

Presentation of the Electre Tri 2.0a software

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ELECTRE TRI is a Multiple Criteria Sorting Method ([Yu 92], [Roy, Bouyssou 93]) which aims at assigning a set of alternatives $A=\{a_1, a_2, \dots, a_l\}$ evaluated by n criteria g_1, g_2, \dots, g_n to one of the preference-ordered and pre-defined categories. The assignment of an alternative a_k to a specific category results from a comparison of its evaluation on all criteria to the profiles defining the limits between consecutive categories.

We present in this section a new implementation of ELECTRE TRI. It integrates specific functionalities supporting the Decision Maker (DM) in the preference elicitation process. These functionalities grouped in a module called ELECTRE TRI Assistant aim at reducing the cognitive effort required from the DM in the phase of calibration of the preference model. The main characteristic feature of ELECTRE TRI Assistant is the inference of the ELECTRE TRI preferential parameters from assignment examples supplied by the DM.

The ELECTRE TRI software version 2.0a (Mousseau et al. 1999, 2000) is the result of a collaboration between LAMSADE (University of Paris-Dauphine, France) and the Institute of Computing Science (Poznan University of Technology, Poland). It is developed in C++ programming language and runs under Microsoft Windows 3.1, 95, 98, NT.

The structure of the options available in the software is the following:

- File: this option allows the user to create a new project, load an existing project and save the current project. Additional print and import options are provided. Generation of project reports is also available,
- Edit: enables the user to enter the data required by Electre Tri (criteria, alternatives, weights, profiles and thresholds) and/or to use the ELECTRE TRI Assistant functionalities.
- Results: allows the user to visualize the results (including intermediary results such as degree of credibility of the outranking relation, comparison of alternatives to profiles,...); also gives a graphical representation of alternatives and profiles.
- Help: provides the user an online help.

Support for Parameters Elicitation: ELECTRE TRI Assistant

One of the main difficulties that an analyst must face when interacting with a DM in order to build a decision aid procedure is the elicitation of various parameters of the DM's preference model. In the ELECTRE TRI method, the analyst should give values to profiles, weights and thresholds. Even if these parameters can be interpreted, it is difficult to fix directly their values and to have a clear global understanding of the implications of these values on the output of the model.

[Mousseau, Slowinski 98] proposed a methodology that avoids this problem by substituting assignment examples for direct elicitation of the model parameters. The values of the parameters are inferred through a certain form of regression on assignment examples. ELECTRE TRI Assistant implements this methodology in a way that requires from the DM much less cognitive effort: the elicitation of parameters is done indirectly using holistic information given by the DM through assignment examples, i.e. alternatives assigned by the DM to categories according to his/her comprehensive preferences.

The ELECTRE TRI Software 2.0 includes an assistant that is able to infer preference model parameters from assignment examples provided by the user. The present version supports the user in defining the weights of criteria and the cutting level l for the pessimistic assignment procedure only (the next version will include similar functionalities for profiles and thresholds). The use of ELECTRE TRI Assistant functionalities proceeds according to the following scheme:

- (a) input the list of assignment examples composed of alternatives for which the DM gives a holistic assignment (such alternative can be an existing alternative of a fictitious one designed for this purpose); imprecise assignments are accepted, i.e. the DM can express an hesitation in the assignment of an alternative a by specifying a subset of consecutive categories to which a could be assigned,
- (b) give preferential information on the weights and/or cutting level (preorder, comparisons of specific coalitions, bounds on weights, on the cutting level l) - optional,
- (c) run the inference procedure to find the most adequate values of the weights,
- (d) check for the acceptability of the obtained weight vector and, either:

- accept the proposed weights so as to use them by the assignment procedure,
- or reject them and revise the information provided in step (a) and/or (b), then perform (c) again.

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