Data Acquisition for Argument Search:
The args.me corpus

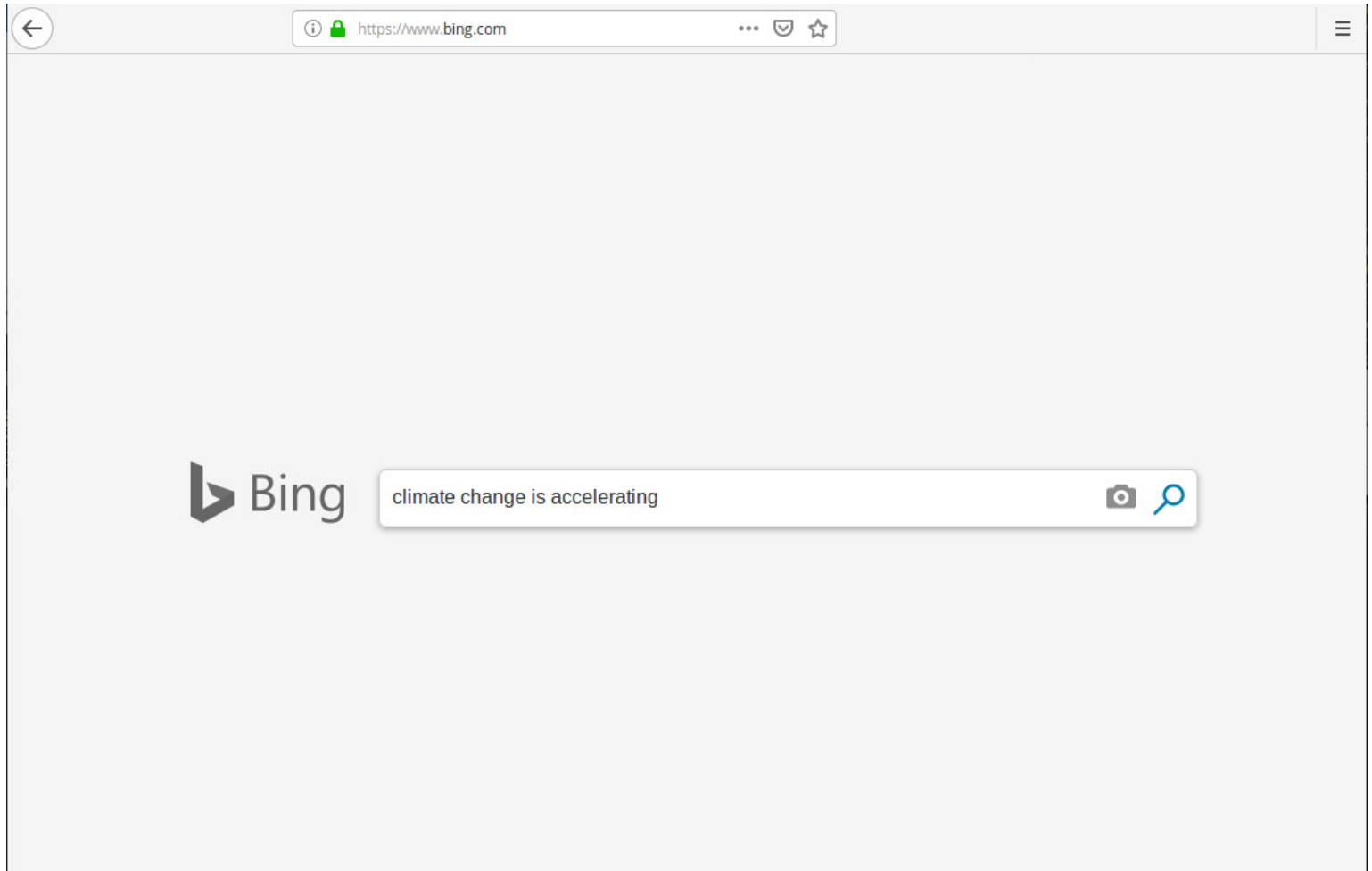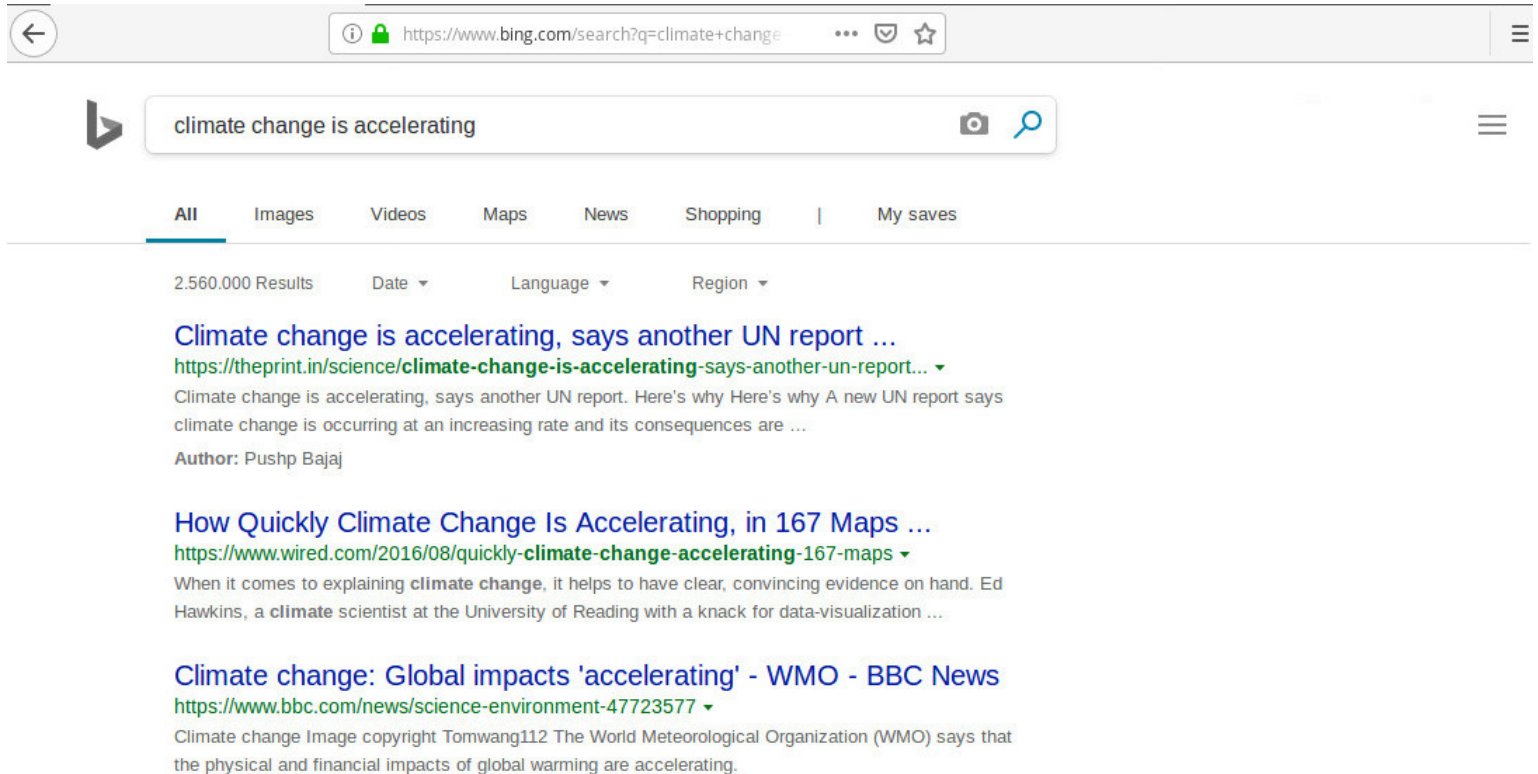| Yamen Ajjour | Henning Wachsmuth | Johannes Kiesel | Matthias Hagen | Martin Potthast | Benno Stein |
| Weimar | Paderborn | Weimar | Halle | Leipzig | Weimar |

