The Decision Deck Project

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Abstract

The Decision Deck project is developing an open-source generic Multiple Criteria Decision Aid (MCDA) software platform composed of modular components. Its purpose is to provide effective tools for decision-aid consultants, for researchers in the field of MCDA, and for operations research teachers.

1 Purpose and achievement

The Decision Deck[1] project aims at collaboratively developing Open Source software tools implementing Multiple Criteria Decision Aid (MCDA). Its purpose is to provide effective tools for three types of users:

- *practitioners* who use MCDA tools to support actual decision makers involved in real world decision problems;
- *teachers* who present MCDA methods in courses, for didactic purposes;
- *researchers* who want to test and compare methods or to develop new ones.

From a practical point of view, the Decision Deck project works on developing multiple software resources that are able to interact. Consequently, several complementary efforts focusing on different aspects contribute to the projects various goals.

The project continues and expands the series of activities that have been mainly pursued by the Decision Deck Community since 2006 in the MathRO laboratory of the Faculty of Engineering of Mons, the Lamsade laboratory of the University Paris-Dauphine, the ILIAS laboratory of the University of Luxembourg and the software company Karmic Software Research. At present date following resources are available:

1. D2: a rich open source Java client offering several MCDA methods (see Figure 1), like

[1]Extract from the Decision Deck project's manifesto (see http://www.decision-deck.org)

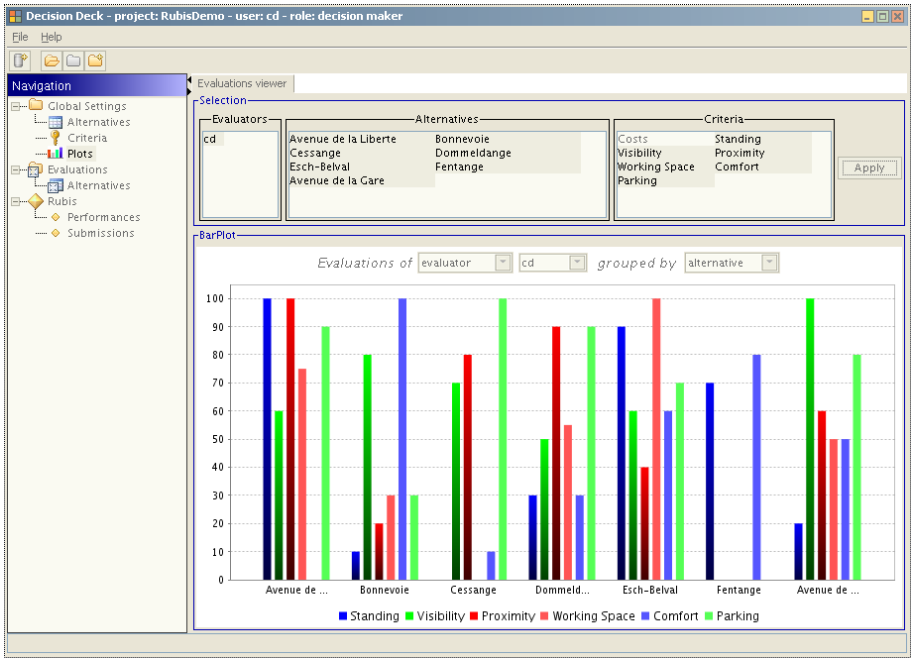

Figure 1: *One of the interesting features offered by the Decision Deck software is the common availability of visualization resources as illustrated in the picture above. The snapshot, taken from a D2 java client session with the* RuBis *plugin, shows the performances of the alternatives on a subset of criteria in a column chart style*

- IRIS (outranking based sorting of alternatives into ordered classes),
- RuBis and VIP (outranking and additive aggregation model based methodologies for the choice decision problem),
- UTA-GMS/GRIP (ranking alternatives with a set of value functions).

2. XMCDA: a standardized XML encoding recommendation to represent objects and data structures issued from the field of MCDA (see Figure 2). Its main objective is to allow different MCDA algorithms to interact and be easily callable;

3. XMCDA web services: distributed open source computational MCDA resources, like the RuBis solver written in Python and the KAPPALAB (Choquet integral based MAVT) R library;

4. D3: an open source rich internet application for XMCDA web services management;

5. diviz: an open source Java client and server for XMCDA web services composition, work flow management and deployment (see Figure 3).

