Political Engagement Through Tools for Argumentation

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Abstract.
In this paper we discuss the development of tools to support a system for e-democracy that is based upon and makes use of existing theories of argument representation and evaluation. The system is designed to gather public opinions on political issues from which conclusions can be drawn concerning how government policies are presented, justified and viewed by the users of the system. We describe how the original prototype has been augmented by the addition of well motivated tools to enable it to handle multiple debates and to provide analyses of the opinions submitted, from which it is possible to pinpoint specific grounds for disagreement on an issue. The tool set now supports both argumentation schemes and argumentation frameworks to provide representation and evaluation facilities. We contrast our system with existing fielded approaches designed to facilitate public consultation on political issues and show the particular benefits that our approach can bring in attempting to improve the quality of such engagement online.

Keywords. Tools for Supporting Argumentation, Reasoning about Action with Argument, Applications of Argumentation, e-Democracy, Argument Schemes.

1. Introduction

The past few years have seen an increase in research to address some of the challenges posed by e-democracy. The reasons underpinning this drive are manifold. Firstly, there is the technological drive. With more members of the public having access to high speed, low cost internet connectivity, there is a desire to move traditional methods of government-to-public communication (and vice versa) online, to speed up and enhance such interactions. Subsequently, in a bid to mobilise the electorate in engagement with political issues, tools to encourage participation are desirable. Furthermore, the governing bodies can also exploit new technologies to support the provision, gathering and analysis of the public's contributions to political debate. With these aims in mind, we discuss a system for e-democracy that makes use of argumentation tools. The system, named Parmenides, was introduced in [2,3] and here we report on developments to the system that have substantially increased its functionality and analysis facilities, through the use of argumentation mechanisms. The tools developed are application driven, having arisen through the identification of issues presented by the domain that they have been built for, as opposed to being technology driven and thus searching for a suitable application.

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The paper is structured as follows. In Section 2 we motivate the need for such a system by discussing particular existing approaches to e-democracy and their shortcomings. In Section 3 we briefly summarise our introductory work on the Parmenides system, then in Section 4 we describe the tools developed to meet the needs identified in the evaluation of the original prototype, plus the benefits that the tools bring. We finish in Section 5 with some concluding remarks and ideas for future developments.

2. Current Trends in e-Democracy

E-democracy and the encouraging of public participation in democratic debate is currently seen as an important obligation for governments, both national and local. The range of Internet-based tools used to support e-democracy vary in their purpose and implementation. One particular noteworthy example is the e-consultation systems described in [5], which are used to support and encourage young people in Scotland to participate in democratic decision making. Other examples are the numerous tools that are based on the use of web-based discussion boards, e.g. as discussed in [6]. As noted in [5], although such discussion boards can indeed encourage participation and debate, they generally provide no structure to the information gathered, so opportunity for analysis of the opinions is limited[2]. Generally in such systems there is often a problematic trade-off between the quality of contribution that users can make and the usability of the systems.

More recently e-petitions have become a popular mechanism. One such example is a site for filing petitions to government which has been running in the UK since November 2006 at `http://petitions.pm.gov.uk/`. This site enables users to create, view and sign petitions. The motivation behind the use of such petitions on this site is stated as making "it easy to collect signatures, and it also makes it easier for us to respond directly using email". Whilst these petitions may facilitate signature collection and subsequent response, and be simple to use, the quality of engagement is questionable due to the numerous problems suffered by this method of communication. Firstly, e-petitions as used here are simply, as the name suggests, electronic versions of paper petitions. Whilst making petitions electronic may increase their visibility by exploiting current favoured methods of communication, they still suffer from the same shortcomings as paper versions. The most significant of these is conflation of a number of issues into one stock statement. By means of clarification, consider the following e-petition, taken from the aforementioned website, which proposes to "repeal the Hunting Act 2004".

> Petitioners know that The Hunting Act 2004: has done nothing for animal welfare; threatens livelihoods in the longer term; ignores the findings of Lord Burn's Enquiry; gives succour to animal rights extremists; is based on political expedience following the Prime Minister's unconsidered response on the television programme Question Time in 1999; is framed to persecute a large minority who support a traditional activity; does not command popular support in the country except amongst the uninformed and mal-advised.