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Limitations of conventational search engines

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Argument Search Engine

Argument Search Engine

https://www.args.me/?q=climate+change

args
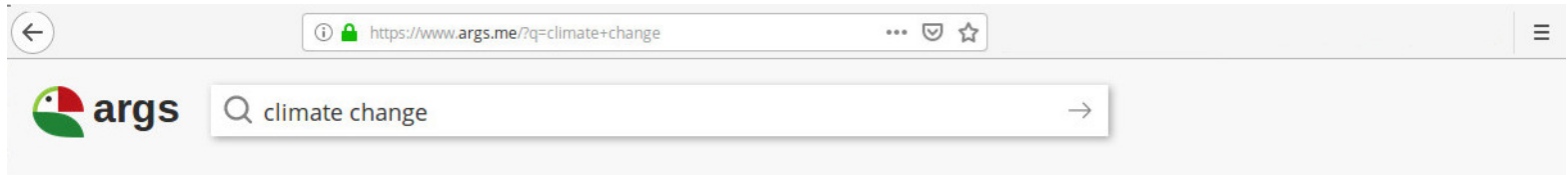
🔍 climate change →

Page 1 of 883 arguments, 393 pro, 490 con (retrieved in 1236.5ms)   Pro vs. Con View | Topic Space View

Pro

My position on climate change is that not only do...
http://www.debate.org/debates/Climate-Change-is-man-caused/1/
My position on **climate change** is that not only do I believe in it but I believe it is man caused. I ... that disagrees with me is ignorant on this subject. 97% of scientists believe that ... ▼ score

There is an overwhelming scientific consensus...
http://www.debate.org/debates/Jail-climate-change-deniers./1/
There is an overwhelming scientific consensus **climate change** presents a serious risk to the future of the Earth and to mankind. Many of the threats we face due to **climate** ... ▼ score

Climate Change is causing the Earth to warm up...
http://www.debate.org/debates/Climate-Change-is-happening/1/
Climate Change is causing the Earth to warm up measurably, and there are already signs of disaster ... reviewed scientific papers on this subject, 0% disagreed that **climate** ... ▼ score

Con

Climate change is quite complicated and requires...
http://www.debate.org/debates/Climate-Change-is-man-caused/1/
Climate change is quite complicated and requires more than two minds. **Climate change** is happening ... enough research done on the natural causes of **climate** ... ▼ score

The effects of climate change will not necessarily...
http://debatewise.org/debates/200-climate-change-is-the-end-of-the-wor...
The effects of **climate change** will not necessarily be bad ... ▼ score

I'm against jailing Climate change deniers. It is...
http://www.debate.org/debates/Jail-climate-change-deniers./1/
I'm against jailing **Climate change** deniers. It is a violation of free speech. I also think it sets ... Nevertheless some people think we should jail **climate change** deniers. ... ▼ score

Design of an Argument Search Engine

Query

Source

Acquisition

Index

Topic Filtering

Argument ranking

Offline (indexing time)

Online (query time)
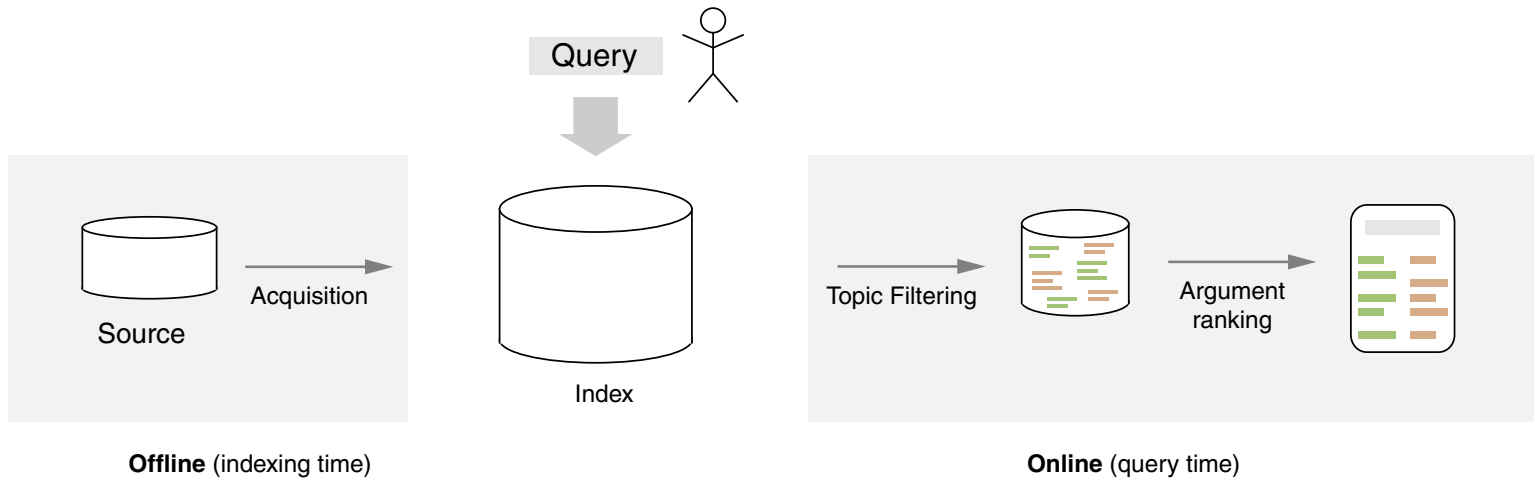
Argument Acquisition

We focus on the first step in designing an argument search engine: argument acquisition.

Query

Source — Acquisition → Index

Topic Filtering → Argument ranking

Offline (indexing time)

