

AI Large Practical Assignment 3

Alan Smaill

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1 The assignment

The third assignment (Assignment 3) involves extending the system you developed in assignment 2 to allow for statements with variables, and the substitution of constants for variables.

This will enable the formation of “critical questions”, based on general patterns which can be checked against statements in an instance of CAES. This involves some aspects of dialogue, where the different parties in a legal dispute are represented by people aiming to present a case for their side, and to undermine the case for the other side.

This will involve:

- looking at some presentations of the use of argumentation systems in dialogue, and in particular the notion of *critical questions*; see references below;
- extending your system to support a schematic form of such critical questions, and designing scenarios to show this operation in action;
- writing a report on the work done, placed in context.

You should write your own code and report. You are not permitted to

- copy programs which someone else wrote.
- show your own programs or report to other students.

but you are encouraged to have discussions with your colleagues.

Please see: <http://www.inf.ed.ac.uk/teaching/plagiarism.html>

2 Submission

You are required to submit

- program source code, ensuring
 - that the comments allow a reader to understand the intention behind the code, together with
 - some example scenarios treated by your program.

Put all these in a single directory, and submit using the command in DICE:

```
submit ailp cw3 <your-directory>
```

- Your report.
We will use turnitin for submission of the report. Details of this will follow.

The deadline for Assignment 3 submission is 16:00 on Wed 20th December 2017.

3 Critical questions

The first goal is to extend the system to allow representation of critical questions. This will involve a further extension to the notion of statement, where variables as well as names (constants) can occur in positions where names (constants) occur in Assignment 2.

The paper Gordon et al. (2007) has a short account of critical questions and their role in argumentation. There is further discussion in Walton & Reed (2003).

You are asked to extend your implementation by having a representation of some of the patterns by which critical questions are described, and using these patterns to compute a suitable “next step” in the argument, from one side or the other. This will typically happen when not all the arguments available have been put on the table, so you can use the input format you have implemented to describe the state of play when an appropriate critical question should be raised.

You should also work out example scenarios that allow your mechanism to be tested, and show some good properties of your implementation.

3.1 Example

From (Gordon et al. 2007, p 878):

Major Premise. Source E is an expert in the subject domain S containing proposition A.

Minor Premise. E asserts that proposition A in domain S is true.

Conclusion. A may plausibly be taken as true.

The six basic critical questions matching the appeal to expert opinion [49, p. 223] are the following.

1. How credible is E as an expert source?
2. Is E an expert in the field that A is in?
3. Does E's testimony imply A?
4. Is E reliable?
5. Is A consistent with the testimony of other experts?
6. Is A supported by evidence?

Note that:

- The “variables” E, S, A are used to allow that the questions can be asked whenever we have matching instances present among the CAES propositions.
- The point of asking these questions is that it places a *burden of proof* on the other side, who can either:
 - already have enough evidence to answer the question positively;
 - come up with evidence not yet available to answer the question positively;
 - or admit that there is no good answer.

4 The report

Your report should be not longer than 8 pages; there is a template for writing the report on the course web page.

You do not have to use any particular word processing system, but an outline document will be provided in L^AT_EX.

Your report should

- explain the background to argumentation systems in general, and Carneades in particular — what are they for?

- Describe the functionality you have added to the system, both in assignments 2 and assignment 3, and how you did this.
- Present test cases, explaining why you chose these particular test cases, and why you encoded them in the way you did, and comment on quality of the resultant behaviour.
- Evaluate your final system as a tool — what are the strengths and weaknesses, how could it be improved?
You are also encouraged to think about the wider issues surrounding the use of systems taking a similar approach, in the longer term.

Those reports that just describe what you did and what you got, without any analysis or discussion, will not get high marks,

Some thought is required in how best to present the test cases you will have run.

References

- Gordon, T. F., Prakken, H. & Walton, D. (2007), 'The Carneades model of argument and burden of proof', *Artificial Intelligence* **171**(10–15), 875–896.
URL:<http://www.sciencedirect.com/science/article/pii/S0004370207000677>
- Walton, D. & Reed, C. (2003), Diagramming, argumentation schemes and critical questions, *in* F. H. Van Eemeren, J. A. Blair, C. A. Willard & A. F. Snoeck Henkemans, eds, 'Anyone Who Has a View: Theoretical Contributions to the Study of Argumentation', Springer Netherlands, Dordrecht, pp. 195–211.
URL:https://doi.org/10.1007/978-94-007-1078-8_16