By the deadline for the closure of the petition (November 2007) it had attracted 43,867 signatures. Once such a petition is closed it is then passed on to the relevant of-

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[2]We note that tools for argument visualisation exist, e.g. Argunet (`http://www.argunet.org/`): our focus here is not primarily on argument visualisation, but argument gathering, representation and evaluation.

ficials or government department for them to provide a response. The website states that "Every person who signs such a petition will receive an email detailing the government's response to the issues raised". However, we do not believe that such a stock response can appropriately address each signatory's individual concerns with the issue. This is precisely because the statement of the issue covers numerous different points and motives for disagreement, whilst those signing the petition will have more particular concerns. What is desirable is that the government response is not itself a stock reply, but customised to individual concerns. If we consider the example petition given above, we can see that the requested repeal is grounded upon numerous different elements:

- disputed facts, e.g. (i) that the act ignores the findings of The Burns Enquiry (which, prior to the act, investigated the impact of fox hunting and the consequences of a ban); and (ii) that public support for the act is low;
- the bad consequences that have followed from implementation of the act, e.g. (i) that there is an absence of improvement in animal welfare; (ii) that the act supports the activities of animal rights extremists; and (iii) that the act poses a long term threat against livelihoods;
- the misaligned purposes that the act promotes, e.g. (i) the unjustified persecution of those who support hunting with dogs; and (ii) the political gain of the Prime Minister following the introduction of the act.

So, in signing the above e-petition it can only be assumed that the signatory agrees wholeheartedly with the objections raised in the statement. This makes it easy to oversimplify the issues addressed in the petition. It is more likely that individuals support repeal of the act, but for differing reasons. For example, a user may agree that the act does not improve animal welfare and gives succour to animal rights extremists, but may disagree that it threatens livelihoods. Thus, signing such a petition is an "all-or-nothing" statement with no room for discriminating between (or even acknowledging) the different reasons as to why people may wish the act to be repealed. Furthermore, it may be that the petition does not cover all of the objections that can be made against the act and there are no means by which individuals can add any other objections they may have.

The above issues in turn have consequences for how an analysis of the petition is conducted and how the results are responded to by the government. After a petition closes the response is analysed quantitatively in terms of the number of signatures it attracted. Information is available from the e-petitions website as to the ranking of petitions, in terms of their relative popularity. Therefore, analysts could see which issues appear to be of most importance to members of the public who engage with the system. A response to the petition is then drafted which attempts to clarify the government's position on the matter and respond to the criticisms made in the petition. However, since, as noted above, there is no means by which to discriminate between the particular reasons presented as to why the petition was endorsed, the stock response is not likely to adequately address each individual's particular concerns. Any answer, therefore, can only be "one size fits all" and so fail to respond to the petitioners as individuals. Furthermore, it may be that the response given does not focus on the most contentious part of the issue, due to the amalgamation of the individual arguments. We thus believe it would be beneficial to recognise the different perspectives that can be taken on such issues where personal interests and aspirations play a role, a point recognised in philosophical works such as [7], and as used in approaches to argumentation, as discussed in [1].

It follows from the issues identified above that such e-petitions do not provide a fine grained breakdown of the justification of the arguments presented, and thus any responses sent to users cannot accommodate the individual perspectives internal to the arguments. In Section 4 we show how recent development of Parmenides increasingly attempts to address these points, but first we provide a brief description of the original system.

3. Overview of Parmenides

As originally described in [3], Parmenides is a online discussion forum that is based upon a specific underlying model of argument. It is intended as a forum by which the government is able to present policy proposals to the public so users can submit their opinions on the justification presented for the particular policy. The justification for action is structured in such a way as to exploit a specific representation of persuasive argument based on the use of argument schemes and critical questions, following Walton [8]. Argument schemes represent stereotypical patterns of reasoning whereby the scheme contains presumptive premises that favour a conclusion. The presumptions can then be tested by posing the appropriate critical questions associated with the scheme. In order for the presumption to stand, satisfactory answers must be given to any such questions that are posed in the given situation. The argument scheme used in the Parmenides system is one to represent persuasive argument in practical reasoning. This scheme has previously been described in [1], and it is an extension to Walton's *sufficient condition scheme for practical reasoning* [8]. The extended scheme, called AS1, is intended to differentiate several distinct notions conflated in Walton's 'goal'. AS1 is given below:

AS1   In the current circumstances R, we should perform action A, which will result in new circumstances S, which will realise goal G, which will promote some value V.