Online (query time)
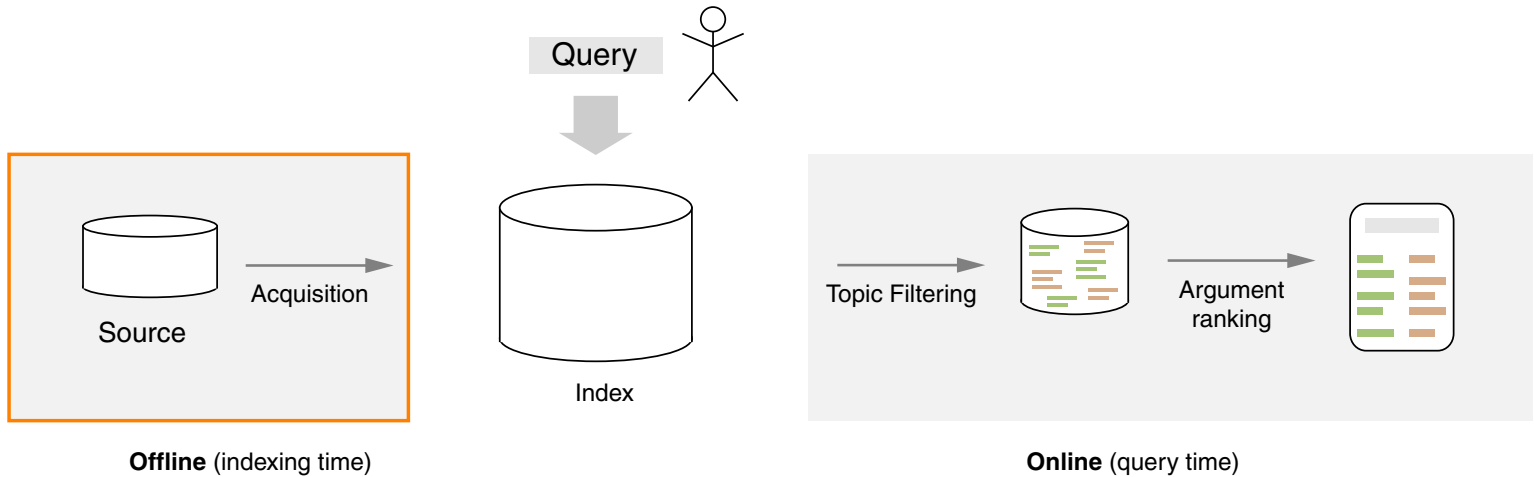
Argument Acquisition
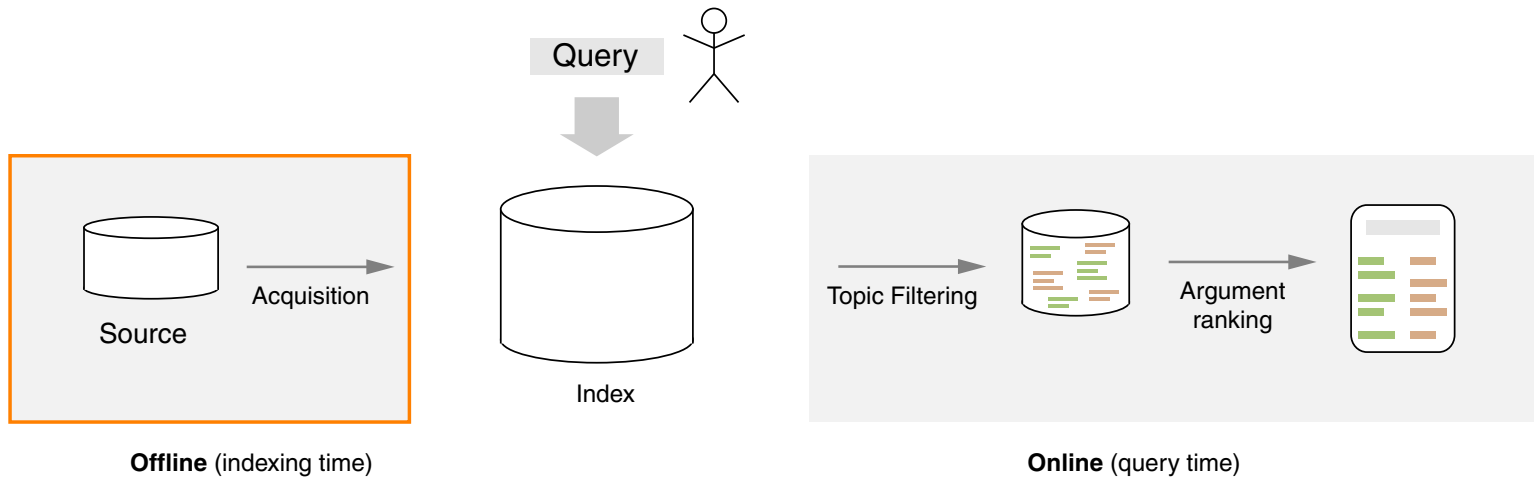
Argument Acquisition is a real challenge because:

- ❏ Annotating arguments is very expensive.
- ❏ Mining arguments from the Web is a hard task.

Approach	F1-score
Baseline (Linear Regression)	0.6
Modiefied BiLSTM (Stab et al., 2018)	0.66
Baseline (Majority)	0.6
Distant-supervision (Al-khatib., 2016)	0.7

Argument Acquisition Paradigms: Consequences
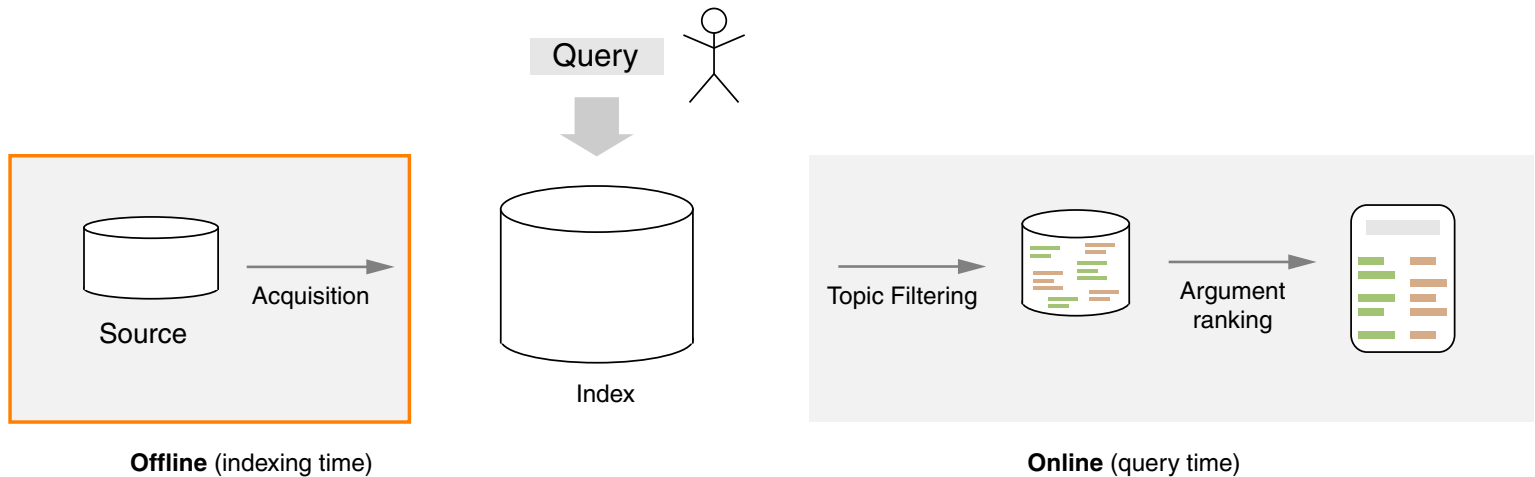
Consequences of choosing the source and approach to extract arguments from:

- ❑ **Precision vs Recall**: Trade off between the quality of the arguments and the coverage of the retrieved arguments.
- ❑ **Stance balance**: how balanced are the stances of the presented arguments?
- ❑ **Efficiency**: How fast is the argument search engine at retrieving arguments?
- ❑ **Research Focus**: What are the research challenges that the paradigm allows to study?

