRIN, NC (Almeida-Dias et al., 2010a, 2010b).
5. The possible and the necessary approach for ELECTRE methods (ELECTRE-GKMS) by Greco et al., (2009, 2010).

Axiomatic and meaningfulness

1. Axiomatic analysis of ELECTRE I method by using conjoint measurement theory (Greco et al., 2001).
2. Representing preferences through conjoint measure and the decision rule approach (Greco et al., 2002).
3. An axiomatic analysis based on a general conjoint measure framework with application to a variant of ELECTRE TRI (Bouyssou and Marchant, 2007a,b).
4. An axiomatic analysis of the concordance-discordance relations (Bouyssou and Pirlot, 2009).
5. Representing preferences by decision rules (Greco et al., 2002).
6. The meaningfulness of ELECTRE methods (Martel and Roy, 2006).

Other aspects

1. The relative importance of criteria (Figueira and Roy, 2002).
2. Concordant outranking with criteria of ordinal significance (Bisdorff, 2004).
3. Evolutionary approaches (Leyva-López et al., 2008; Doumpos et al., 2009).
4. The EPISSURE method for the assessment of non-financial performances (André and Roy, 2007; André, 2009).
5. Group decision aiding (Damart et al., 2007; Greco et al., 2009, 2010).

Areas

1. Agriculture and Forest Management.
2. Energy.
3. Environment and Water Management.
4. Finance.
5. Medicine.
6. Military.
7. Project selection (call for tenders).
8. Transportation.
9. . . .

Areas

- Sorting cropping systems (Arondel and Girardin, 2000).
- Land-use suitability assessment (Joerin et al., 2001).
- Greenhouse gases emission reduction (Georgopoulou, 2003).
- Risk zoning of an area subjected to mining-inducing hazards (Merad et al., 2004).
- Participatory decision-making on the localization of waste-treatment plants (Norese, 2006).

Areas

- Material selection of bipolar plates for polymer electrolyte membrane fuel cell (Shanian and Savadogo).
- Assisted reproductive technology (Matias, 2008).
- Promotion of social and economic development (Autran-Gomes et al., 2009).
- Sustainable demolition waste management strategy (Roussat et al., 2009).
- Assessing the risk of nano-materials (Tervonen et al., 2009).

Concluding remarks

1. ELECTRE methods have a long history of successful real-world applications with impact on the life of populations (see Figueira et al., 2005)).
2. When applying ELECTRE methods analysts should pay attention to the characteristics of the context and also to the (theoretical) weaknesses of these methods. Note that all the MCDA methods have theoretical limitations.
3. Software implementations of high quality along with friendly interfaces render possible the application to a vast range of applications.
4. Research on ELECTRE methods is not a death field. It stills evolving and rapidly, namely over of the first years of this new millennium.

Thank You!

(very much for your attention)