Instantiations of AS1 provide *prima facie* justifications of proposals for action. By making Walton's goal more articulated, AS1 identifies further critical questions that can be posed to challenge the presumptions in instantiations of AS1, making sixteen in total, as against the five of [8]. Each critical question can be seen as an attack on the argument it is posed against and examples of such critical questions are: "Are the circumstances as described?", "Does the goal promote the value?", "Are there alternative actions that need to be considered?". The full list of critical questions can be found in [1].

Given this argument scheme and critical questions, debates can then take place between dialogue participants whereby one party attempts to justify a particular action, and another party attempts to present persuasive reasons as to why elements of the justification may not hold or could be improved. It is this structure for debate that forms the underlying model of the Parmenides system, whereby a justification upholding the action proposed for the particular debate is presented to users of the system in the form of argument scheme AS1. Users are then led in a structured fashion through a series of web pages that pose the appropriate critical questions to determine which parts of the justification the users agree or disagree with. Users are not aware (and have no need to be aware) of the underlying structure for argument representation but it is, nevertheless, imposed on the information they submit. This enables the collection of information which is structured in a clear and unambiguous fashion from a system which does not require users to gain specialist knowledge before being able to use it.

In [2] it was suggested that Parmenides could be integrated with other methods of argument representation and evaluation, in particular Value-based Argumentation Frameworks [4]. Since all opinions submitted to Parmenides are written to a back-end database, the arguments can be organised into an Argumentation Framework to evaluate which elements of the justification have the most persuasive force. Tools to support this extension have been implemented, along with numerous other substantial features to expand and enhance the functionality of the system. We describe these tools in the next section.

4. Additional Tools to Support Parmenides

In this section we provide details of a number of implemented tools to support Parmenides. These tools can be broadly categorised as: 1) Tools to allow the system to collect opinions on different topics of debate; 2) Tools for the analysis of data collected from opinions submitted through the website; 3) Tools for demographic profiling of users.

The original implementation of Parmenides [3] was based on the 2003 Iraq War debate. The tools have been implemented to facilitate modelling of other debates. One particular example is based on fox hunting, as described in the e-petition format earlier in this paper, and it poses the question "Should the fox hunting ban be repealed?". For comparison purposes we will use this debate as a running example throughout the rest of the paper. The debate appears on the Parmenides system at:

`http://cgi.csc.liv.ac.uk/~parmenides/foxhunting/`

The initial statement instantiating AS1 for this debate is presented to the user as follows:

In the current situation: The ban affects the livelihoods of those who make a living from hunting, Less humane methods of controlling fox population have been introduced, The ban prejudices those who enjoy hunting with dogs, The ban ignores the findings of a government enquiry, The ban gives succour to animal rights extremists.

Our goals are: Create more jobs in the countryside, Reduce the need for less humane methods of fox control, Remove the prejudice against people who enjoy fox hunting, Take heed of the government enquiry, Withdraw support for animal rights extremists.

This will achieve: Creating more jobs promotes prosperity, Reducing the need for inhumane methods of fox control promotes animal welfare, Removing the prejudice against those who enjoy fox hunting promotes equality, Taking heed of the government enquiry promotes consistency, Withdrawing support for animal rights extremists promotes tolerance.