Argument Acquisition Paradigm of args.me
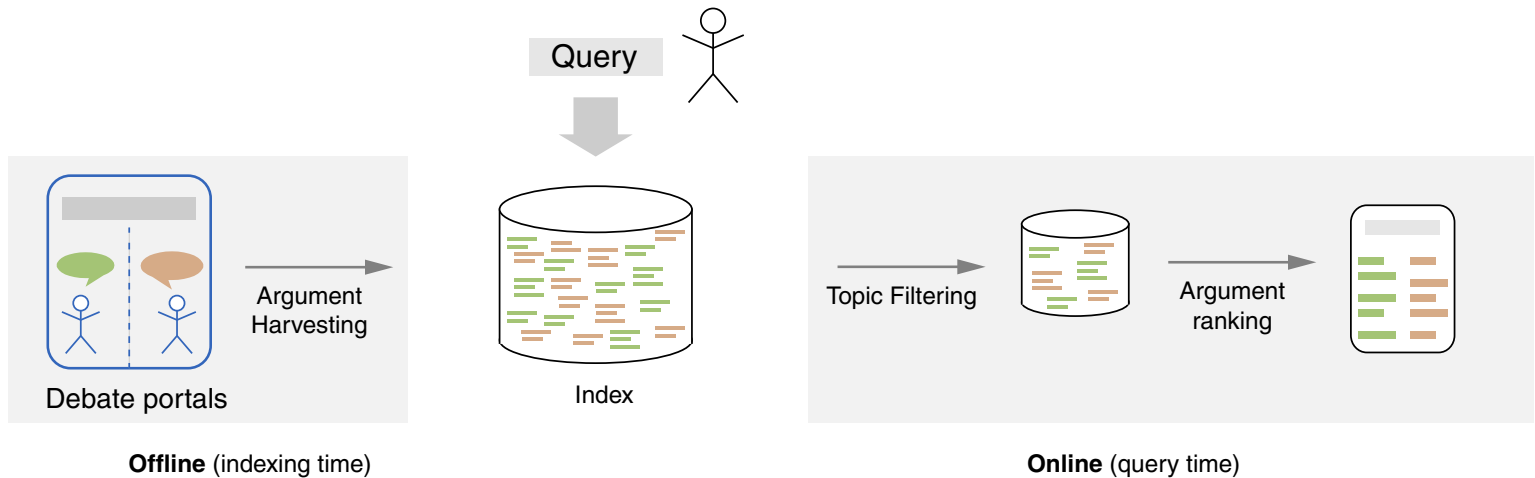
Consequences:

- High precision, low recall.
- Stance balance is guaranteed.
- Very efficient.
- Research focus on all computational argumentation tasks, e.g, argument generation.

Argument Acquisition Paradigm of IBM Debater
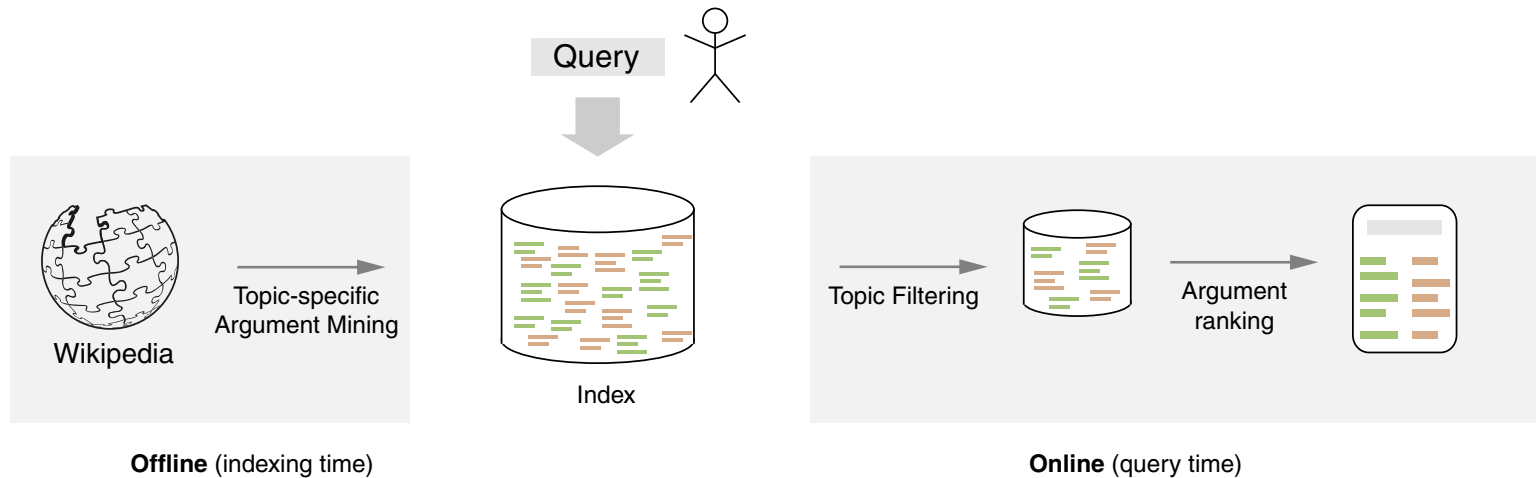
Consequences:

- ❑ High precision, low recall.
- ❑ Stance balance is guaranteed.
- ❑ Very efficient.
- ❑ Research focus on all computational argumentation tasks, e.g, argument ranking.

Argument Acquisition Paradigm of ArgumentText
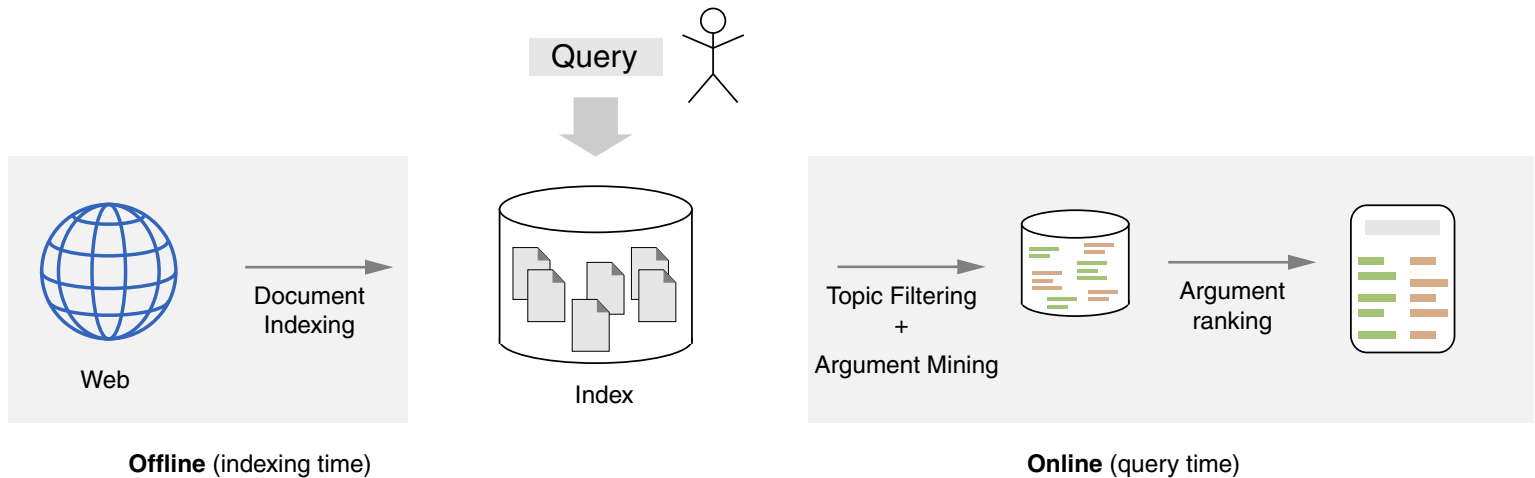
Consequences:

- ❑ Low precision, high recall.
- ❑ Stance balance is not guaranteed.
- ❑ Slow since argument mining is performed online.
- ❑ Research focus on argument mining.

