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Critiquing Justifications for Action Using a Semantic Model: Demonstration

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1. Introduction

Citizens consult their representatives about policy proposals to seek a justification, to object, or to make a proposal. In the first instance, the representative only needs to state a justification. In the second instance, the locus of the objection needs to be identified. As a result, the government can carry out a survey to discover precisely what citizens object to. The third instance requires a well formulated proposal from the citizen that can then be critiqued from the standpoint of the government's policy proposal. At the end of such a consultation, users will have aired their proposals, understood the implications, and received feedback on how their proposals contrast to that of the government. The demonstration provides an interactive program for this third instance, similar to that described in [3]. It is developed for a well-defined domain using a formalisation of an argumentation scheme [1] that is grounded in a semantic model [2].

2. Program

We model the so-called *speed camera debate* [2], which concerns whether introducing speed cameras is the best way to reduce the number of road deaths. The program is intended to support e-participation [3]. The semantic model is the Action-based Alternating Transition System (AATS) with values as described in [1]. The argumentation scheme for practical reasoning and its critical questions [1] are used to structure and investigate the policy proposal; the scheme is analysed in terms of and instantiated with respect to the model.

The program represents in Prolog the argumentation scheme, the semantic model, and a representation of alternative proposals and their relationships. The argumentation scheme is of the form: *In the current circumstances R, we should perform action A, which will result in new circumstances S, which will realise the desireable consequence G, which will promote some value V.* V is the reason why it is desireable to achieve G from R. The idea is that the action A is justified because it promotes V by moving from R to S in which G is realised. An instantiated scheme can be critiqued in a variety of ways.

For the AATS, we represent the literals corresponding to the propositions and their negations, the states formed from these literals, the joint actions of the relevant agents, the transitions between states resulting from these actions, and

the values promoted and demoted by the transitions. Note that the program represents *the model*, not a set of statements about the world. As such, the program can generate questions that can be posed in terms of the model. We cannot, of course, question justifications for the model itself, but the scope for generating questions is considerably greater than is the case where we have only a set of rules representing responses to particular situations.

The program is interactive. From the model, the program generates the logical space of justifications of actions, and forms menus to solicit the user's beliefs as to the current state, a proposed action, the state the user believes will be reached as a consequence, and the value this will promote. For each part of the user's proposal, the program applies the tests defined in [1], and where the test is satisfied, offers the corresponding criticism or *caveat*.

The program considers seven questions[1]:

1. Is the Action Possible? (CQ1, CQ13).
2. Can the Action have the Stated Effects? (CQ1, CQ2).
3. Does the Action Promote the Value? (CQ4).
4. Are There Negative Side Effects? (CQ8, CQ9).
5. Are there Other Ways to Promote the Value? (CQ7).
6. Could Other Values be Promoted? (CQ11).
7. Will the Other Agents Do What they are Supposed To Do? (CQ17).

Input and output is currently the traditional Prolog "glass teletype" style, with the questions, menus and responses being canned text templates with the appropriate substitutions for variables. This interface needs cosmetic improvement before the program can be offered to actual users. The program is currently written in Prolog, but will be ported to PhP/MySQL to provide a greatly enhanced interface and remote access. The code is available upon request. In future, subsidiary argumentation schemes, such as Credible Source to justify the states, transitions and values, will be added.

Acknowledgments

References

[1] K. Atkinson and T. Bench-Capon. Practical reasoning as presumptive argumentation using action based alternating transition systems. *Artif. Intell.*, 171(10-15):855–874, 2007.

[2] K. Atkinson, T. Bench-Capon, D. Cartwright, and A. Wyner. Semantic models for policy deliberation. In *Proceedings of the 13th ICAIL*, pages 81–90, 2011.

[3] A. Wyner, K. Atkinson, and T. Bench-Capon. Model based critique of policy proposals. In *Proceedings of ePart 2012*, page In Press, 2012.

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[1]For those familiar with [1], two are problem formulation questions (2 and 3), two are epistemological questions (1 and 7) and three are preferences questions (4, 5 and 6) and the related CQ(s) from [1] is given in brackets