

Advances in Argument Mining

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Working with the BBC

to teach 16-18 year olds how to recognise fake news

The screenshot shows a web browser window with the URL <https://www.bbc.co.uk/taster/pilots/evidence-toolkit-moral-maze>. The BBC logo is in the top left, and navigation links for News, Sport, Weather, iPlayer, TV, Radio, and More are in the top center. A search bar is on the right. Below the navigation bar, the word 'TASTER' is prominently displayed. To the right of 'TASTER' are three buttons: 'Try' (10 months left), 'Rate' (32 ratings), and 'Share' (26 shares). The main content area features a large, dark background with the word 'PROPAGANDA' repeated in various sizes and orientations, creating a word cloud effect. Below this, the title 'Moral Maze Evidence Toolkit' is displayed in large white text. To the left of the title is a small icon of a document with an upward arrow. Below the title, there is a paragraph of text: 'Team up with BBC School Report and take fake news to task with the Evidence Toolkit. Equip yourself with all you need to dissect the news and figure out what's really going on.' Below this paragraph are two buttons: 'Try it' (10 months left) and 'Rate' (32 ratings). At the bottom of the page, there is a section titled 'The Inside Story' with a subheading 'To explain the project, here's Professor Chris Reed of the Centre for Argument Technology, Dundee University'. Below this section is a link 'Can You Sum It In The Project'.

BBC Sign in News Sport Weather iPlayer TV Radio More Search

TASTER

Try 10 months left Rate 32 ratings Share 26 shares

Moral Maze Evidence Toolkit

Try it 10 months left

Team up with BBC School Report and take fake news to task with the Evidence Toolkit. Equip yourself with all you need to dissect the news and figure out what's really going on.

★ 32 ratings | ↗ 26 shares

The Inside Story

To explain the project, here's Professor Chris Reed of the Centre for Argument Technology, Dundee University

[Can You Sum It In The Project](#)

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The Evidence Toolkit
Tools for getting from news to truth

ABOUT ?

ARG-tech
Centre for Argument Technology

University
of Dundee

BBC
RADIO 4

SCHOOL
REPORT

Welcome to the Evidence Toolkit. Select the first news article to get started.



Air pollution: Are diesel cars always the biggest health hazard?

Theo Leggett, BBC News



All dietary advice was fruit company conspiracy

The Daily Mash



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BBC
4

? HELP

The first task is to find the main claim in the article: what's the article really saying? You can select a fragment of text in the article that you think is expressing the main claim. If you click "Help me!" over on the right, the Reason Checker will suggest what it thinks is the main claim by underlining it with a wavy red line. You can then select the text if you agree. Finally, click "I'm done" to see how you've done.

TRUST TOOLBAR



Diesel Toxicological overview
[www.gov.uk]



History of the diesel car
[en.wikipedia.org]

BBC

Theo Leggett – Business
correspondent, BBC News

Air pollution: Are diesel cars always the biggest health hazard?

Sales of diesel-powered cars fell dramatically last year, declining more than 17% compared with 2016.

People within the industry blame anti-diesel rhetoric from the government, local authorities and clean air campaigners for eroding consumer confidence.

They insist that modern diesel engines are actually very clean and the health risks have been overstated.

They also say that they can play a vital role in helping to cut carbon dioxide emissions, in order to meet climate change targets.

So have modern diesels just been getting a bad press, or do they represent a serious health hazard?

The reality is not as black and white as you might think. It's true that some diesel engines produce fewer toxic emissions than some petrol engines, but by and large petrol remains the cleaner option.

Although both petrol and diesel engines convert chemical energy into mechanical power by burning fuel, they do so in different ways.

A diesel engine should, in principle, use less fuel and produce less carbon dioxide than a petrol engine with the same power output.

However, this superior efficiency comes at a price. Diesel engines produce higher levels of particulates, microscopic bits of soot left over from the combustion process.

These can penetrate deep into the lungs, causing irritation and potentially triggering asthma attacks.

REASON CHECKER

Select the text that you think corresponds to the main claim of the article

I'm done

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? HELP

Now we need to look at each reason in more detail. How well does the reasoning work in each case? First you need to identify the general class of reasoning involved from the Reasoning Palette. Is the evidence supplied factual or is it an opinion?

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power output.

However, this superior efficiency comes at a price. Diesel engines produce higher levels of particulates, microscopic bits of soot left over from the combustion process.

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Particulate filters

The greatest danger lies with the smallest, so-called "ultrafine" particles, according to Dr Matthew Loxham, a research fellow in air pollution toxicology at the University of Southampton.

"They get so deep into the lungs, they get to the surfaces where oxygen enters our blood, and the particles themselves almost certainly can enter the blood," he says.

"They can cause increased stroke rates and increase heart attacks in people who are most susceptible, who have underlying health conditions".

However, modern diesels actually emit very few particulates - because they are equipped with special filters.

According to Emissions Analytics chief executive Nick Molden these systems work very well.

His company carries out its own real-world emissions testing - as opposed to the tests used by manufacturers to certify their new vehicles, which until recently were exclusively laboratory-based.

"Modern diesels essentially do not have a particulates problem," he says. "The filters clean up 99% of the particles. So long as they are not tampered with, they are very effective".

HIDE

But diesels also produce nitrogen oxides, or NOx - and how they deal with those is also very important.

Long term exposure to nitrogen dioxide in particular can decrease lung function, increase the risk of respiratory conditions and exacerbate allergic reactions.

Effective technologies do exist that are capable of drastically reducing NOx output. In addition, the current European emissions standard, Euro 6, sets strict limits on how much can be produced.

Euro 6 has applied to all new cars sold since September 2015. The legal limit on NOx from diesel engines was halved compared with the previous standard, Euro 5.

The Society of Motor Manufacturers and Traders says the latest diesels are "broadly on a par" with their petrol

REASONING PALETTE

This is a piece of evidence. Is it presented as a fact or an opinion?



Fact



Opinion

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There are several different types of factual reasoning. Sometimes evidence is grounded in statistics; sometimes just a single example. But there are other types of factual reasoning too. Do you think this reason looks statistical? Or perhaps relies upon an example? Or neither?

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REASONING PALETTE

You've identified this as factual evidence. Of what sort?



Statistical



e.g.

Example



Other



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Having identified the type of reasoning from the Reasoning Palette, the next step is to cast a critical eye at the reasoning with the help of the Critique Template. Each type of reasoning is associated with a specific template comprising several questions. Have a think about the questions and offer your answer to each one.

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The Society of Motor Manufacturers and Traders says the latest diesels are "broadly on a par" with their petrol equivalents in terms of their impact on air quality.

According to Emissions Analytics, however, the reality is not quite so simple.

Road testing

HIDE

For a start, cars often produce more NOx when driven on the road than they do when tested in the laboratory, and some models turn out to be much dirtier than others.

CRITIQUE TEMPLATE

You've identified this as expert evidence. Do you think that:

the source actually made the attributed statement?



the source is a credible expert on this subject?



the source is duly impartial and not profiting from lending their support?



other experts agree with the source?



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Finally, we need to check how impartial and balanced the article is. Does it manage to consider alternative perspectives to the one expressed in the main claim? Select the bits of the text that you think show the author expressing such counters, alternatives or objections.

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The reality is not as black and white as you might think. It's true that some diesel engines produce fewer toxic emissions than some petrol engines, but **by and large petrol remains the cleaner option.**

Although both petrol and diesel engines convert chemical energy into mechanical power by burning fuel, they do so in different ways.