Argument Acquisition Paradigms

Level of supervision

Distantly supervised
args.me

Recognized source
IBM Debater

Entire Web
ArgumenText

Query

Argument harvesting

Topic-specific argument mining

Document indexing

Topic filtering

Topic filtering

Topic filtering + Argument mining

Argument ranking

Argument ranking

Argument ranking

Offline (indexing time)   Index   **Online** (query time)
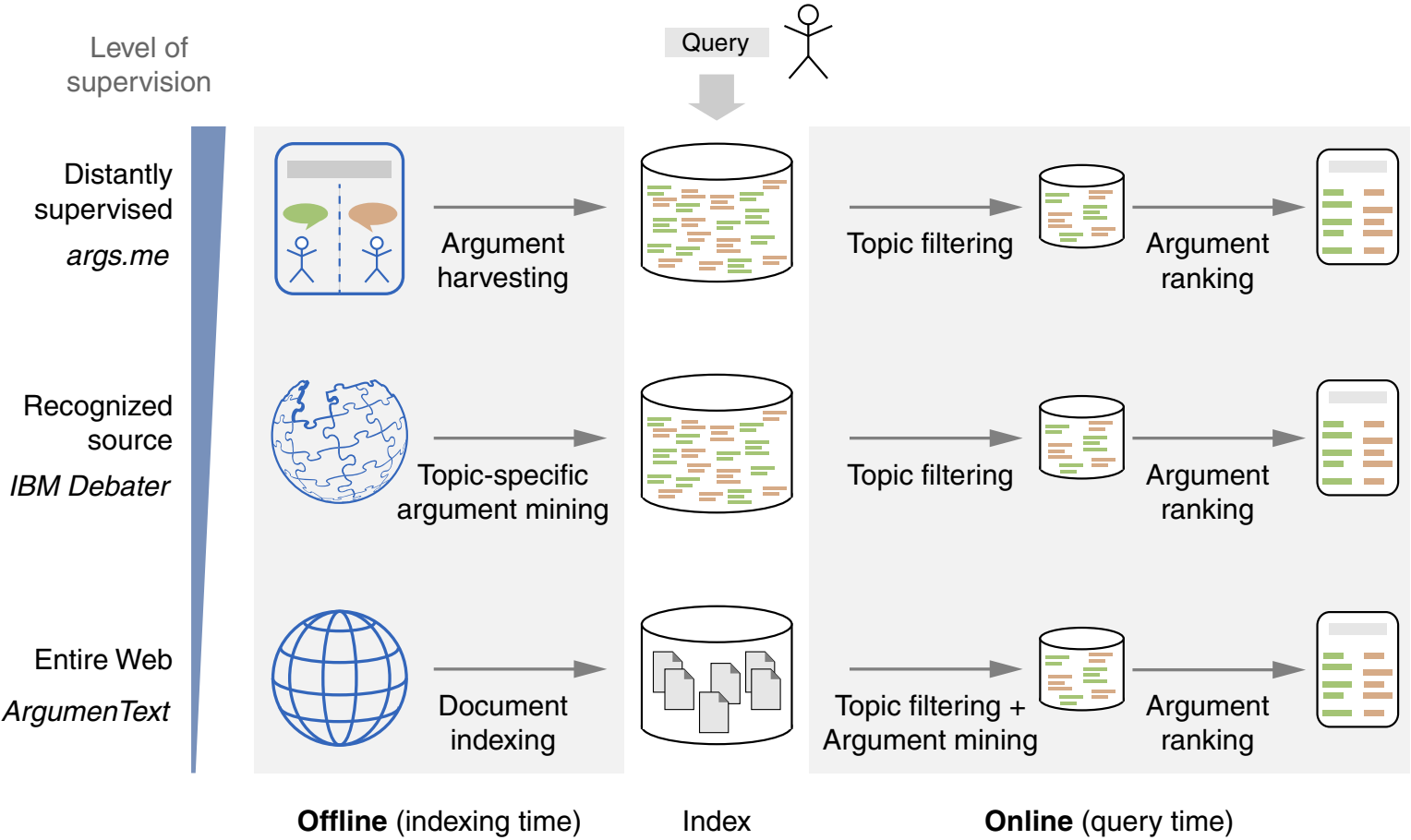
Low Hanging Fruits in Debateportals

Debate portals are websites where people discuss or list arguments about controversial topic, e.g, climate change.

There are two types of Debateportals:

- ❑ Dialogical: people discuss topics in rounds.
- ❑ Monlogical: people or admin list arguments.
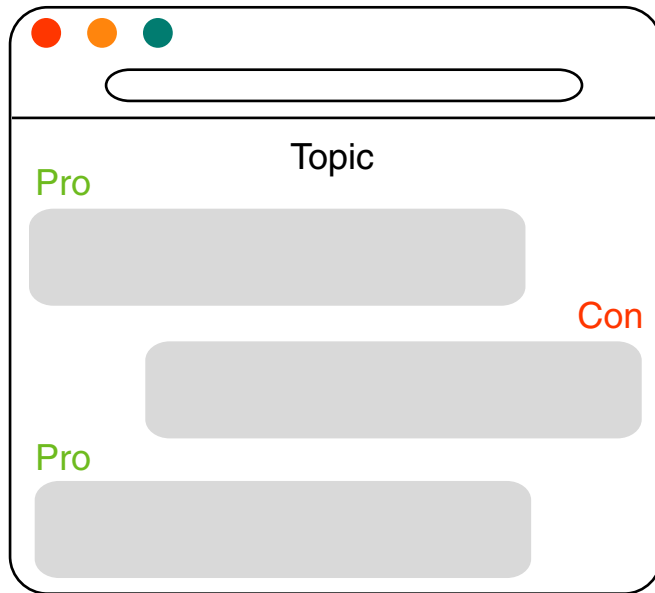
Dialogical Debate portals   Monological Debate portals
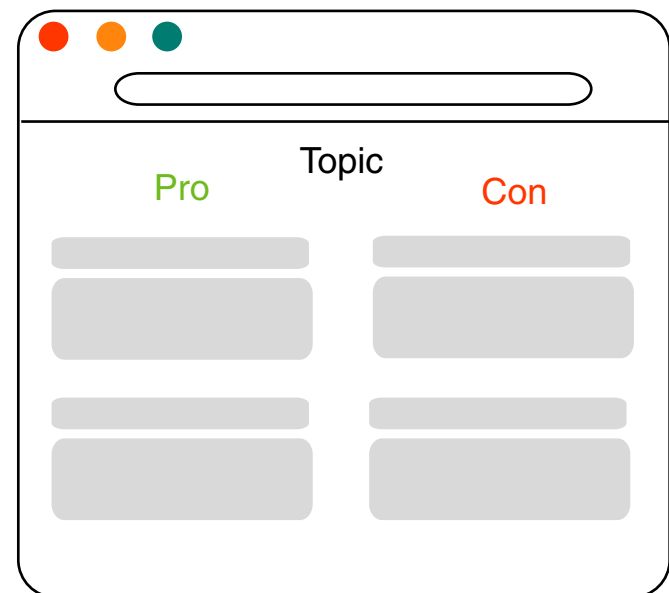
Extraction Heuristics for Dialogical Debateportals