If we consider this debate as presented in the e-petition discussed earlier, we can see that Parmenides is easily able to represent the arguments as put forward there[3]. As per its implementation with the Iraq War debate, the system first asks the user whether he agrees or disagrees with the initial position. Those who disagree with it are then presented with a series of the appropriate critical questions, tailored to this specific debate, in order to uncover the specific element of the justification that they disagrees with. For example,

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[3]Within our representation of this debate we have excluded the argument given in the e-petition that is based upon the Prime Minister's appearance on the television programme Question Time, since this is a specific point with no clarification of the underlying details given. It would, of course, be possible to include this argument in our representation, and any other such ones excluded, if it were so desired.

the following question (instantiating CQ3) is posed to users to confirm their agreement with the achievement of goals by the action, as given in the initial position:

Do you believe that repealing the ban would achieve the following?:
Create more jobs in the countryside.
Reduce the need for less humane methods of fox control.
Remove the prejudice against people who enjoy fox hunting.
Take heed of a government enquiry.
Withdraw support for animal rights extremists.

After users have submitted their critique of the initial position, they are given the opportunity to construct their own position by choosing the elements of the position, from drop-down menus, that best reflect their opinion. We acknowledge that in restricting the users' choices to options given in drop down menus we constrain their freedom to express their opinions fully. However, such a trade-off, whilst not entirely desirable, is necessary if we are to capture overlapping opinions on an issue and automate their collection and analysis. Furthermore, allowing for input of entirely free text responses would increase both the risk of abuse of the system and the administration work involved in managing and responding to data collection of such opinions, including identifying and collating semantically equivalent but syntactically different responses. In an attempt to afford some element of increased expressivity to users, we do provide limited facilities to allow them to enter free text, with a view to drawing attention to elements of the debate that they believe have been excluded. Such elements could be considered for inclusion by the system's administrator, were a large number of similar omissions to be uncovered.

4.1. Creating a New Debate

The debate described above is just one example of how Parmenides is implemented to model a different topic of debate to that given in the original version of the system. To make it simple to add new debates we have implemented the 'Debate Creator', which enables administrators of the system to create new debates for presentation on the forum. The application allows administrators to input the parameters of a debate and it outputs the associated PHP webpages, plus a database source file. The Debate Creator requires little technical knowledge on the part of the administrators: they do not need to have knowledge of website and database design, nor specify the page ordering and layout necessary for the system to operate correctly. They are only required to understand the different elements that constitute the argument scheme used.

To create a new debate using this tool, the administrator must enter details of both the content of the debate, i.e. all the elements of the initial position and the drop-down menu options available for providing an alternative position, and details of the supporting technology, i.e. details of the SQL database host to which the data will be written. The data entered is used to create PHP webpage files, SQL database files, and data files necessary for analysis of the debate, without the need for any coding on the part of the administrator. This ensures that the debate remains internally consistent, requiring each data item to be entered only once (and the data is then propagated appropriately), and the format of the debate remains consistent with other debates on the forum. To aid usability, the Debate Creator provides support to ensure that all details of new debates are entered in the correct format. This consists of small help buttons next to each input box, which the user can click on to get more information about, and examples of, the input required.

4.2. Analysis Facilities

In order to analyse the opinion data submitted by users of the Parmenides website, a Java-based application has been implemented that analyses the arguments through the use of Argumentation Frameworks (AFs). The application consists of two analysis tools: the 'Critique statistics analysis tool' and the 'Alternative position analysis tool'. Both tools retrieve user submitted opinions from the database and analyse them using Argumentation Frameworks to enable administrators to view the conclusions that can be drawn from the analysis. We discuss each tool in turn.

The 'Critique statistics analysis tool' analyses the individual critiques that users have given of the initial position of the debate and computes a set of statistics that reflect the analysis. The arguments are automatically translated into an AF graph representation that is displayed and annotated with the relevant statistics, allowing the administrator to easily see which element of the initial position users agree or disagree with most. Figure 1 shows an example of the tool being used to analyse the results of the fox hunting debate.