A diesel engine should, in principle, use less fuel and produce less carbon dioxide than a petrol engine with the same power output.

However, this superior efficiency comes at a price. **Diesel engines produce higher levels of particulates, microscopic bits of soot left over from the combustion process. Statistical 🤖.**

These can penetrate deep into the lungs, causing irritation and potentially triggering asthma attacks.

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"They get so deep into the lungs, they get to the surfaces where oxygen enters our blood, and the particles themselves almost certainly can enter the blood, Expert 😊" he says.

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OBJECTIONS

Select each bit of text you think shows the author thinking about the claim from other perspectives

I'm done

Help me!

HIDE

But diesels also produce nitrogen oxides, or NOx - and how they deal with those is also very important.

Long term exposure to nitrogen dioxide in particular can decrease lung function, increase the risk of respiratory conditions and exacerbate allergic reactions.

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BBC RADIO 4

SCHOOL REPORT

? HELP

Finally, we need to balanced the article consider alternative expressed in the the text that you t expressing such o objections.

Feedback

In the martial art of critical thinking, you are... **An apprentice analyst!** **3/10**

Identifying the main claim - 0/2

The main claim is surprisingly hidden in the body of the article. Overall the article is coming down on the side of petrol being cleaner.

Identifying the reasons - 0/3

After a bit of background explanation, the first key reason concerns the higher levels of particulates produced by diesel engines. Then the next bit of evidence comes from an expert who explains why particulates are a health hazard.

Identifying evidence types - 3/4

That engines produce higher levels of particulates is a fact, but not one that is being treated as either a statistical fact or an example. But there's no reason to think the claim is untrue, and it does indeed work to support the claim. So this is a good bit of reasoning.

For the second reason, we have expert opinion. We have no reason to think the source didn't make the claim, the article gives us information that he is a credible authority in the

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Under 13s are not encouraged to share on social media

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However, this superior efficiency comes at a price. Diesel engines produce higher levels of particulates, microscopic bits of soot left over from the combustion process **Statistical** .

These can penetrate deep into the lungs, causing irritation and potentially triggering asthma attacks.

Select each bit of text you think shows the author thinking about the claim from other perspectives

[I'm done](#) [Help me!](#)

This article has a very great deal of material on the other side of the claim - it is an example of balanced, impartial reporting. There are two areas where alternative positions are expressly introduced (though there are others that are less clear-cut). The first introduces particulate

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The screenshot shows the BBC School Report website. The browser address bar displays 'www.bbc.co.uk/schoolreport'. The page features a red header with 'SCHOOL REPORT' in white. Below this, a large image shows a hand holding a smartphone displaying the 'BBC iREPORTER' app interface with the text 'GET READY TO MAKE THE HEADLINES!'. To the left of the phone, a black box contains the text 'Play the role of a journalist with our BBC iReporter game' and a date '14 March 2018'. Below the main image, there are two smaller promotional boxes. The left box, titled 'The Evidence Toolkit', shows a group of students and a large stylized 'E' logo, with the text 'Take fake news to task with this online tool' and a date '15 March 2018'. The right box, titled 'We want young people's story ideas!', shows a computer monitor displaying a BBC News globe graphic, with the text 'IT COULD END UP HERE' and a date '8 February 2018 | Have Your Say'.

SCHOOL REPORT

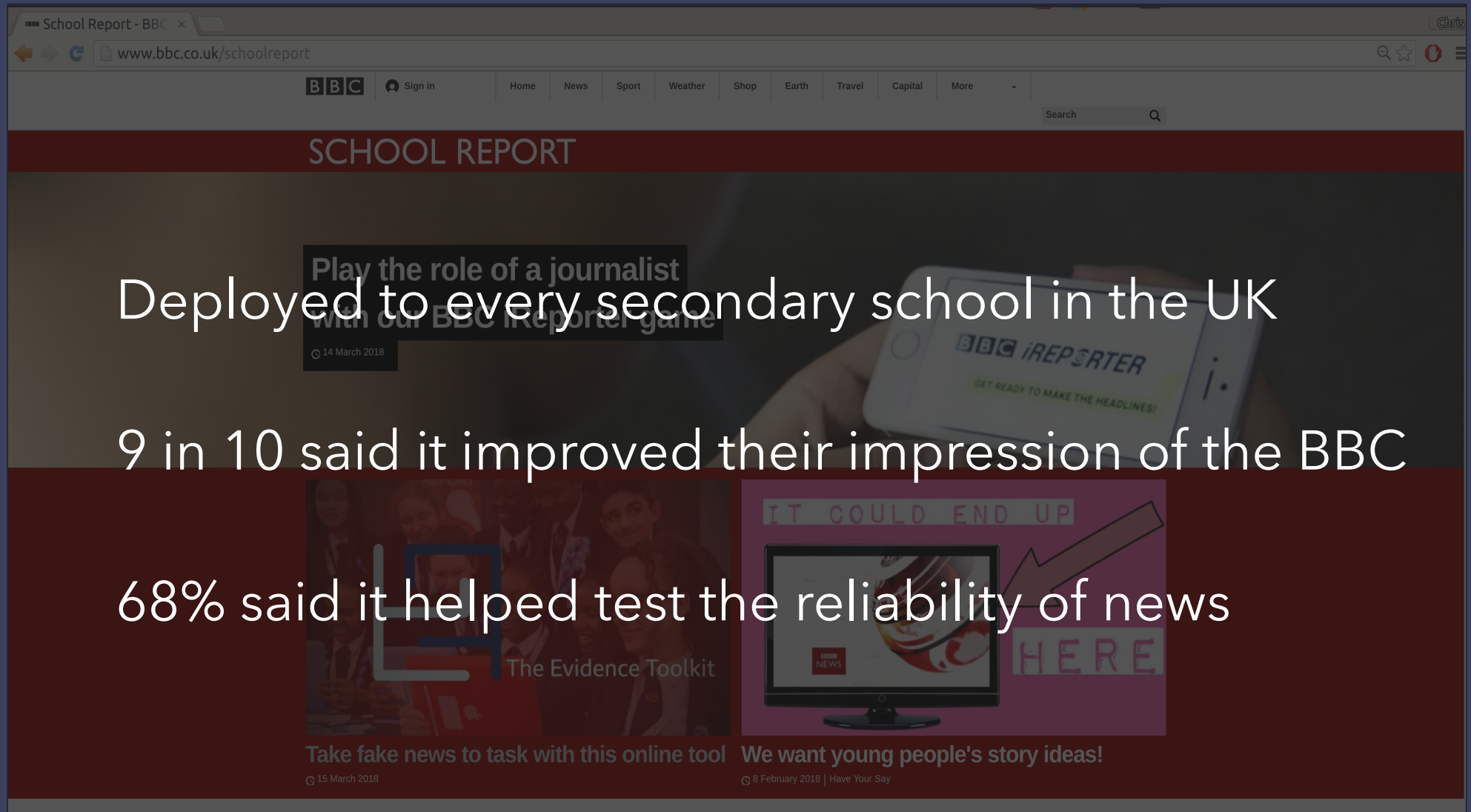
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IT COULD END UP
HERE
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Why?

After almost a decade of argument mining research, why is this the only public deployment?

Why?

- Deployment requires engineering

Why?

- Deployment requires engineering
- Argument mining is hard (really hard)

Why?