We extract for each post an argument whose conclusion is the topic.
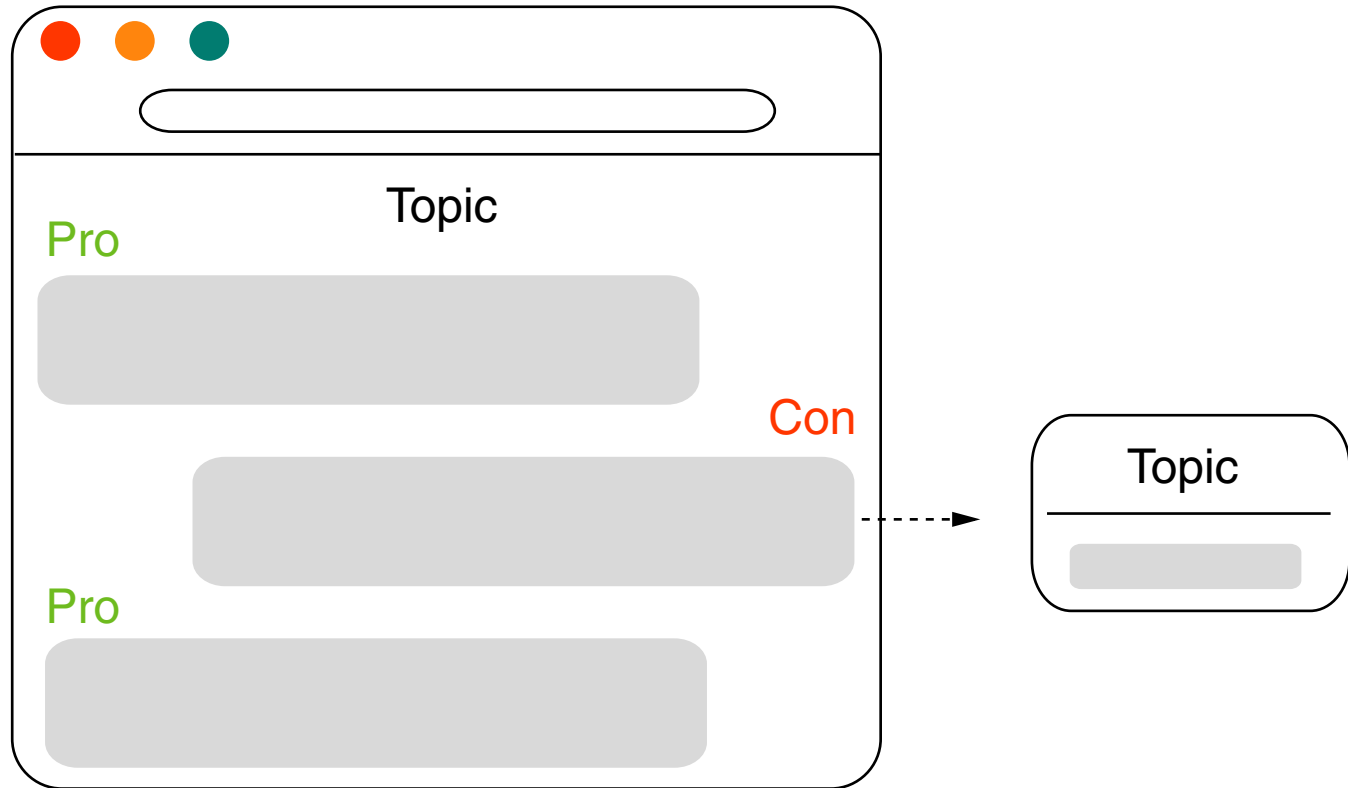
Extraction Heuristics for Monological Debateportals
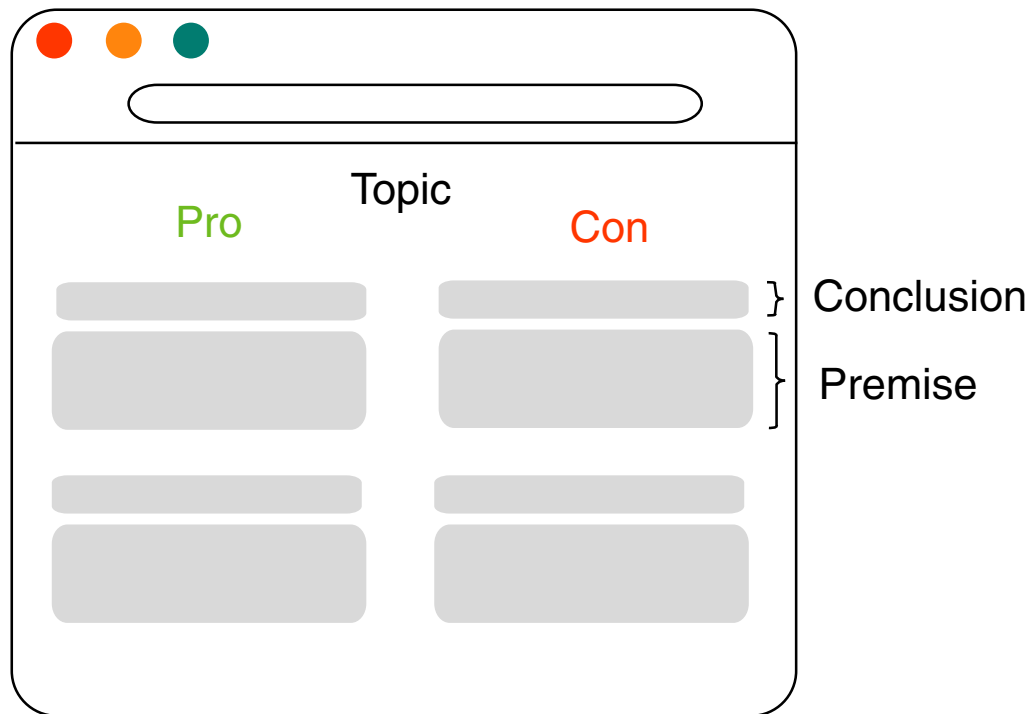
Extraction Heuristics for Monological Debateportals

We extract for each post two arguments:

