



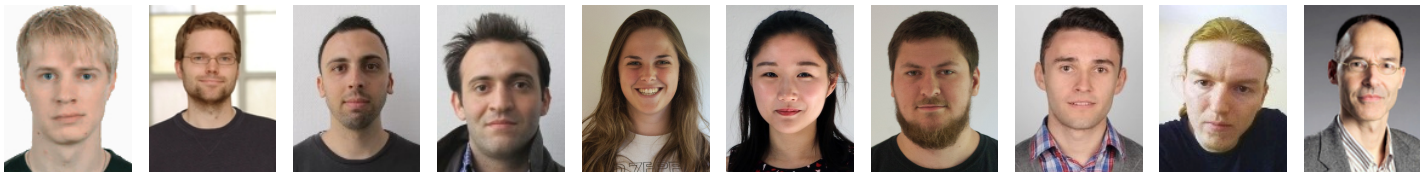
# Building an Argument Search Engine for the Web

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Page 1 of 319 arguments, 168 pro, 151 con (retrieved in 147.3ms) [Pro vs. Con View](#) | [Overall Ranking View](#)

## Pro

With universal health care, people are able to seek...

[http://debatewise.org/debates/2954-health-care-universal/...](http://debatewise.org/debates/2954-health-care-universal/)

With universal health care, people are able to seek preventive treatment. This means having tests a... ... ▼

Moving to a system of universal health care would reduce the burden on human resources personnel in ... ... ▼

[http://debatewise.org/debates/2954-health-care-universal/...](http://debatewise.org/debates/2954-health-care-universal/)

Moving to a system of universal health care would reduce the burden on human resources personnel in ... ... ▼

I thank my opponent for posting this debate and clearly...

[http://www.debate.org/debates/Universal-health-care/16/...](http://www.debate.org/debates/Universal-health-care/16/)

if not impartially, than certainly thoroughly. Since my opponent does not define Universal Health Care, I will do so now. Universal Health Care refers to a government run single-payer public health care ... ▼

No universal health care causes "job lock"...

[http://www.debatepedia.org/en/index.php/Debate:\\_Single-payer\\_universal...](http://www.debatepedia.org/en/index.php/Debate:_Single-payer_universal...)

No universal health care causes "job lock" ... ▼

## Con

Well here is what i belive is wrong with universal health...

[http://www.debate.org/debates/Universal-health-care/3/...](http://www.debate.org/debates/Universal-health-care/3/)

well here is what i belive is wrong with universal health care is that i will pay x amount ... The cost of universal health care also takes out the competition of hospitals which stop them from trying ... ▼

I will post first in the second round i am not totally...

[http://www.debate.org/debates/Universal-health-care/3/...](http://www.debate.org/debates/Universal-health-care/3/)

i will post first in the second round i am not totally agianst universal health care but i find it often absurd ... ▼

Universal health care risks monopsony:...

[http://www.debatepedia.org/en/index.php/Debate:\\_Single-payer\\_universal...](http://www.debatepedia.org/en/index.php/Debate:_Single-payer_universal...)

Universal health care risks monopsony: ... ▼

Aging countries cannot afford universal health care....

[http://www.debatepedia.org/en/index.php/Debate:\\_Single-payer\\_universal...](http://www.debatepedia.org/en/index.php/Debate:_Single-payer_universal...)

Aging countries cannot afford universal health care. ... ▼

demo

# Vision

- **Computational argumentation in future search**

- Support forming opinions on controversial issues
- Make it easy to find relevant arguments

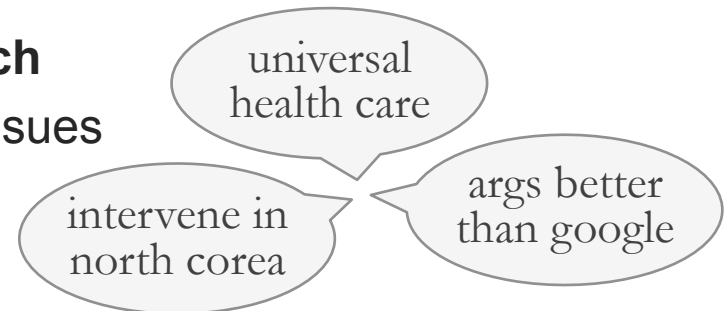
- **Search results should...**

- Rank the *best* arguments highest
- Cover diverse aspects of an issue
- Cover heterogeneous sources
- Be up-to-the-minute
- Be concise but detailed enough
- Be traceable and evaluable