- Deployment requires engineering
- Argument mining is hard (really hard)
- Arguments in textbooks and arguments in armchairs
≠
Arguments in the real world

This afternoon

- What arguments in the real world are like
 - Structure
 - Computational models
 - Arguments between people
- Mining real world arguments

Argument structure I: The pieces

Argumentative Discourse Units

- Much of the time, just Elementary Discourse Units (EDUs)
- Sometimes smaller than EDUs
- Sometimes bigger than EDUs
(this is irritating)

Argument structure I: The pieces

- Argumentativeness vs. non-Argumentativeness
- Can be difficult to tell
(this is irritating)

I love bananas.

Argument structure I: The pieces

- Argumentativeness vs. non-Argumentativeness
- Can be difficult to tell
(this is irritating)

“What fruits do you like?” “I love bananas.”

Argument structure I: The pieces

- Argumentativeness vs. non-Argumentativeness
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“What fruits do you like?” “I love bananas.”

“We should visit the Philippines. I love bananas and they grow amazing ones there – best in the world.”

Argument structure I: The pieces

- Argumentativeness vs. non-Argumentativeness
- Can be difficult to tell
(this is irritating)

"What fruits do you like?" "I love bananas." **Not argument**

"We should visit the Philippines. I love bananas and they grow amazing ones there - best in the world." **Support**

"You hate all fruits!" "I love bananas." **Conflict**

Argument structure I: The pieces

- Argumentativeness vs. non-Argumentativeness
- Can be difficult to tell
(this is irritating)

"What fruits do you like?" "I love bananas."

"We should visit the Philippines. I love bananas and they grow amazing ones there - best in the world."

"You hate all fruits!" "I love bananas."

Argument structure I: The pieces

Intrinsic vs. Extrinsic properties of ADUs

- Argumentative vs. Nonargumentative
- Premise vs. Conclusion
- Claim vs. Evidence
- Backing, Warrant, Datum, Claim, Rebuttal (Toulmin 1958)
- ditto plus Modality (Freeman 1991)

all extrinsic (so require context to determine)

Argument structure I: The pieces

Intrinsic vs. Extrinsic properties of ADUs

- Fact, Policy, Value (Wagemans, 2017)
- Verifiable, Unverifiable, Experiential (Park & Cardie, 2014)
- Normative, Testimonial, and 60 more (Walton et al., 2008)
- many other ontologies

intrinsic (so in principle do not require context to determine)

Argument structure I: The pieces

Why does this matter?

Arguments in the real world are often connected.
(Your conclusion might be my premise.)

So argumentative units might have many contexts.

So extrinsic features cannot be associated with ADUs alone.

Instead, they must be associated with relations between ADUs.

Argument structure II: The relations

Support(/Inference/Entailment)

Conflict(/Attack)

Argument structure II: The relations

Support(/Inference/Entailment)

- Convergent
- Linked
- Divergent (arguments are graphs not trees)
- (Serial, Complex)

Conflict(/Attack)

- Rebutting
- Undercutting
- (Undermining)

'The Standard Account'
(Freeman, 1991)

CLINTON : But it 's because I see this—we need to have strong growth , fair growth , sustained growth . We also have to look at how we help families balance the responsibilities at home and the responsibilities at business. So we have a very robust set of plans.

#10624

Convergent Argument

CLINTON : But it 's because I see this—we need to have strong growth , fair growth , sustained growth . We also have to look at how we help families balance the responsibilities at home and the responsibilities at business. So we have a very robust set of plans.

#10624

O'MALLEY : But we elected a president, not a magician, and there is urgent work that needs to be done right now. For there is a – deep injustice, an economic injustice that threatens to tear our country apart, and it will not solve itself...

#10810

Linked Argument

O'MALLEY : But we elected a president, not a magician, and there is urgent work that needs to be done right now. For there is a – deep injustice, an economic injustice that threatens to tear our country apart, and it will not solve itself...

#10810

BUSH: ... We've created rules and taxes on top of every aspiration of people, and the net result is we're not growing fast, income's not growing.

#10832

Divergent Argument

BUSH: ... We've created rules and taxes on top of every aspiration of people, and the net result is we're not growing fast, income's not growing.

#10832

CLINTON: You even at one time suggested that you would try to negotiate down the national debt of the United States.

TRUMP: Wrong. Wrong.

#10848

Rebutting Attack

CLINTON: You even at one time suggested that you would try to negotiate down the national debt of the United States.

TRUMP: Wrong. Wrong.

#10848

Undercutting Attack

(perhaps)

CLINTON: When I was secretary of state, we actually increased American exports globally 30 percent. We increased them to China 50 percent. So I know how to really work to get new jobs and to get exports that helped to create more new jobs.

HOLT: Very quickly...

TRUMP: But you haven't done it in 30 years

#10847

Argument structure II:

The relations

Argumentation schemes (Walton et al., 2008)

- Knowledge engineering / ontology building for argumentation

Argument from Expert Opinion

E is an expert in domain D

E claims that P

therefore, P is true

Argument structure II:

The relations

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Argument from Expert Opinion

E is an expert in domain D

E claims that P

therefore, P is true

Critical Questions:

- Is E biased?
- Is E trustworthy?
- Is P in the domain of D?
- ...

Argument structure II: The relations

An aside on enthymemes

- Missing pieces
(e.g. Modus Ponens' major premise in Modus Brevis)
- Difficult & contentious for humans to reconstruct
- Poor computational results
- There is a connection with argumentation schemes
- Difficulty is deep

Enthymeme reconstruction game

- Write down a short sentence expressing a proposition

Enthymeme reconstruction game

- Write down a short sentence expressing a proposition
- Show your proposition to your neighbour
- Between you, pick one proposition to be Conclusion and the other to be Premise

Enthymeme reconstruction game

- Write down a short sentence expressing a proposition
- Show your proposition to your neighbour
- Between you, pick one proposition to be Conclusion and the other to be Premise
- Imagine someone just delivered the argument to you: Premise so Conclusion. Write down one or more bits of additional information that the speaker is assuming in order to make this argument work.

Enthymeme reconstruction game

- Enthymemes are overly constrained
If Premise then Conclusion would do (and make the argument deductively valid)
- Enthymemes are wildly under-constrained
(you used an enormous amount of world knowledge)
- Enthymemes are wildly under-constrained
(any two people could come up with different reconstructions)

Arguments and persuasion

- Well structured arguments \neq persuasive arguments
- Logos, Ethos, Pathos
- E.g. work with Reddit CMV (Tan et al., 2014)
- On ethos (Duthie & Budzynska, 2018)

Computational Models of Argument

- ABA, inspired by logic programming (Toni, 2014)
- Abstract Argumentation that focuses on attack (Dung, 1995)
- ASPIC+, adding structure to AFs (Modgil & Prakken, 2014)
- AIF, with semantic web foundations (Chesnever et al, 2006)
- see also COMMA conferences (www.comma-conf.org)

Argument Datasets

- AMT (Peldszus & Stede, 2017)
- AAEC (Habernal & Gurevych, 2016)
- IAC2 (Anand et al., 2018)
- US2016 (Visser et al., 2019)
- www.aifdb.org
- see also SEMEVAL2018 (Task12)
- NB. Argument annotation is often expensive and often unsuitable for crowdsourcing

Argument in Dialogue

- SDRT (requires semantic parsing)
- KoS (ditto)
- IAT (narrow scope)

Inference Anchoring Theory

$$\frac{P \quad P \rightarrow Q}{Q}$$

Bob says, Q
Wilma says, Why?
Bob says, P

Inference Anchoring Theory

- (1) Bartholomew: The real question, as opposed to going out to theoretical 'nowhereville', is to ask "What is the best welfare state we can make, in the real world? "
- (2) Bartholomew: And that is a worthwhile ambition.
- (3) Kenan Malik : Go on; explain.
- (4) Bartholomew: Well, I believe there are lots of ways in which we can change our welfare state to make it better.