- ❑ The conclusion and premise of the post.
- ❑ An argument whose conclusion is the topic and its premise is the conclusion of the post.
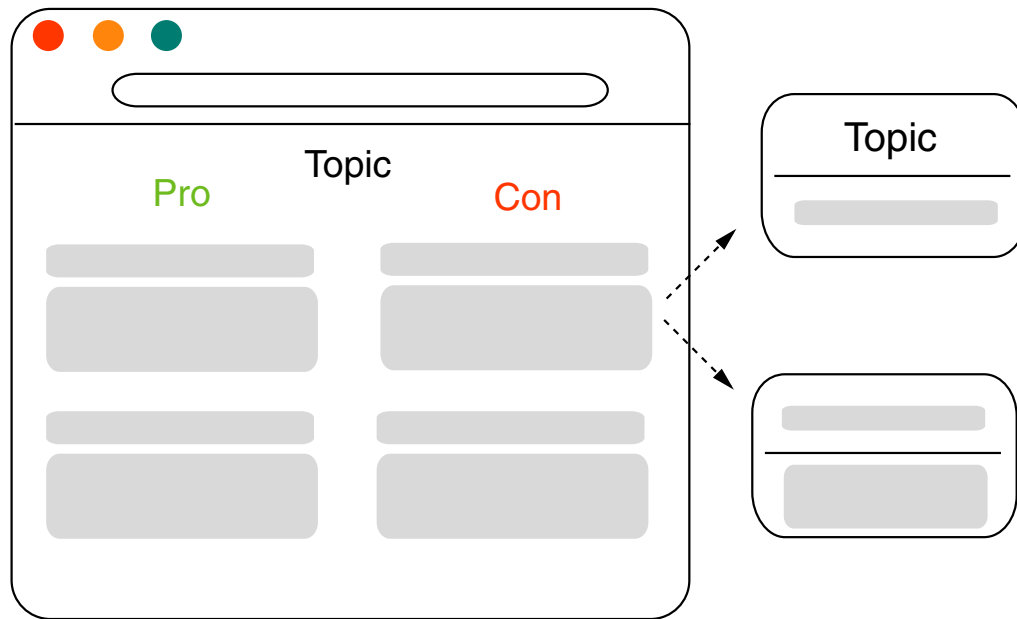
Args.me corpus statistics

Args.me corpus is the largest argument corpus with 387,606 arguments.

Count of arguments	Count of pro stance	Count of con stance	Count of debates
387 606	200 099	187 507	59 637

Count of conclusions

65%
50 000
40 000
31%
30 000
20 000
10 000
1%

1-10   11-50   >50
Count of tokens

Count of premises

58 %
250 000
200 000
150 000   33%
100 000
50 000   9%

1-50   51-1000   >1000
Count of tokens
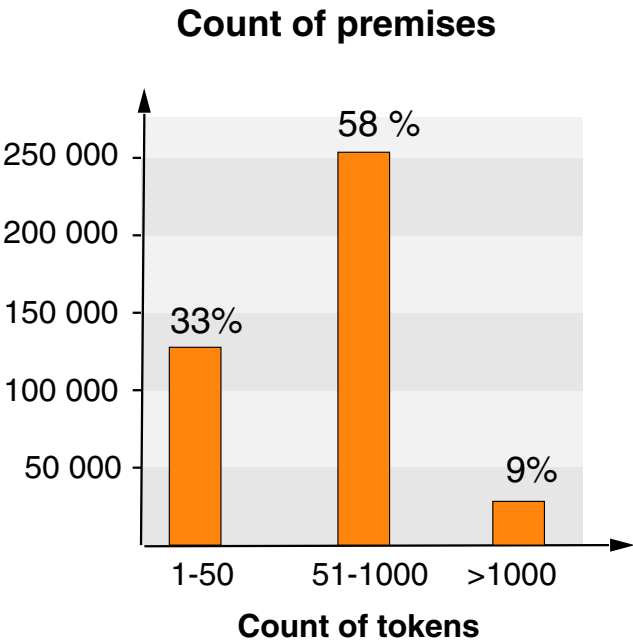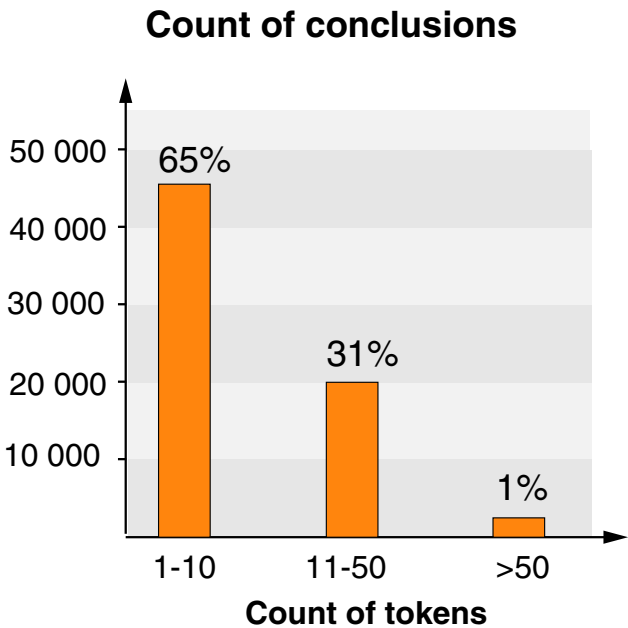
Args.me corpus statistics

Most of the conclusions in args.me corpus have 1-5 supporting or attacking arguments.

Some conclusions have more than 50 supporting or attacking arguments.

Count of conclusions
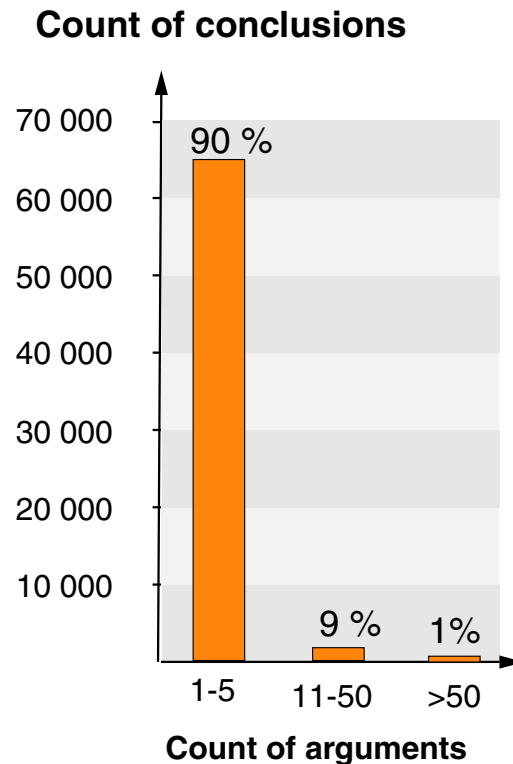
Argument search tasks

List of tasks that can be performed on the args.me corpus:

- ❑ Argument relation classification
- ❑ Stance classification
- ❑ Same side classification
- ❑ Argument generation
- ❑ ..

Argument Relation Classification

Task Description: Given two arguments detect if one attacks or support the other.

Application: Retrieval of counter arguments for an given argument.

Argument 1

Support / Attack
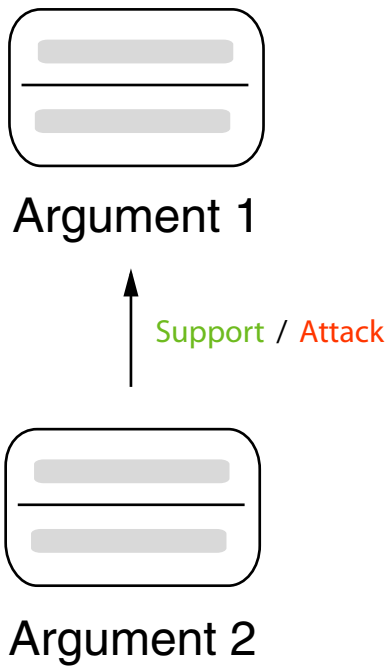
Argument 2

Approach	Accuracy
Baseline (Linear Regression)	0.77
LSTM (Cocarascu et al., 2017)	0.89

Stance Classification

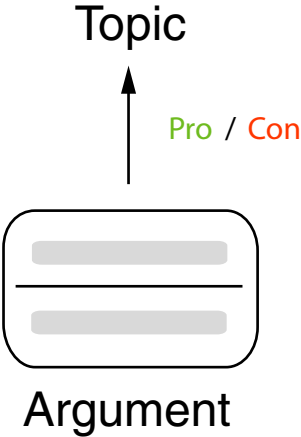**Task Description:** Given a topic and an argument, detect whether the argument is pro or con the topic.

