



AI Large Practical: Assignment 3 ctd

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- ▶ Remember that the hand-in date is Wednesday 20th December
- ▶ I will normally be available during drop-in sessions, up to Tuesday 12th December; and by email & Piazza after that.
- ▶ You can use any additional programming tools and techniques that you think will help you – remember to acknowledge the source of ideas and code in your report.

A motivating example from the paper:

Let us illustrate the concept of argumentation schemes with the scheme for arguments from expert opinion, as formulated in [49, p. 210], with some minor notational changes:

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.

Gordon et al. p 5

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?*

Gordon et al. p 5

In this case, we have a list of the 6 basic critical questions for expert testimony. In fact, (4) is used in the paper we used as starting point for the python implementation.



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

We can think of a dialogue here as a sequence of steps where arguments are put forward into a public arena; 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:

<http://plato.stanford.edu/entries/speech-acts/>

Thus:

Speech acts can be modelled 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.

When asking critical questions, consider what we can say about a *good* question.

Possible criteria:

- ▶ It cannot be immediately refuted.
How check? Can look to see if outcome of local point of contention would change, somehow.
- ▶ It attacks a weak point in the opponent's case.
How check?
Look for the relevant arguments already in play;
see how the evidence adds up for relevant statements,
somehow.

For your chosen examples, it should show the following:

- ▶ An intermediate state in deployment of the arguments in a legal case;
- ▶ an abstract version of a relevant critical question;
- ▶ a mechanism to compute and display appropriate concrete version of a critical question;
- ▶ for extra credit, some system information relevant to the quality of the question.

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.

You should make clear which statement is being disputed when asking a critical question.

The expert witness example is a good example for initial development.

As part of your extended implementation, you will want to find a way to match the schematic statements in a critical question against statements stored in a CAES.

One way to do this involves implementing **substitution**: this can be taken as an association of **variables** with **constants**.

This should allow:

1. Applying a substitution to a schematic statement in order to get a concrete statement;
2. Matching a schematic statement against a concrete statement to get a substitution;
3. Composing compatible substitutions.

- ▶ ▶ Python as a scripting language is well placed to help you with running experiments and displaying results.
- ▶ This is also potentially a good way to allow your system to be tested.
- ▶ ▶ Alternatively, shell scripts can be useful in helping to organise experimental runs, and keeping track of data.
- ▶ Resources:
 - ▶ Bash Guide for Beginners
<http://tldp.org/LDP/Bash-Beginners-Guide/html/>
 - ▶ Advanced Bash-Scripting Guide
<http://tldp.org/LDP/abs/html/>

- ▶ There is a zip file on the course web page with \LaTeX template for writing the report.
- ▶ You can use whatever you like to produce the report; but your submitted report must be in **PDF** format.
Use `pdflatex` to produce PDF directly.
- ▶ Some resources for \LaTeX :
obvious place to look is the \LaTeX project site:
`http://www.latex-project.org/`
— in particular the short introduction.

It is very helpful when designing experiments and building systems to have an idea of what underlying claims you should be in a position to say something about after going through this exercise.

You are being asked not just to develop some software, but to think about what the role of similar systems might be in the longer term, and whether your experience gives you good reason to think that this role is achievable, or not.

Let's think of a couple of such hypotheses.



1. *Systems like Carneades show that, given advances in Natural Language Processing to allow analysis of input materials, they could effectively replace human advocates in simple legal cases.*

Evidence either way??

2. Argumentation systems with suitably chosen parameters can provides a good way to provide explanations for choices made by AI systems on behalf of humans.

You are strongly encouraged to introduce some hypothesis like the above early in your report. In your conclusions you should discuss using your experience and any other sources that you can find what the evidence is for and against your hypothesis.



Look through the template; this should be self-explanatory.

There is a useful emacs mode for editing L^AT_EX source, `auctex`. To enable this, put the following in your `.emacs`

```
(load-library "auctex")  
(TeX-PDF-mode 1)           ;turn on PDF mode
```

This will give helpful menus for compiling and viewing pdf documents.

You are recommended to use `pdflatex` to produce output pdf from L^AT_EX.

However you write your report, you should submit **pdf** document; just about any system you might use allows this.

- ▶ More ideas about the final assignment.
- ▶ using \LaTeX