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Location Details

Firstname

J

Surname

Bartholomew

X Cancel

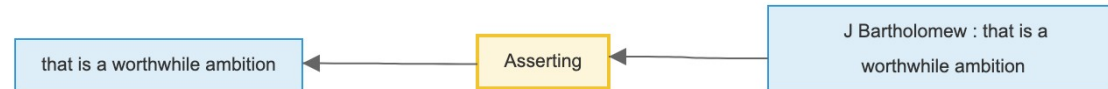
Add

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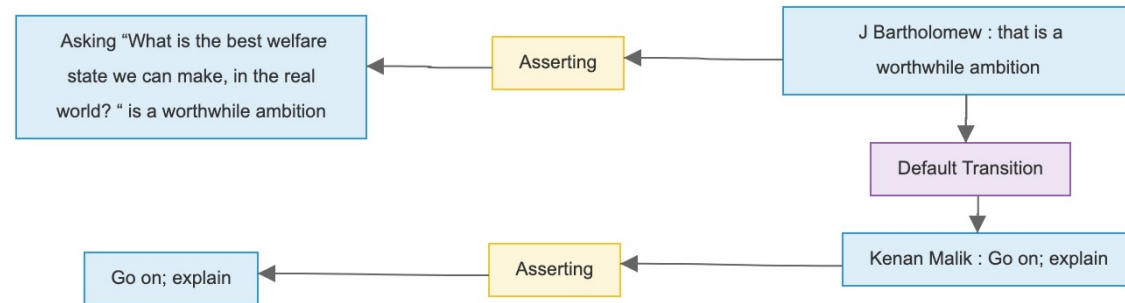


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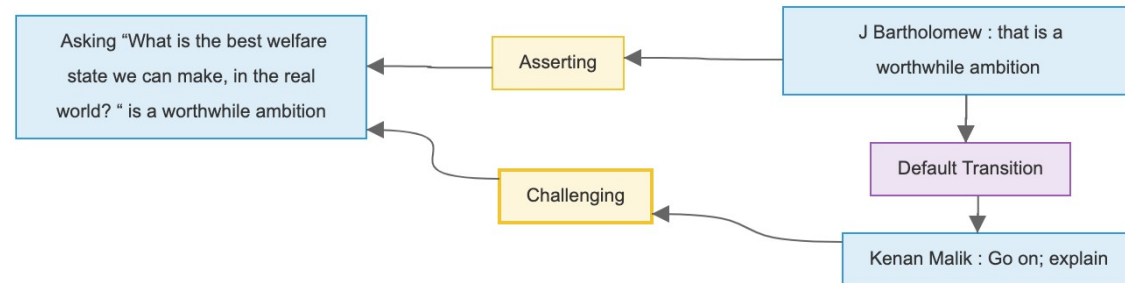


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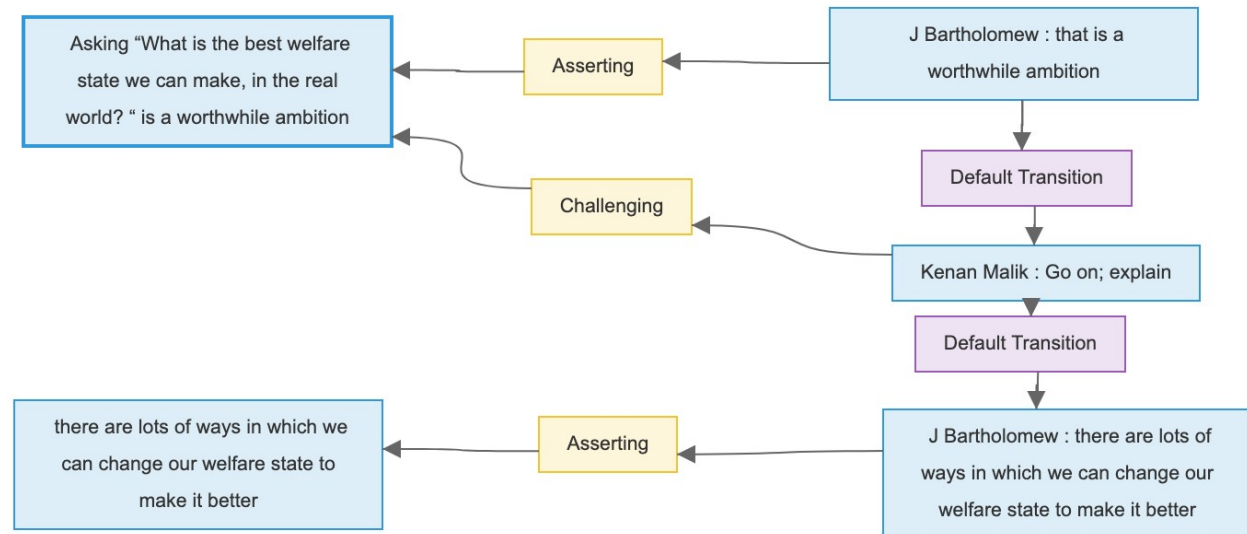