... and much more

- **Our argument search engine...**

- Is improvable on all these criteria
- Defines a basis to work towards the vision



Pro

With universal health care, people are able to...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
With universal health care, people are able to seek preventive treatment. This means having tests a...  
->

Moving to a system of universal health care would...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Moving to a system of universal health care would reduce the burden on human resources personal...  
->

I thank my opponent for posting this debate and...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
I am not ready, but seriously though, since my opponent does not define Universal Health Care, I...  
will do so now. Universal Health Care refers to a...  
->

No universal health care causes 'job lock'...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
No universal health care causes 'job lock'...  
->

The well insured also face risks without universal...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
The well insured also face risks without universal health care...  
->

A payroll tax could help fund universal health...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
A payroll tax could help fund universal health care...  
->

Universal health care creates a universal standard...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care creates a universal standard of care...  
->

The government funds fire-stations, why not...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
The government funds fire-stations, why not universal health care?...  
->

Free universal health care motivates people to...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Free universal health care motivates people to seek preventive care...  
->

Universal health care grounds doctors in...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care grounds doctors in professionalism, not commercialism...  
->

Con

Well here is what I believe is wrong with universal...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Well here is what I believe is wrong with universal health care that I will pay a amount in taxes...  
->

I will post first in the second round I am not...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
I will post first in the second round I am not finally against universal health care but I find it often...  
absurd...  
->

Universal health care risks monopoly...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care risks monopoly...  
->

Hi, guys, I'm new to debating, and this is my...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Hi, guys, I'm new to debating, and this is my first debate ever. It is fighting against universal health...  
care in the US while pro will fighting for it just accept in the first...  
->

Aging countries cannot afford universal health...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Aging countries cannot afford universal health care...  
->

Universal health care creates dependencies on...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care creates dependencies on government...  
->

Universal health care leads to rationing...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care leads to rationing...  
->

Government-funded universal health care would...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Government-funded universal health care would violate patient privacy...  
->

Universal health care creates a big, inefficient...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Universal health care creates a big, inefficient bureaucracy...  
->

Government-funded universal health care is no...  
[http://www.dailymail.co.uk/health/healthcare/universal.html](#)  
Government-funded universal health care is a right...  
->

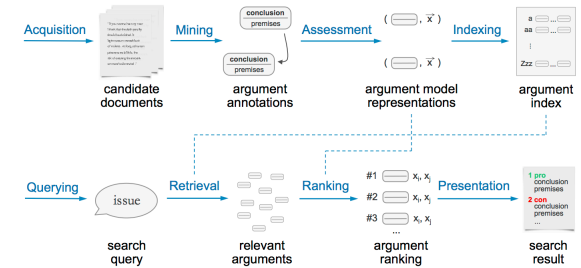


args.me

# Contributions

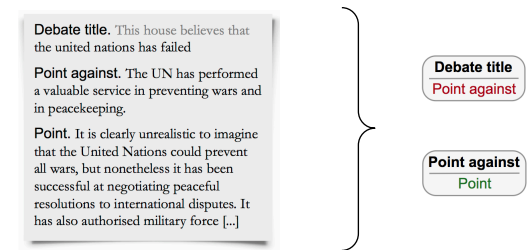
## 1. An open search framework

- Common argument model
- Modular indexing and retrieval processes
- [Java source code coming soon](#)



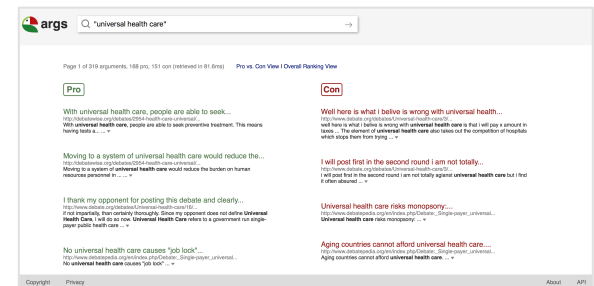
## 2. An initial search index

- 300k debate portal arguments
- Mining with distant supervision
- [www.args.me/static/args-api.html](http://www.args.me/static/args-api.html)