Within the argumentation frameworks displayed, the initial position is broken down into a number of sub-arguments, one for each of the social values promoted in the initial statement. For example, in the fox hunting debate the initial position presented actually comprises five separate arguments[4], consisting of the relevant statements supporting each of the five social values promoted by the initial position. This can be seen in Figure 1 where the individual arguments are presented in tabular format along the top of the screen. In the centre of the framework is a large node containing the sub-argument for the currently selected social value, which in this case is 'Prosperity'. The five arguments comprising the initial position are as follows:

- The ban affects the livelihoods of those who make a living from hunting. Repealing the ban will create more jobs in the countryside. Creating more jobs promotes Prosperity. Prosperity is a value worth promoting.
- Less humane methods of controlling fox population have been introduced. Repealing the ban will reduce the need for less humane methods of fox control. Reducing inhumane methods of fox control promotes animal welfare. Animal welfare is a value worth promoting.
- The ban prejudices those who enjoy hunting with dogs. Repealing the ban will remove the prejudice against people who enjoy hunting. Removing the prejudice against those who enjoy hunting promotes equality. Equality is a value worth promoting.
- The ban ignores the findings of a government enquiry. Repealing the ban will take heed of a government enquiry. Taking heed of a government enquiry promotes consistency. Consistency is a value worth promoting.
- The ban gives succour to animal rights extremists. Repealing the ban will withdraw support for animal rights extremists. Withdrawing support for animal rights extremists promotes tolerance. Tolerance is a value worth promoting.

In the analysis, each of these sub-arguments is displayed as a separate AF. The sub-arguments are broken down further into the individual elements (circumstances, goals,

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[4]In using this particular debate we intend to show that our representation can capture the arguments used in the corresponding e-petition: we make no claim about the comprehensive coverage of all arguments related to the debate and acknowledge that there may be other numerous relevant aspects not included here.

values and purpose) that constitute the sub-argument, and each element is then assigned to a node in the AF. Nodes are also assigned to the 'counter-statement' of each element, the counter-statement effectively being one that is the opposite of the individual element in question. For example, consider the bottom right hand branch of the AF in Figure 1. Here, the statement for the particular element under scrutiny, the goal element, is "Repealing the ban will create more jobs in the countryside". The counter-statement is simply its opposite: "Repealing the ban will not create more jobs in the countryside". Through the critical questioning users are asked to say whether they agree or disagree with each positive statement, hence the need for the AF to show the opposing arguments. Each node is labelled with the number of users that agree with the representative statements.
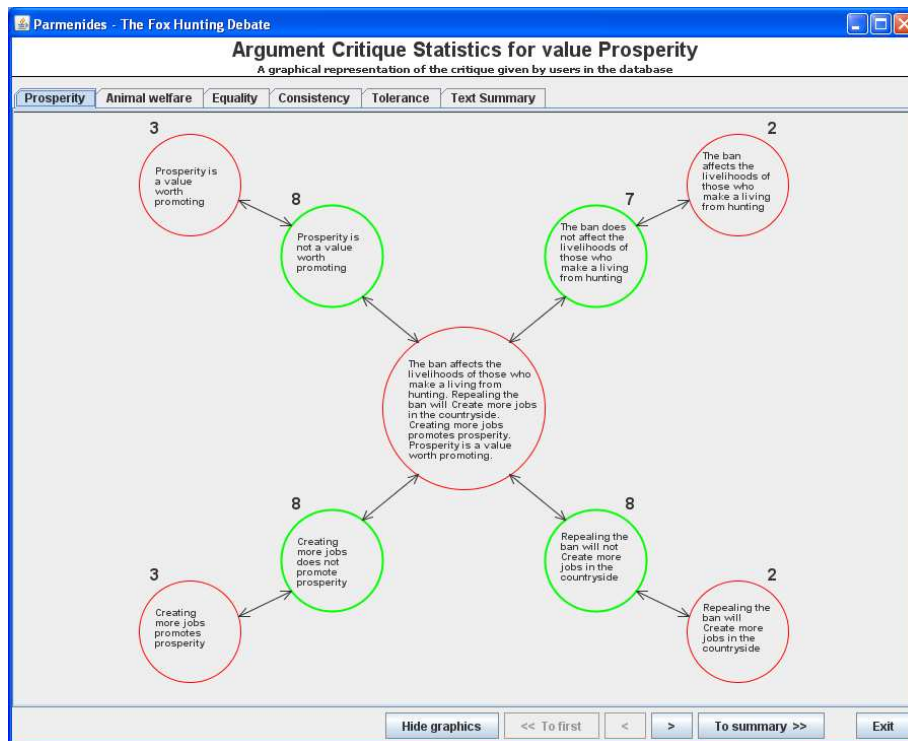

Figure 1: Critique statistics analysis framework for the fox hunting debate.