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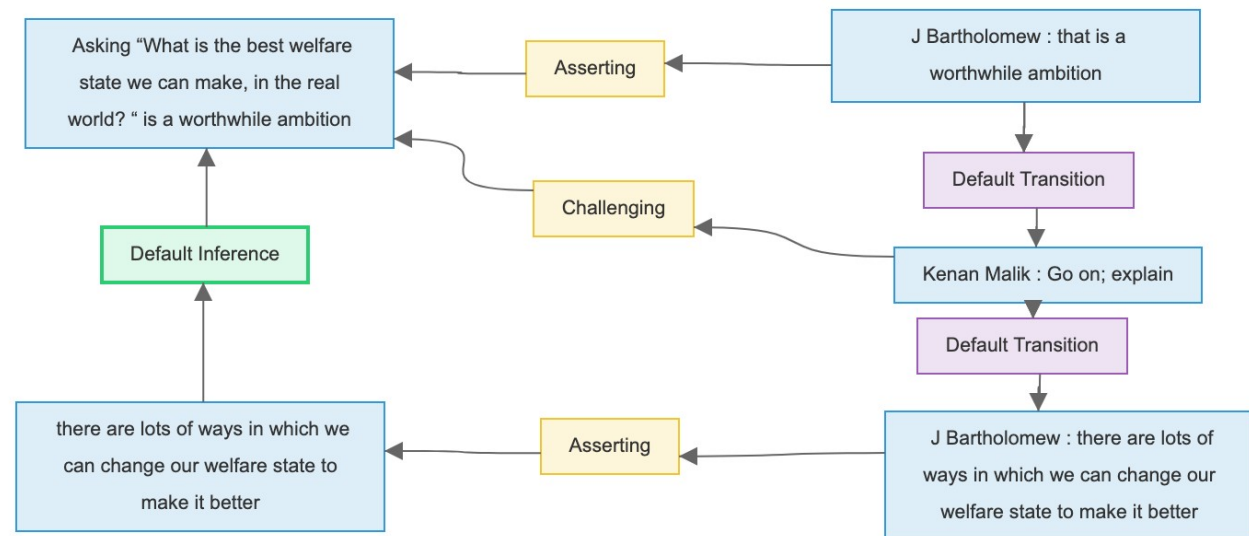
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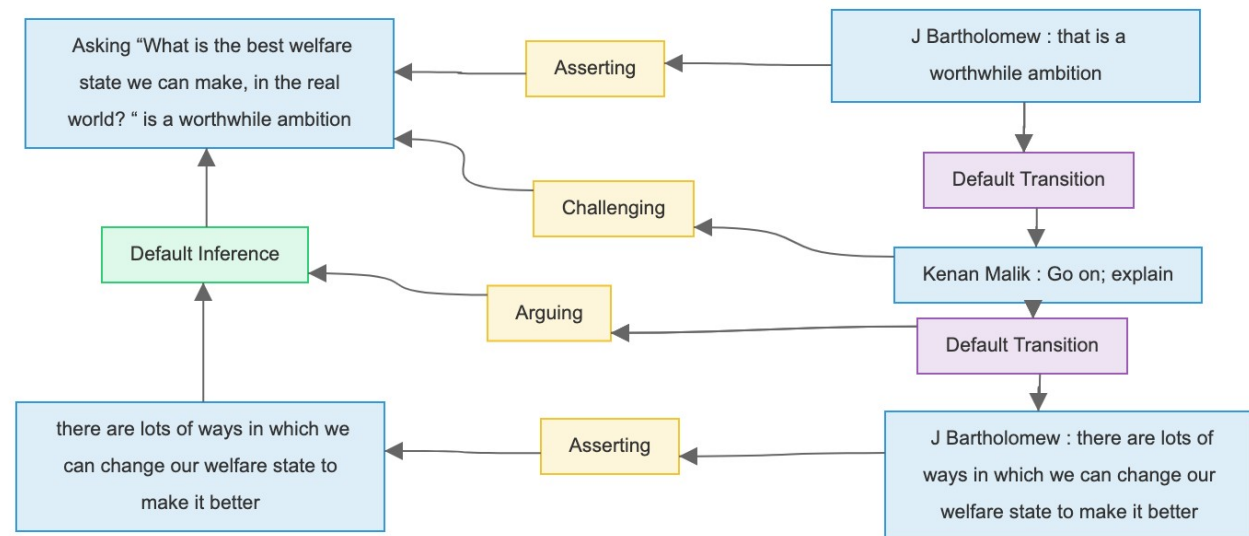
Inference Anchoring Theory