## 3. A prototype search engine

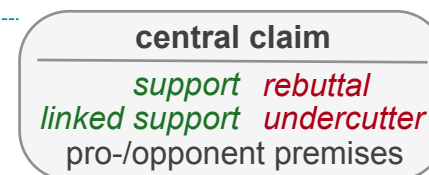
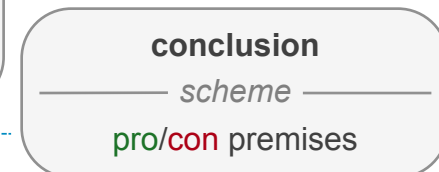
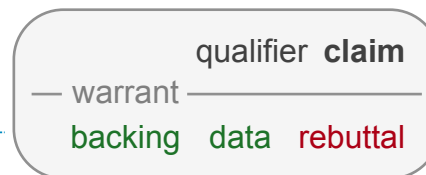
- Based on framework and index
- Standard retrieval methods
- [args.me](http://args.me)



# Argument search framework: Model

## Existing argument models

- Fine-grained unit roles (Toulmin, 1958)
- Inference schemes (Walton et al., 2008)
- Relations between units (Freeman, 2011)  
... among others

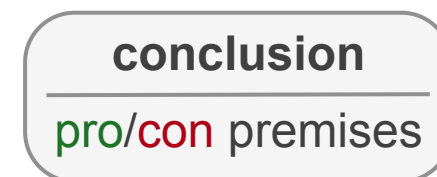


## Argument search needs a model that...

- Is applicable to all arguments
- Allows treating all arguments analogously
- Works with simple mining approaches
- Supports sophisticated approaches

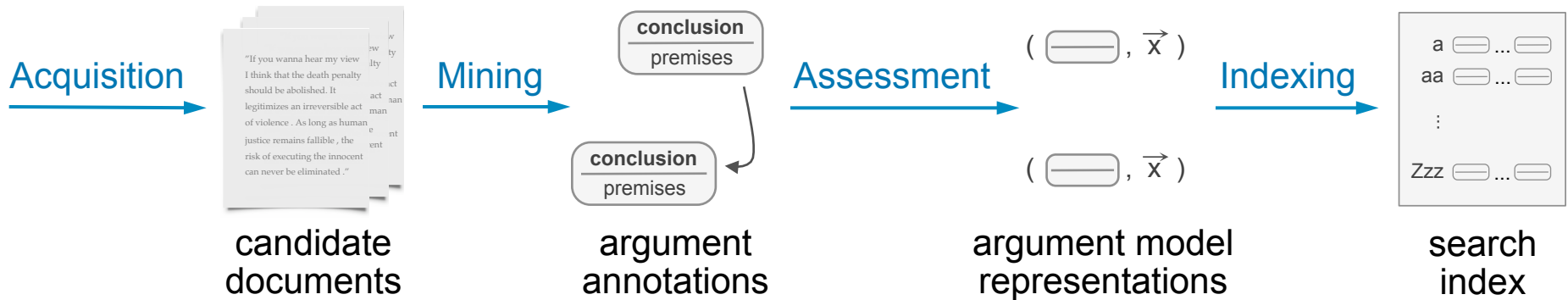
## Our model

- **Argument.** Conclusion,  $k$  premises with stance
- **Context.** URL, discussion, argument position
- **Extensions.** Roles, schemes, scores, ...

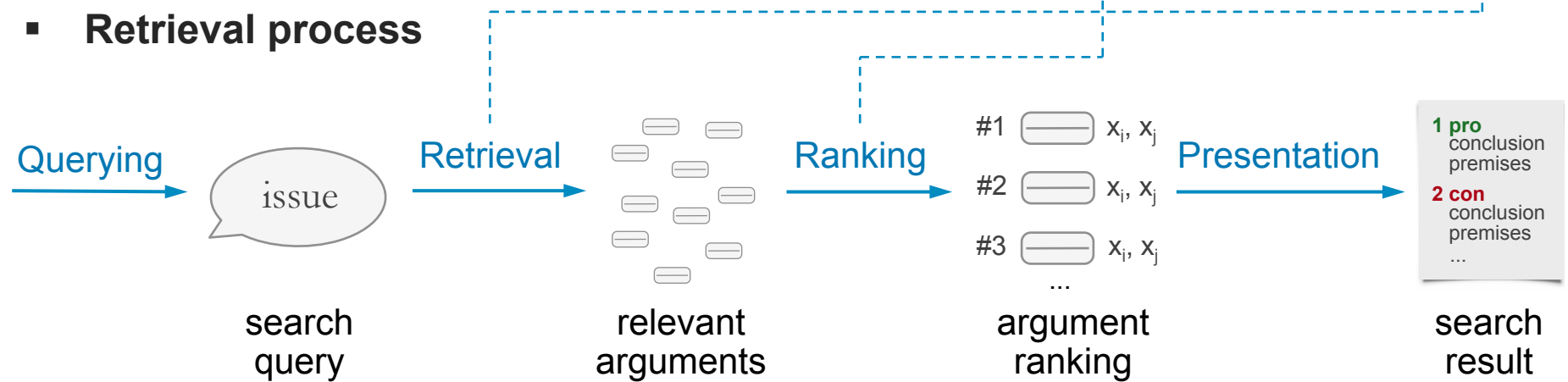


# Argument search framework: Processes

## Indexing process



## Retrieval process



(implementation based on Apache UIMA and Apache Lucene)

