

Parmenides: Structured argument creation, response, and analysis

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Parmenides (Persuasive ARGUMENT In DEMocracieS) is a tool for e-Democracy that is based upon and makes use of existing theories of argument representation and evaluation. The aims of the Parmenides system are three-fold: Firstly, the system aims to provide support for the creation of arguments surrounding particular political issues through the use of Argumentation Schemes [1]. This is achieved using a web-based debate creation system that guides the administrator through the process of instantiating a particular political argument using an appropriate argumentation scheme. The second aim of Parmenides is to allow the public to respond to arguments put forward by the government, by responding to the critical questions associated with the scheme used to instantiate the particular argument. The structure of the system is hidden from the public to aid ease of use. The third and final aim of the system is to allow for evaluation of the responses submitted by the public in the form of a graphical interface. In order to achieve this, the individual statements representing the government's position are extracted and represented as nodes in an Argumentation Framework [2], coloured either green or red to represent majority agreement or disagreement respectively. This fine-grained analysis allows the debate administrator to see exactly which parts of the government's position are most agreed and disagreed with, which could, for example, be used to assist the government in fine-tuning policy proposals.

The original Parmenides system was based on the use of one particular scheme for practical reasoning used to justify a policy proposal. Should the user disagree with any part of this proposal, there was no chance for the government to provide any further justification in the original prototype system. Of course, in real-life argumentation, the proponent of an argument is likely to respond to a disagreement with his or her position by providing an additional argument to support the position – which may be of a completely different type. Recent additions to the Parmenides system have been implemented to allow it to support additional argumentation schemes, which can be used by the government to provide a justifying argument for any part of its position. Specifically, we have implemented a number of new software tools and extensions to the existing tools, including; a tool through which new argumentation schemes can be easily added into the system, ensuring that the semantics of the scheme can be preserved by the software; extensions to the debate creation system which allow the debate administrator to support parts of his position using arguments instantiated with other schemes; extensions to the Parmenides website which allow supporting arguments to be presented to, and critiqued by, members of the public who disagree with the particular part of the position to which the supporting argument belongs; and finally, extensions to the Argumentation Frameworks of the analysis tool which allows user's responses to the supporting arguments to be evaluated.

The latest developments to the Parmenides system allow for debates to be represented in greater depth. We will demonstrate the workings of the system with a sample debate, in order to illustrate the capabilities of this structured yet highly usable system.

[1] D. N. Walton. *Argumentation Schemes for Presumptive Reasoning*. Lawrence Erlbaum Associates, Mahwah, NJ, USA, 1996.

[2] P. M. Dung. On the acceptability of arguments and its fundamental role in nonmonotonic reasoning, logic programming and n-person games. *Artificial Intelligence*, 77(2):321–357, 1995.