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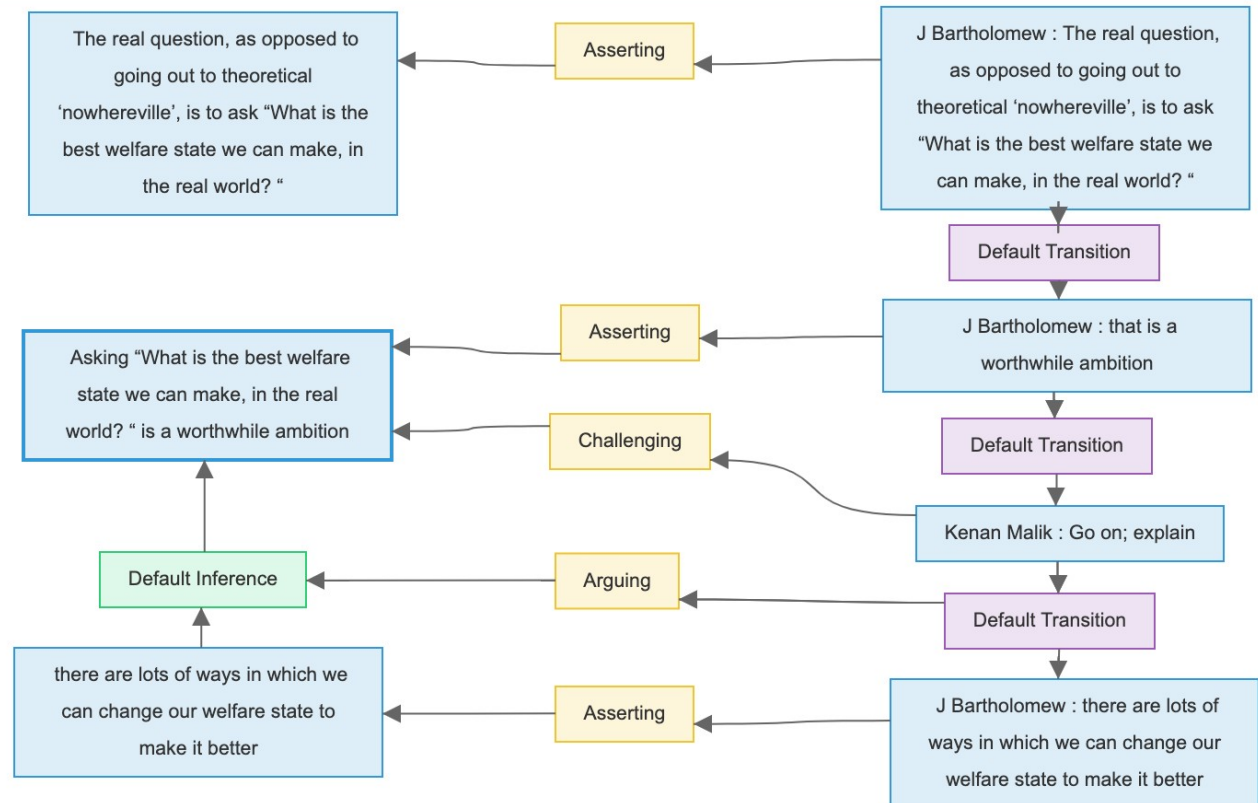
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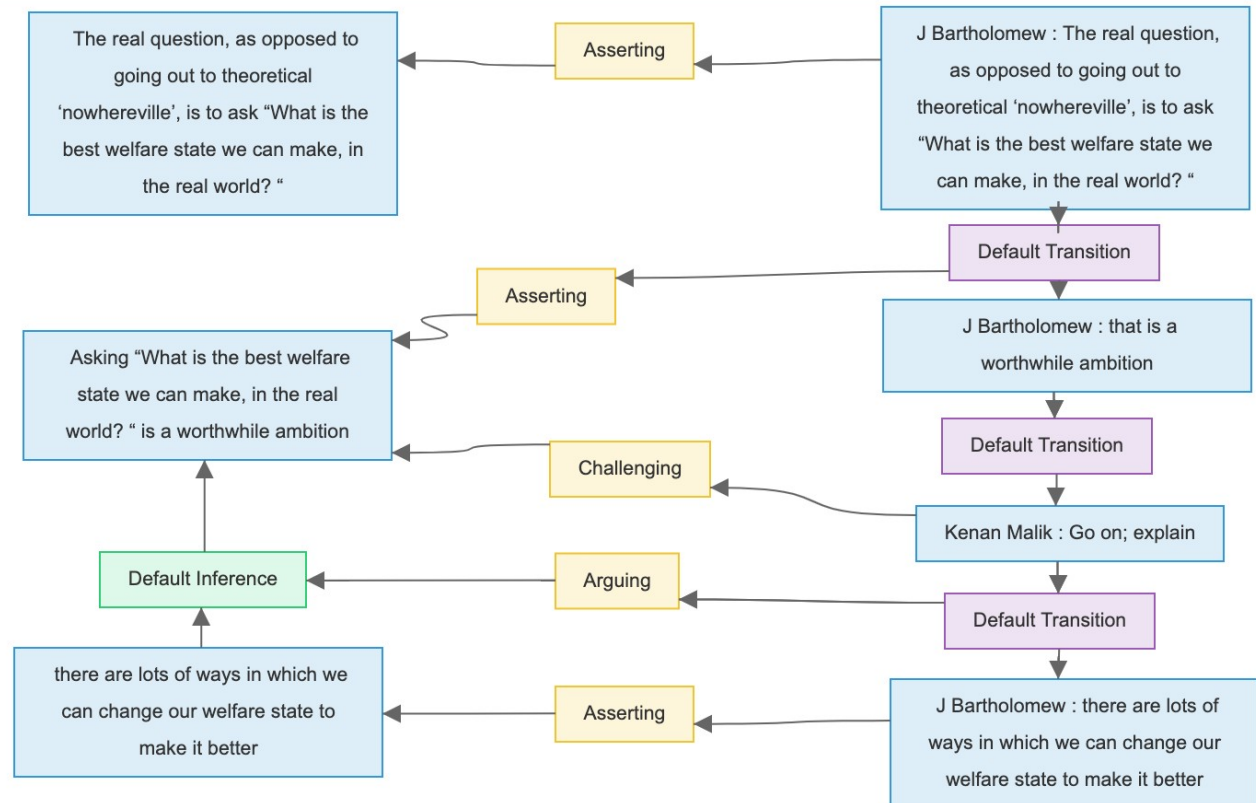
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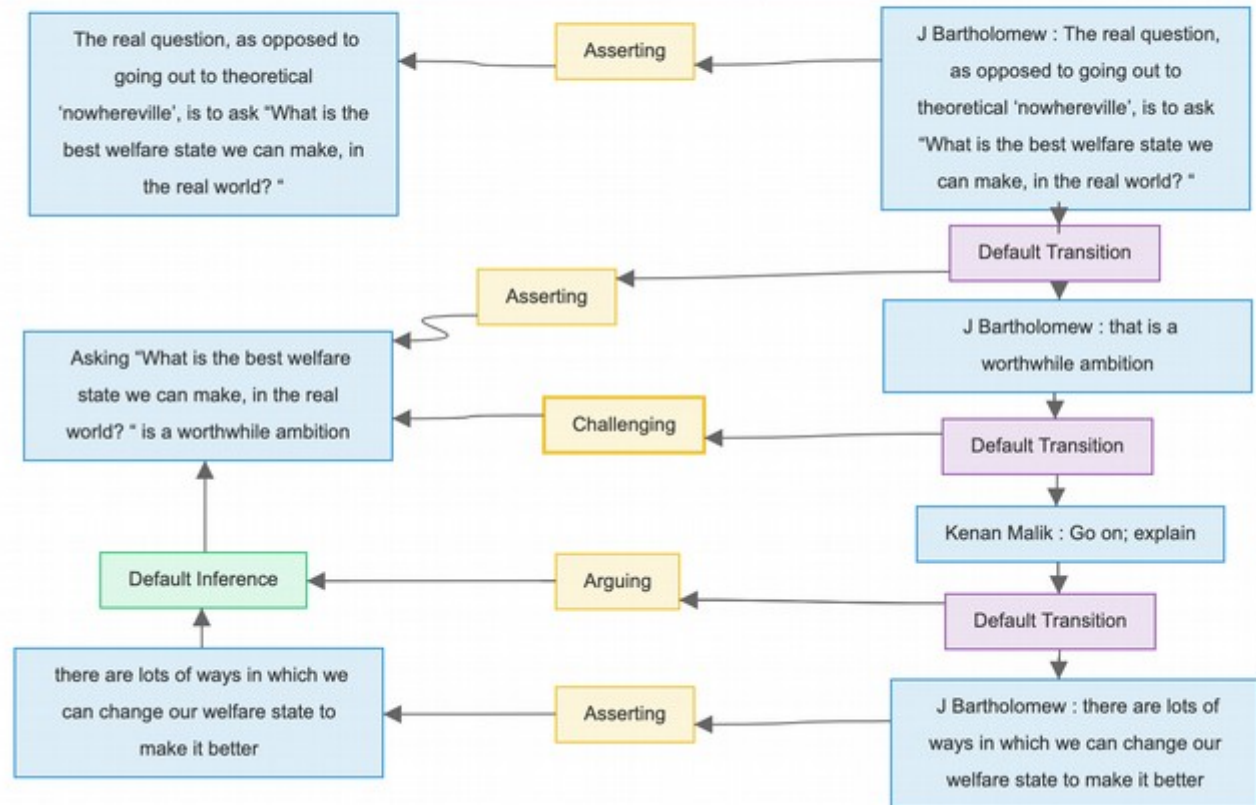
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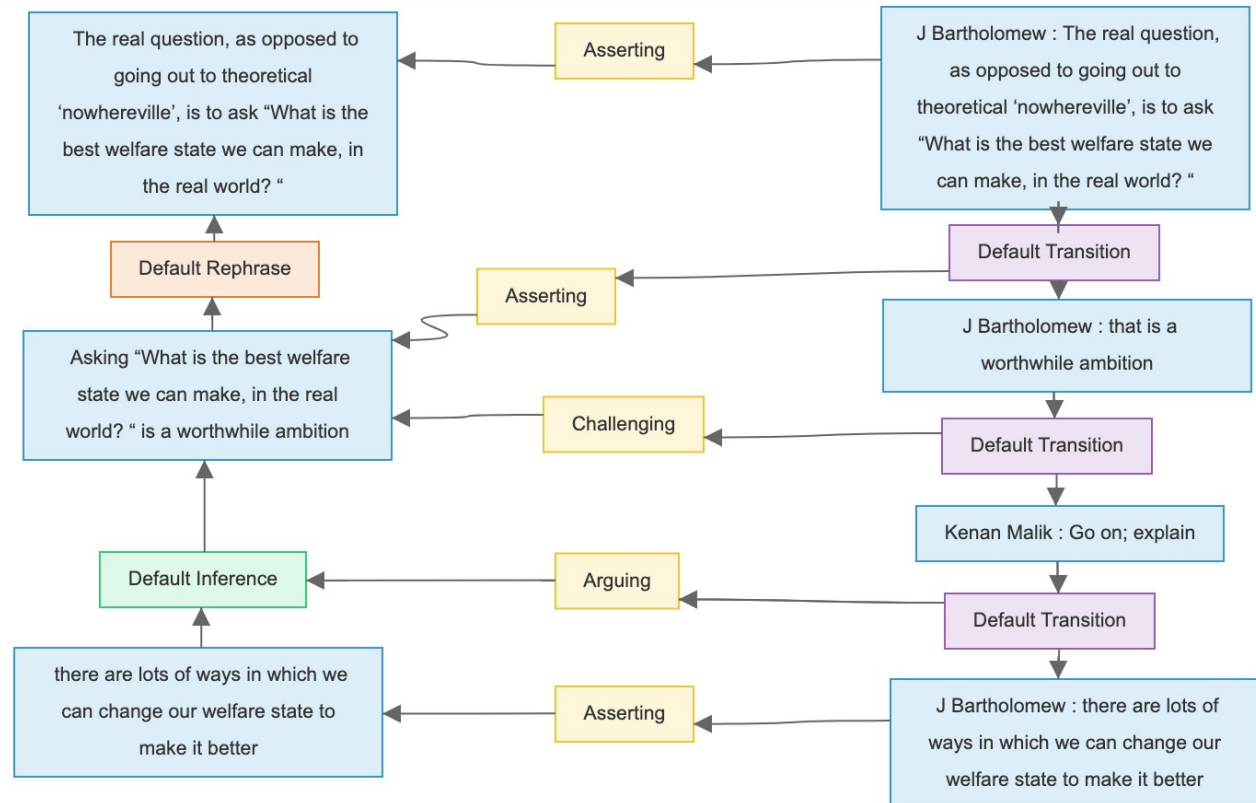
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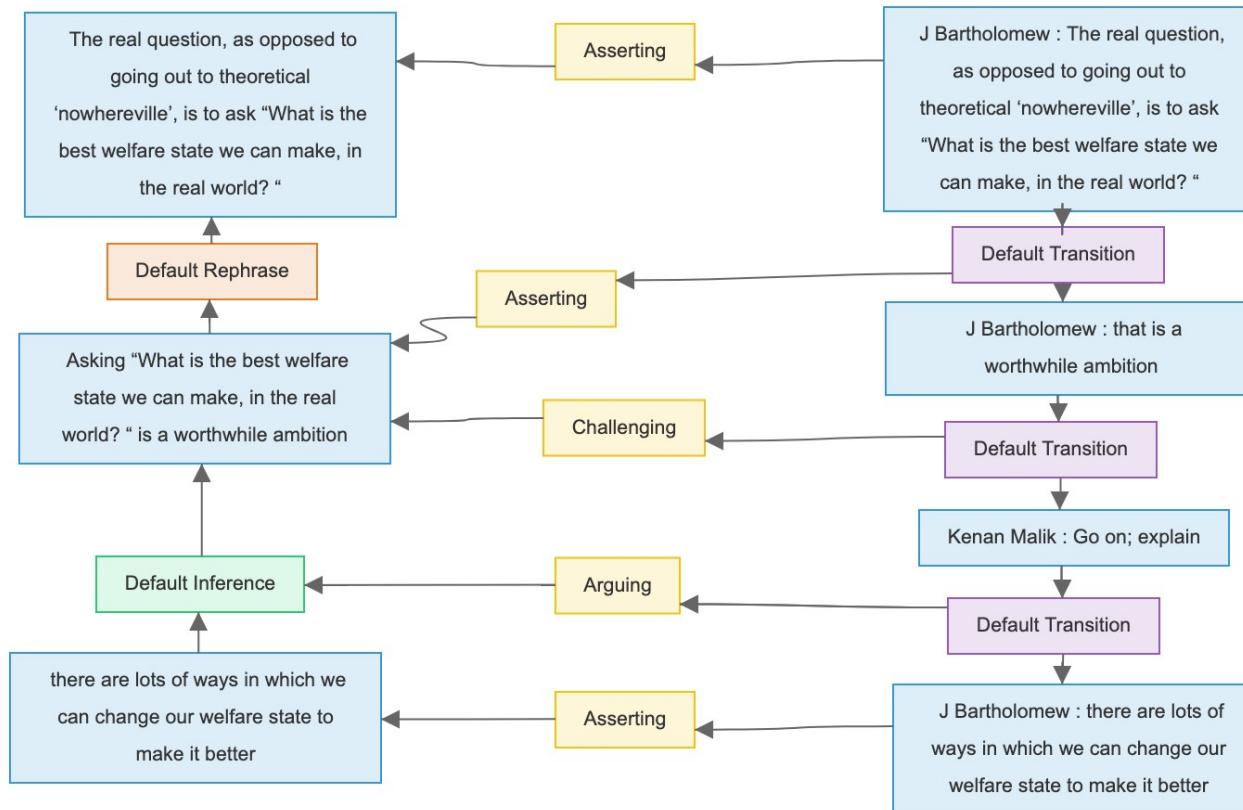