The critique statistics represented in the AF can be evaluated to determine the level of support for the various elements of the initial position. In the AF, for each sub-argument we define attacks between each element statement and its counter-statement. Defeat is determined by considering the statistics associated with each statement and its counter-statement. If more users have expressed their agreement with the counter-statement for a particular element, then the node representing the positive statement for the element is said to be defeated.

The attack relations are present not only between the individual elements and their counter-statements, but also between the counter-statements and the full sub-argument (the one represented in the central node of the AF). Therefore whenever a counter-statement has more support than its corresponding positive statement, the attack of the

counter-statement on the central node succeeds and the full sub-argument is deemed to be unjustified. This can be seen in the screenshot in Figure 1.

As described above, each AF has one branch for each element of the sub-argument. Consider again the branch in the bottom right hand corner of Figure 1, which relates to the 'Consequence' element. In this small-scale example, eight users agree with the counter-statement whereas only two users agree with the statement supporting this value. Therefore, the attack of the counter-statement on both the positive statement for the element and the sub-argument itself succeed. This is indicated with a green outline being given to the node representing the 'winning' counter-statement and a red outline to the nodes representing the statement and the sub-argument, which are both defeated.

The tool also provides a textual summary of the statistics, allowing the user to obtain an overview of support for various elements of the initial position. The textual summary may be a preferable form of analysis when the initial position of a debate promotes a large number of social values that make it difficult to visualise the numerous associated AF graphs. The textual summary can be used to easily determine which particular element of the argument is most strongly disagreed with. Consider the example presented in Figure 2, showing the statistics for our example debate. From these statistics we can easily determine that the social value with least overall support is 'equality' with an average of only 5% agreement with the statements supporting the value. Towards the bottom of the textual summary, the overall agreement with circumstances, goals, purposes and values is also displayed. In this case, circumstances and goals have least support amongst the users. The administrator would thus be able to pass on the conclusions to the relevant body who may consider making clear the evidence given for the current circumstances being as stated, or reviewing the relevance of the particular circumstances that are presented in the original position.

The advantage of this analysis of opinions over the e-petition representation described earlier in the paper is obvious: we can now see exactly which *particular* part of the debate is disagreed with by the majority of users. This can be either in the form of agreement with overall social values that are promoted by the position and their supporting statements, or in the form of aggregated statistics for each element of the position (circumstances, values, goals and purpose). In the case of the government e-petitions, once a petition is closed, an email is sent to all signatories to attempt to explain why the government policies critiqued are in place and operate as they do. However, as noted in Section 2, it is undoubtedly very difficult for the government to adequately address each person's concerns since they are not aware of users' specific reasons for disagreeing. Parmenides, in contrast, would allow the administrator to see which parts of the justification are most strongly disputed and hence enable any such correspondence to be more targeted so that it addresses the appropriate disputed part(s) of the government's position. We could now modularise responses into paragraphs to be included or omitted, according to the concerns expressed by particular addressees.

The second analysis tool is the 'Alternative position analysis tool'. This tool analyses the positions submitted by users as an alternative to the initial position. The positions are represented as Value-based Argumentation Frameworks (VAFs) [4] to represent and evaluate positions that promote different values. The Java program automatically constructs the VAF by assigning a node in the framework to each unique social value specified in the alternative positions constructed by users. Also assigned to each node is a list of actions that are specified in alternative positions that promote the value represented