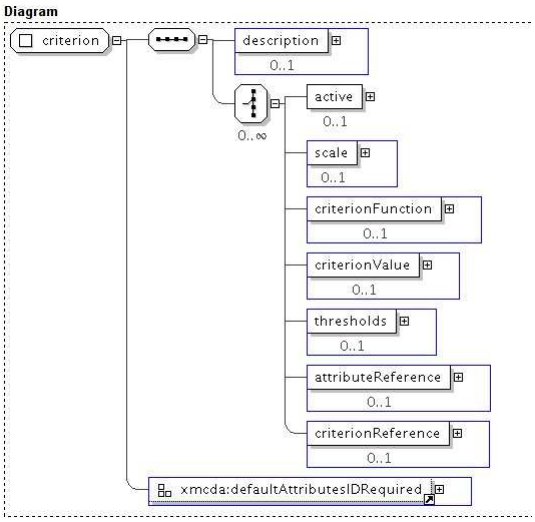

Figure 2: *Extract from the XMCDA-2.0 schema with standard xmcda types such as scale, thresholds, criterion function a.o. for encoding the individual criterion data*

2 Valuable features and ongoing work

One of the most valuable features of the Decision Deck software is the effective consideration of specific roles such as decision maker, evaluator, coordinator or facilitator in a given decision analysis project. For instance, evaluators from different distant places may communicate their evaluations via their local D2 clients to the common decision analysis project under the supervision of the project coordinator, whereas the decision maker may input his personal preferences via method-specific criteria tuning facilities offered in his local client (see Figure 1).

The major actual task of the Decision Deck project concerns the development and maintenance of XMCDA-2.0, an XML modeling language standard which describes in a generic way the inputs and the outputs of MCDA methods, as well as the different steps of a decision analysis work flow. The purpose of XMCDA-2.0 (see Figure 2) is on the one hand, to allow an easy integration of MCDA web services, such as the Rubis Python server mentioned above and, on the other hand, to facilitate communications and data exchanges between core components of the software platform. The forthcoming diviz java client and server for MCDA work flow composition and execution both rely essentially on this XMCDA-2.0 standard.

In order to coordinate the various activities of the Decision Deck project a French non profit association named Decision Deck Consortium has been recently created which is going to steer and manage the project along the lines of the preceding ideas (see the Decision Deck manifesto at http://www.decision-

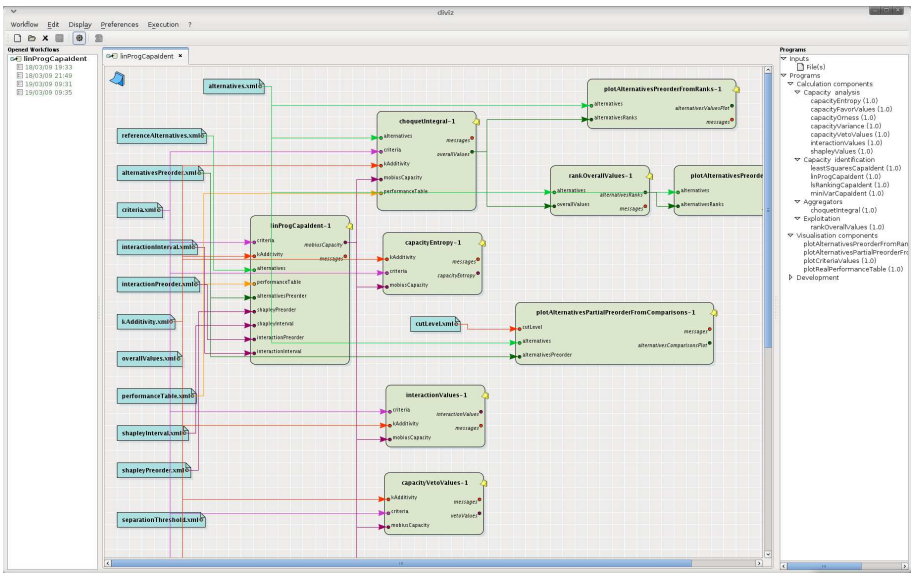

Figure 3: *A snapshot of the diviz manager for XMCDA-2.0 web services composition*

deck.org/). Its main task is to organize regular Decision Deck workshops. The next one is going to take place in Brest (France) on September 17–18, 2009 (see http://conferences.telecom-bretagne.eu/ddws5/).

3 Related links and contact information

- http://www.decision-deck.org/
- http://www.decision-deck.org/xmcda/
- http://decision-deck.sourceforge.net/
- http://sourceforge.net/projects/decision-deck/
- http://www.decision-deck.org/diviz/
- http://www4.fe.uc.pt/lmcdias/iris.htm
- http://ernst-schroeder.uni.lu/ (RuBis resources)
- http://www4.fe.uc.pt/lmcdias/english/vipa.htm (VIP related)
- http://conferences.telecom-bretagne.eu/ddws5/ (5th Decision Deck workshop related)

The Decision Deck Consortium is an open association and persons interested in the Decision Deck project and willing to join are welcome. For further information please contact:

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