**Application:** Classifying the retrieved arguments for a query into pro or contra.

Topic

Pro / Con

Argument

Approach	Accuracy
Baseline (Majority)	0.51
Sentiment-based (Bar-Haim et al., 2017)	0.65

Same Side Classification

Task Description: Given two arguments, detect whether they are on the same or opposite side.
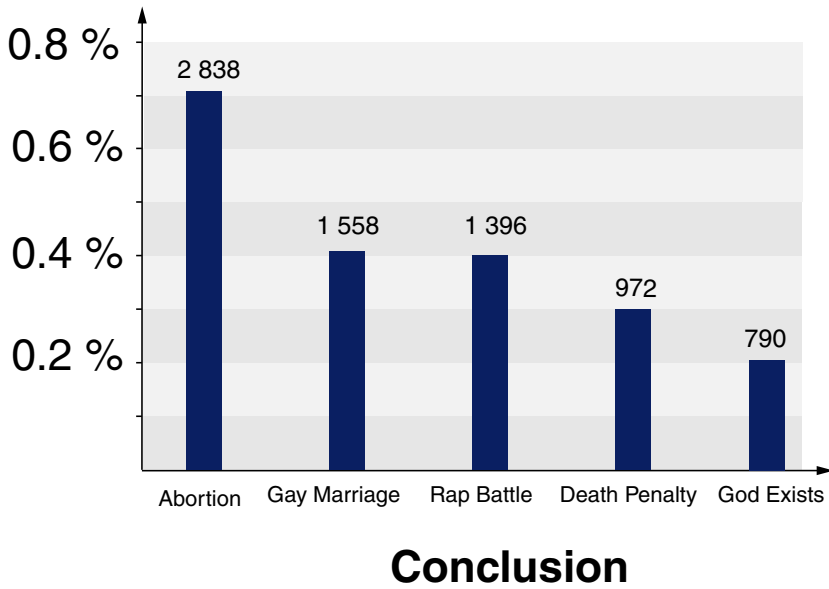
Application: Grouping the retrieved arguments for a query under different claims.
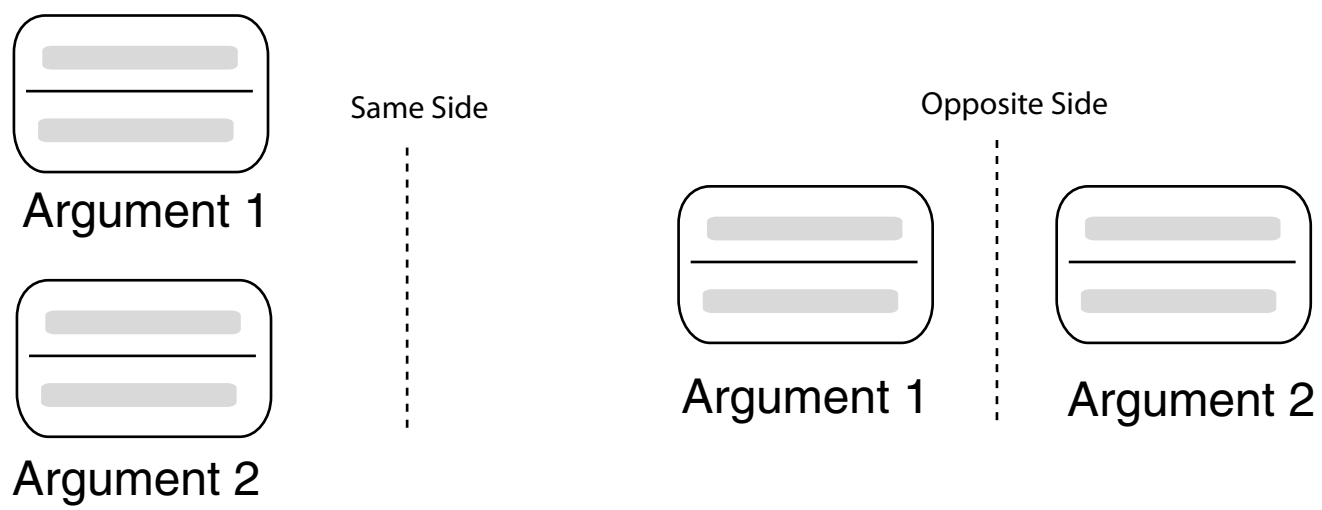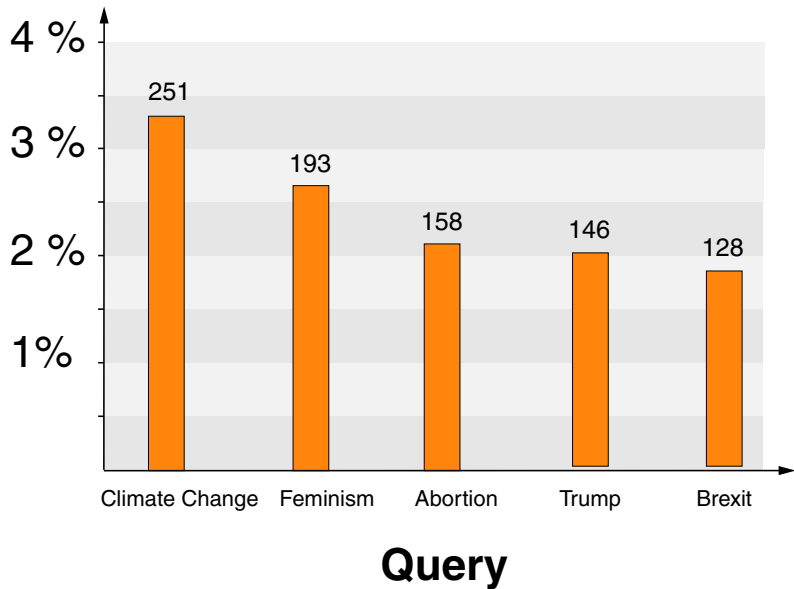
Approach	Accuracy
Majority	0.50
BERT	0.73

First insights from args.me

Count in args.me corpus

Top five conclusions in args.me corpus

- Abortion: 2 838
- Gay Marriage: 1 558
- Rap Battle: 1 396
- Death Penalty: 972
- God Exists: 790

Conclusion

Count in args.me logs

Top five queries in args.me query logs

- Climate Change: 251
- Feminism: 193
- Abortion: 158
- Trump: 146
- Brexit: 128

Query

Summary

- Argument acquisition paradigm: a set of decisions made while designing an argument search engine.
- Comparison of three major argument search engines under the argument acquisition paradigm.
- Introduction of the largest argument corpus args.me corpus.
- Introduction of several tasks that can be performed on args.me corpus.