by the node. One VAF is constructed for each of the social values promoted by the initial position of the debate, and within each framework a node is assigned to this social value. All nodes representing social values promoted by alternative positions attack the value promoted by the initial position, within each framework.
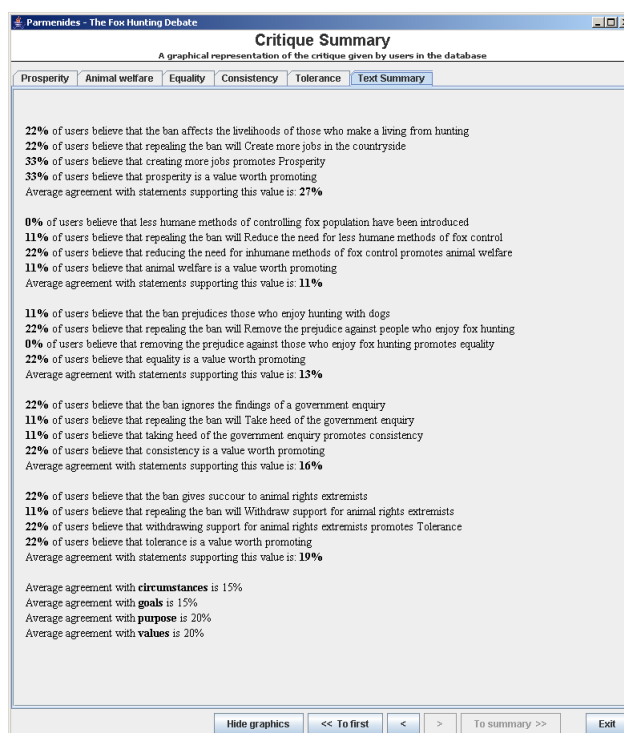

Figure 2. Critique statistics summary.

The Alternative position analysis tool can be used to obtain a subset of actions, from those submitted within positions that are alternative to the initial one, which can be considered 'justifiable' actions to carry out. We obtain the set of justifiable actions by applying a ranking over the values that appear in each VAF. For example, consider the screenshot in Figure 3. This shows a VAF based on the social value 'Prosperity' from the initial position of our example debate, with the central node representing the value. Surrounding and attacking this node are nodes representing social values promoted by alternative positions, as subscribed to by users. At this point we show the arguments without evaluating their relative status, thus we do not know which attack(s) succeed.

In order to determine whether or not an attack succeeds, following the definition of VAFs in [4], a ranking can be applied over the values in order to determine precedence. To obtain the ranking, the administrator is presented with an interface which allows him to input an ordering on all the values included in the initial position (the value ranking could alternatively be implemented as a "vote" on users endorsing the values). Once the ranking has been given, the arguments are evaluated as follows: if an argument attacks another whose value has a lesser ranking, the attack succeeds; if an argument attacks another whose value has a higher ranking, the attack fails; if an argument attacks another whose value is the same as that of the attacker, the attack succeeds.

Once the value ranking has been applied, the VAF is updated to show the status of the arguments according to the given ranking. Those arguments that are defeated have their associated nodes outlined in red and those outlined in green are not defeated. The actions which promote the values represented by the green nodes can then be considered 'justifiable' actions to carry out, since they withstood the critiques applied given the value ranking, and any one may be justifiably chosen to execute. This set of actions is output on screen, concluding presentation of the analysis data.
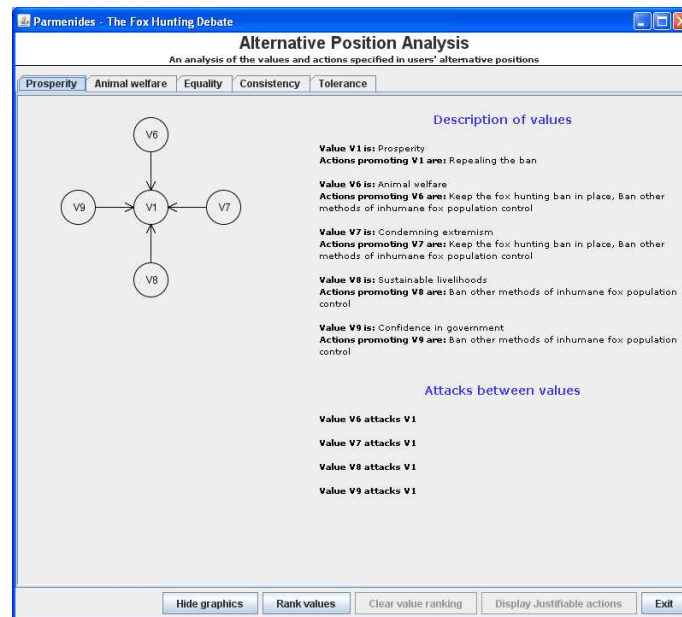

Figure 3. VAF showing competing alternative arguments.