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Inference Anchoring Theory



Putting Theory into Practice

Example 1

LA: It was a ghastly aberration.

CL: Or was it in fact typical? Was it the product of a policy that was unsustainable that could only be pursued by increasing repression?

Putting Theory into Practice

Example 2

MB: What do you think is going on here? If there is an element, if you like, of retrospective moral judgements, are there problems with that?

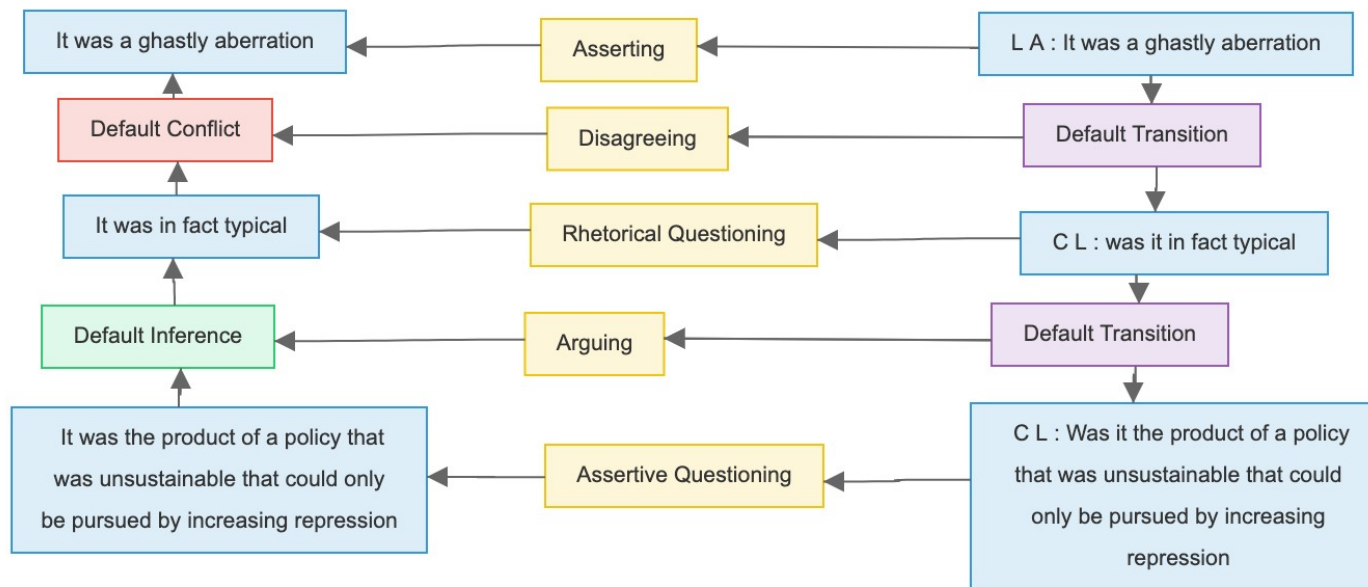
LA: I always have a problem of judging the past by our values. It seems to me a mixture of arrogance and absurdity.

MB: Okay, Matthew Taylor?

