Building an Argument Search Engine for the Web

Henning Wachsmuth, Martin Potthast, Khalid Al-Khatib, Yamen Ajjour, Jana Puschmann, Jiani Qu, Jonas Dorsch, Viorel Morari, Janek Bevendorff, Benno Stein
With universal health care, people are able to seek...  
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 ... ... ...

I thank my opponent for posting this debate and clearly...  
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"...  
No universal health care causes "job lock" ... ...

Well here is what I believe is wrong with universal health care...  
http://www.debate.org/debates/Universal-health-care/3/...  
well here is what I believe is wrong with universal health care is that I will pay x amount of universal health care also takes out the competition of choosing which one to try ... ...

I will post in the second round I am not totally...  
http://www.debate.org/debates/Universal-health-care/3/...  
i will post in the second round I am not totally aganist universal health care but if I find it often abused ... ...

Universal health care risks monopsony...  
Universal health care risks monopsony... ...

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

3. A prototype search engine
   - Based on framework and index
   - Standard retrieval methods
   - 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)

- **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**
  - Acquisition
  - Mining
  - Assessment
  - Indexing

- **Retrieval process**
  - Querying
  - Retrieval
  - Ranking
  - Presentation

(candidate documents) → (argument annotations) → (argument model representations) → (search index)

(search query) → (relevant arguments) → (argument ranking) → (search result)

(implementation based on Apache UIMA and Apache Lucene)

"If you wanna hear my view
I think that the death penalty
should be abolished. It
legitimates an irreversible act
of violence. As long as human
justice remains fallible, the
risk of executing the innocent
can never be eliminated."

Building an Argument Search Engine for the Web, Henning Wachsmuth
Argument search index

- **Crawling of 5 debate portals**
  - idebate.org, debatepedia.org, and debatewise.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 ≥1 argument
  - 42% match with ≥1 conclusion

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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 [...]
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
Conclusion

- **Towards argument search on the web**
  - An open search framework
  - An initial search index
  - A prototype search engine

- **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

- **Freeman (2011).** *Argument Structure: Representation and Theory.* Springer.


... many more in the paper