

# Argument-Based Policy Consultation Through Crowd Sourcing

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We describe a project to support e-participation using crowd sourcing as part of public consultation. The project involves a number of discrete stages. So far we have considered question design, generated suitable test data and compared existing aggregation algorithms. Using these results we can design software to collect opinions, and generate arguments which can be evaluated with respect to variously composed populations.

In a Green Paper the purpose of the consultation is to ask some rather general questions to identify the key problems while the White paper presents a specific proposal for a policy and its justification. Comments on and critiques of these proposals are received and the policy refined. Existing tools [5] identify the key points of agreement and disagreement and solicit alternative proposals, but rely on an underlying model [1]. The model is intended to be developed from responses to the Green Paper, but building it is a significant and difficult task [4] and so the current project is intended to facilitate the model building process through crowd sourcing techniques (e.g. [3]). In this paper we provide an overview of the proposed stages in our project, and the results produced thus far. Although we have completed only the first few steps, we have obtained substantial results on which we can build.

Typically questions in a Green Paper are open questions inviting a discursive response. For our purposes we need to present the questions in a form which can receive “yes” or “no” answers. In particular, to construct our model we need to identify the consensus on the key components of the model: relevant current *facts*, the *consequences* of relevant actions, and the *values* they promote and demote. We also need to ask what option the respondents favour, so that we can determine preferences, and relate them to the opinions. In our experiments we designed a set of questions concerning the legalisation, decriminalisation or continued prohibition of cannabis use.

We need to aggregate the responses to determine a consensus for each answer. Several methods have been proposed for aggregation (see e.g. [2]). We have generated test data and conducted a number of experiments to determine a suitable method, and to explore its appropriateness under a range of different conditions. We explored two methods in particular, both taken from [2], a *distance based* algorithm and a *greedy consensus* algorithm.

For our experiments we allocated “right” answers to a set of questions and then generated sets of answers with varying numbers of “right” answers. From this

we can compose different populations with different characteristics with respect both to the degree (e.g. 80%, 70% or 60% “right”) and to the distribution (e.g. uniform, normal, bimodal) of error, and to the option favoured. This enables us to test against populations with clear majorities, and those which are more equally split between options. Key results were:

- The greedy consensus algorithm clearly outperformed the distance based algorithm in identifying the majority position with respect to the questions;
- This result was robust over all the various distributions (uniform, normal and bimodal)
- Although the greedy consensus identifies the majority position, it does not reflect the *size* of the majority. If we allow “do not know” as a third response and the population is more or less evenly split over the three options the distance based algorithm can be used to produce a compromise, rather than a winner takes all, position.

The application of the greedy consensus algorithm will thus allow us to populate the *state*, *action* and *transition* relations of a database which characterise the model as implemented in [5]. This will enable us to use both programs described there to consult the public: thus we can both present arguments for a particular position, and critique proposals from the point of view of the consensus model (or the consensus of those advocating a particular option). This will typically produce arguments for (and against) several options.

This paper has described an on-going project to provide support based on crowd sourcing for the model building required to underpin the argumentation based policy consultation tools described in [6] and [7] and implemented as in [5]. Thus far we have looked at question design, generated test data and thoroughly explored the properties of various possible aggregation algorithms. The next phases will be to build a tool to collect the opinions, and to experiment with the various sets of arguments produced from the model for various populations.

## References

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