4.3. Profiler

So far we have described the Parmenides system, its use in an e-government context, and the tools implemented to analyse the data submitted. We now briefly describe an additional tool that allows for demographic profiling of the system's users. The Parmenides Profiler allows users to create an account, which is then associated with every debate on which they submit an opinion, as well as a demographic profile which the user may optionally complete with their personal details, such as education, marital status, lifestyle, etc. The interface provides a list of live debates currently on the forum, which can be altered using the Parmenides Profiler Admin Portal, a PHP webpage for Parmenides administrators. The profiler system interface can be viewed at: `http://cgi.csc.liv.ac.uk/~parmenides/Profiler/`

Although there is currently no functionality to analyse the data collected by the Profiler, there is plenty of scope for developing such tools. For example, tools could be created to see if certain responses to particular arguments within a debate are popular with a certain demographic of people. It would also be possible to analyse all opinions of each individual user to determine whether they always believe that the same values are worth promoting, for example. Alternatively the government, or other body interested in

the debate, may wish to filter the opinions of certain demographics. For example, they may wish to see the difference in opinion between males and females or different age groups. The same could be done for policies that affect certain sections of the population, e.g. road policies, where it may be useful to analyse the difference in opinion submitted by those who hold driving licences to those who do not. We hope to incorporate such demographic profiling facilities into future work on the Parmenides system.

5. Concluding Remarks

In this paper we have described the development of a prototype system and suite of tools to support e-democracy, which make use of specific methods for representing and reasoning with arguments. These tools were motivated by support for the following features: facilities to enable multiple debates on different topics to be presented within a common format; a tool to enable administrators to create their own debates, on any topic, from which an associated website and database are dynamically created to present the debate; analysis facilities that allow the arguments submitted to be represented as Argumentation Frameworks, from which statistical information concerning a breakdown of support for the arguments can be gathered, and value based arguments assessed; and, a profiler system to enable demographic profiling of users from their responses to multiple debates.

Future work will be to extend the profiler tool to include analysis facilities, and investigate methods to increase and better handle free text input of users' own opinions. We also intend to investigate how we could make use of other argumentation schemes to expand and enhance the range of arguments and types of reasoning that are used in the system. Finally, and most importantly, we intend to conduct large scale field tests to validate the effectiveness of the system, investigations for which are currently underway.

To summarise, we believe that the current developments of the Parmenides system that we have described here begin to address some of the shortcomings of other systems that do not allow for a fine-grained analysis of the arguments involved in a debate, and this is strengthened by the use of existing methods of argument representation and evaluation that are themselves hidden from the users, ensuring the system is easy to use.

References

[1] K. Atkinson. *What Should We Do?: Computational Representation of Persuasive Argument in Practical Reasoning*. PhD thesis, Department of Computer Science, Liverpool University, 2005.

[2] K. Atkinson. Value-based argumentation for democratic decision support. In P. E. Dunne and T. Bench-Capon, editors, *Computational Models of Argument, Proceedings of COMMA 2006*, volume 144 of *Frontiers in Artificial Intelligence and Applications*, pages 47–58. IOS Press, 2006.

[3] K. Atkinson, T Bench-Capon, and P. McBurney. PARMENIDES: Facilitating deliberation in democracies. *Artificial Intelligence and Law*, 14(4):261–275, 2006.

[4] T. Bench-Capon. Persuasion in practical argument using value based argumentation frameworks. *Journal of Logic and Computation*, 13 3:429–48, 2003.

[5] A. Macintosh, E. Robson, E. Smith, and A. Whyte. Electronic democracy and young people. *Social Science Computer Review*, 21(1):43–54, 2003.

[6] Ø. Sæbø and H. Nilsen. The support for different democracy models by the use of a web-based discussion board. In R. Traunmüller, editor, *Electronic Government*, LNCS 3183, pages 23–26. Springer, 2004.

[7] J. R. Searle. *Rationality in Action*. MIT Press, Cambridge, MA, USA, 2001.

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