AI Large Practical: Assignment 2

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Nov 5 2014

Critical questions

- ▶ Critical questions articulate ways of challenging arguments created using an argument scheme.
- ▶ For some critical questions, merely asking the question is enough to shift the **burden of proof** back to the party who put forward the argument to answer the question.
- ▶ For other critical questions, the party who raised the question also has the **burden of answering it**.
- ▶ Carneades models critical questions as additional premises of an argument, with a different type of premise, called assumptions and exceptions, for each kind of question.

Burden of proof and Carneades

A motivating example from the paper:

"Let us illustrate the concept of argumentation schemes with the scheme for arguments from expert opinion, ..."

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.

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The six basic critical questions matching the appeal to expert opinion ... are the following.

Gordon et al. p 5

Motivating example

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?

In this case, we have a list of the six basic critical questions for expert testimony.

Different sorts of premises, 1

In a dialogue, use the Carneades classification of statements in an argument to distinguish where the burden of proof lies:

Ordinary premises:

     Must always be supported with further grounds.

Assumptions:

     Can be assumed until they are questioned.

 Exceptions:

     Their negations are held to be true by default.

see Gordon et al., p 7

Different sorts of premises, 2

Ordinary premises:

> Burden of Proof is on the proponent to provide back-up.

Assumptions:

> *can be ignored as far as shifting the Burden of Proof is concerned*

Exceptions:

> Burden of Proof is on the opponent to provide evidence that they hold.

Burden of Proof

So Gordon et al. claim a strong link between types of premises (in Carneades) and the allocation of the burden of proof.

- If one side uses an argumentation scheme, then the burden is on that side to give evidence for:
    - the ordinary premises,
    - and, if challenged, the assumptions involved.

    after which the burden is on the other side to:
- defeat the argument by either:
    - finding a counter-argument to the conclusion (rebutting), or
    - pointing out exceptional circumstances.

Proof Standards

Alongside the association of burden of proof with types of premises, the authors suggest starting with low proof standards assigned to statements of premisses:

> *The burden of production is distributed by dividing premises into different types: evidence for ordinary premises and (once challenged) assumptions must be produced by the proponent of the argument with these premises, while evidence for exceptions must be produced by the respondent. In addition some initially low proof standard needs to be assigned to the statement of each premise*

> *Gordon et al., p 9*

Dialogue

We can think of a dialogue here as a sequence of steps where arguments are put forward for discussion; the state of the partial argument can be checked with the version of Carneades already implemented.

Here the notion of "speech acts" is in the background, where the state of play of the dialogue is updated by presentation of new claims. For background on this, see Stanford Encyclopedia of Philosophy:

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http://plato.stanford.edu/entries/speech-acts/
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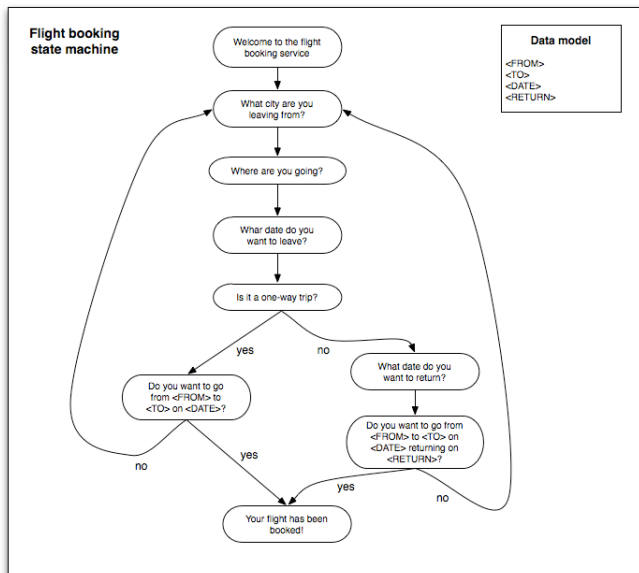
Speech acts and dialogue

Thus:

> *Speech acts can be modeled as functions which map a state of the dialogue to another state.*

Gordon et al., p 11

The state of the dialogue includes at least the set of arguments in play, and the current assignment of burden of proof.

Finite State Models of Dialogue

Critical questions and Carneades

Section 4 of Gordon et al. introduces some new proof standards and judgements; it is not required to implement these, but you may want to consider what role these may play in assigning burden of proof.

Sections 5 and 6 of Gordon et al. are important for the assignment. Section 5 discusses reasons for assigning premisses as (ordinary) premises, assumptions or exceptions.
The argument scheme for expert opinion is then worked out, based on the earlier characterisation of critical questions.

Expert witness and critical questions

The argument scheme:

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

Premise E asserts A.

Assumption E is a credible expert.

Exception E is not reliable.

Exception A is not consistent with the testimony of other experts.

Assumption A is based on evidence

Conclusion A.

Example in paper

Look at the example in section 6.

This shows a small example of combination of argument schemes following the ideas already presented.

1. First the prosecution gives an initial argument that murder has occurred;
   Carneades finds that on its own it is convincing.
2. Burden of proof passes to defence, who claim that self-defence is involved, and supply witness.
   This is enough at this stage to block the murder conclusion.
3. This is attacked in turn by the prosecution; however at this stage the evidence is not strong enough to establish murder.

Comments on example

Note that the defence put forward a combination of arguments, since it had a burden of proof to establish a premise of its own argument; only then does burden of proof pass to the prosecution.

So care is needed in setting out arguments.
The paper makes use of *argument schemes* – these are general patterns which then give particular arguments in different cases. A full implementation could make this explicit, but it's enough here to take care of particular instances.

What should implementation provide?

- A method of moving through a sequence of dialogue states; and
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In a given state, it should be clear what the current set of arguments is, and what the state of the top-level assertion is.

The different sides of the argument should start with some arguments they can bring to the table, and deploy them in a relevant way, following the burden of proof.

The example in Gordon et al., section 6, would be a good development example.