# Argument search index

- **Crawling of 5 debate portals**
  - *idebate.org, debatepedia.org, and debatawise.org*
  - *debate.org and forandagainst.com*
- **”Mining“ with distant supervision**
  - Portal-specific mappings to model
  - Conclusion + 1 premise with stance in all cases
  - 376,129 arguments initially
  - 291,440 after cleaning
- **Coverage of phrase queries**
  - 1082 Wikipedia controversial issues
  - 78% match with  $\geq 1$  argument
  - 42% match with  $\geq 1$  conclusion

**Debate title.** *This house believes that the united nations has failed*

**Point against.** *The UN has performed a valuable service in preventing wars and in peacekeeping.*

**Point.** *It is clearly unrealistic to imagine that the United Nations could prevent all wars, but nonetheless it has been successful at negotiating peaceful resolutions to international disputes. It has also authorised military force [...]*

**Debate title**  
**Point against**

**Point against**  
**Point**

# Argument search engine

## ■ Our prototype

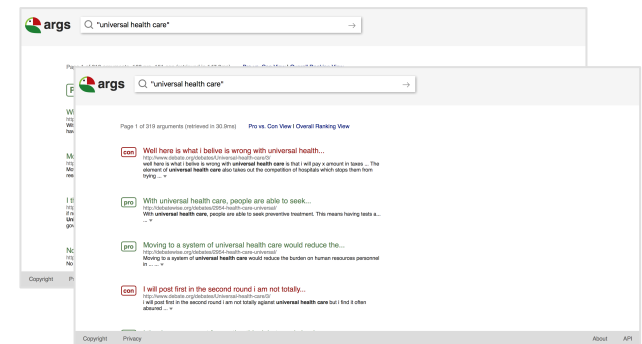
- Based on framework and index
- Content-based argument search

## ■ Capabilities so far

- **Querying.** Free text *phrase* and *and* queries
- **Retrieval.** Exact matching with conclusion
- **Ranking.** BM25F on conclusion, premise, and context (Robertson and Zaragoza, 2009)
- **Presentation.** *Pro vs. con* and *overall ranking*

## ■ Limitations so far

- **Querying.** No argument-specific interpretation
- **Retrieval.** Stance taken from premises
- **Ranking.** Quality not considered
- **Presentation.** Snippets only premise excerpts



capitalism  
over socialism

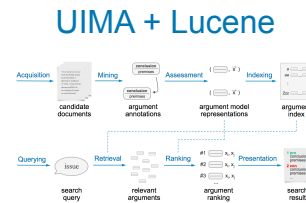
against  
abortion



# Conclusion

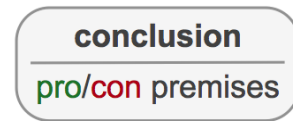
## ▪ Towards argument search on the web

- An open search framework
- An initial search index
- A prototype search engine



300k arguments

args.me



## ▪ Environment for collaborative research

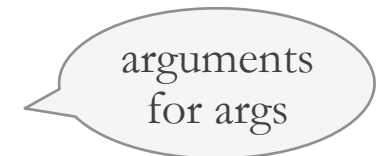
- Combining computational argumentation methods
- Evaluating methods in practice
- Shaping the future of web search



## ▪ Several open questions

- **Mining.** How to find arguments robustly on the web?
- **Querying.** How do users search for arguments?
- **Ranking.** What arguments should be seen as best?

... and many more



# References

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- **Freeman (2011)**. *Argument Structure: Representation and Theory*. Springer.
- **Robertson and Zaragoza (2009)**. Stephen Robertson and Hugo Zaragoza. 2009. The Probabilistic Relevance Framework: BM25 and Beyond. *Foundations and Trends in Information Retrieval* 3(4):333–389.
- **Toulmin (1958)**. Stephen E. Toulmin. 1958. *The Uses of Argument*. Cambridge University Press.
- **Walton et al. (2008)**. Douglas Walton, Christopher Reed, and Fabrizio Macagno. 2008. *Argumentation Schemes*. Cambridge University Press.

... many more in the paper