MT: I don't see really what the problem is here. There are three people who it seems very likely suffered, they suffered in the context of imprisonment possibly, the way they suffered was a crime, in almost any jurisdiction in the world it would be seen as a crime, they have the opportunity now to try to seek justice, the closest they can get to the people who actually committed this is the British state, and they're pursuing their case. What's wrong with this?

Putting Theory into Practice

Example 1



Example 2



PART II

Mining real world arguments

Most approaches to argument mining use a pipeline:

- ADU segmentation

- Typed segmentation

- Argumentative / argumentatively connected

- Relations

- Directed relations

- Typed relations

Segmentation

- ADUs similar to EDUs (Peldszus & Stede 2013)
- But need to consider argumentative function (i.e. context)
Many techniques just default to sentences...
- others are slightly more refined but still only use punctuation
- Clausal/punctuation-based segmentation has accuracy around 80%

Challenges for Segmentation

- Unit size ranges from single-word to paragraph:

Yes.

Challenges for Segmentation

- Unit size ranges from single-word to paragraph:
Do you agree that governments today should be held responsible for crimes of the past?
Yes. There is no statute of limitation on genocide.

Challenges for Segmentation

- Unit size ranges from single-word to paragraph:
Do you agree that governments today should be held responsible for crimes of the past?
Yes. There is no statute of limitation on genocide.

*So that reminds me of the story of when I was a little kid.
There was this...*

Challenges for Segmentation

- Complex argumentative function
If radioactive elements have existed forever, then they should have all decayed by now.

Challenges for Segmentation

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- Syntactic challenges, e.g. dislocation
Products X and Y because of their toxicity are not allowed in this building. (Saint Dizier, 2012)
- Indexicality
*Should we go to the beach cos it'll be hot.
No I don't like it hot.*

Challenges for Segmentation

- Complex argumentative function
If radioactive elements have existed forever, then they should have all decayed by now. But they're still around, so they must have been created.
- Syntactic challenges, e.g. dislocation
Products X and Y because of their toxicity are not allowed in this building. (Saint Dizier, 2012)
- Indexicality
Do you like hot weather?
No I don't like it hot.

Segmentation

- (Ajjour et al. 2017) is more or less state of the art, with F1 ranging from 0.88 in ideal test-train configurations down to 0.55 when handling online discourse.

BiLSTM for IOB labelling; lexical (but not vectorised), syntactic and pragmatic features.

Typed Segmentation

- Is this segment of a particular type?
- Verifiable/Unverifiable (Park & Cardie, 2014)
- Fact/Policy/Value
- Fact/Opinion (Dusmanu et al., 2017)
- Extraction of claims from Wikipedia using templates (Shnarch et al., 2017)

Can merge into or interact with later parts of the pipeline particularly (though not exclusively) for extrinsic features.

Typically noisy.

Connected?

- Is this segment part of the argument or not?
- One solution: Yes
- Another solution: Yes because otherwise it wouldn't be a segment
- A third solution: Yes if we can connect it (at the next step)
- (Some older techniques such as Moens et al., 2007 treat this as a separate task)

Identifying Relations

- Attack/Support (Boltužić & Šnajder 2014)
- Support/Nonsupport (Stab & Gurevych 2014)
- Pro/con (Cabrio & Villata, 2012)
- Surprisingly difficult, with surprisingly poor results:
F-score 0.5 ± 0.1

Identifying Relations

- Using argumentative discourse indicators was a common starting point:
'because' is reliable ($P \approx 0.9$)

Identifying Relations

- Using argumentative discourse indicators was a common starting point:
'because' is reliable ($P \approx 0.9$)
... but hopelessly rare ($R < 0.1$)
- In general, only around 20% of argumentative relations have explicit marking on the lexical surface (unusual – cf. PDTB)

Identifying Relations

- Using similarity is a common technique.
But similarity is symmetrical so requires an extra task of identifying directionality.
- Different similarity foundations (LDA & threshold; Wordnet sysnet walks; ADW)
- The problem is that similarity isn't enough.

Identifying Relations

- Even though we know arguments are not trees in general, it can be a useful simplifying assumption
- Niculae et al. (2017) build (undirected) trees (simultaneously with segment typing).
- Lawrence & Reed (2015) build trees using similarity distances as a proxy for siblinghood
- Carstens et al. (2014) build AF trees
- Also a connection with conflict (Wachsmuth et al. 2018)

Identifying Relations

- More trees but more familiar techniques
- Peldszus & Stede (2015) use MST for tree construction (F1 0.50 – 0.75)
- Stab & Gurevych (2017) use ILP for tree construction (F1 up to 0.71)
- Potash et al. (2017) is a nice synthesis using ILP and neural techniques and attempts cross-domain comparison (though results are poor)

Typing Relations

- Argumentation schemes
Feng & Hirst (2011); Lawrence & Reed (2015)
Musi et al. (2016)
- As yet no typing of conflict
- Performance can be high – but only when the number of classes is cut or conflated

Doing everything

- Pipeline – but not
 - Persing & Ng (2016) ILP for end-to-end tree construction
 - Hand crafted integration (Lawrence and Reed, 2016)
 - End-to-end as dep parsing (Eger et al., 2017)
-
- Implementations (as web services)
 - <http://margot.disi.unibo.it/>
 - <http://amf.arg.tech/>

Arguments between people

- Dialogues: more difficult

Arguments between people

- Dialogues: more difficult ... and more to go on
- Preliminary steps in Illocutionary Structure Parsing (Budzynska et al., 2016) accuracy 38%-78%
- Some techniques aim to cross monologue and dialogue, e.g. Compositional Argument Mining (Gemechu & Reed, 2019) F1 0.62-0.79 but therefore do not exploit dialogical priors

Why bother?

- Argument mining is one of the most challenging problems in NLP, combining
 - Textual entailment
 - World knowledge
 - Paraphrase
 - Dialogue act annotation
 - Implicature
 - and moreall with low levels of expensive annotated data
(see Stede and Schneider (2019) for more)

Why bother?

- Argument mining is applicable to many tasks

Improving writing

Tracking debates

Identifying fake news

Supporting group decision making

Navigating complex arguments

Why bother?

- Argument mining is applicable in many domains

Jurisprudence

Intelligence analysis

Pedagogy

Politics

Science

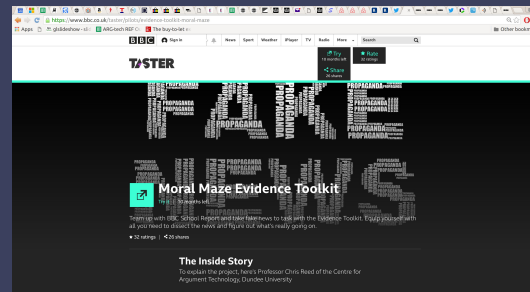
Consumer support ...

and anywhere that uses reasoning expressed in language.

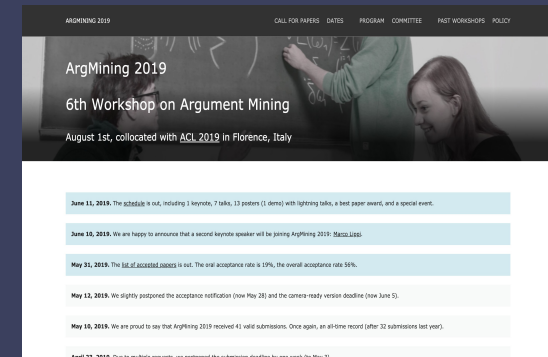
Concluding Remarks



Find out more at
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