

Analysing arguments from political debates: obtained results and open challenges

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Argumentation : why is it important?

- A reasoning framework based on the need of justifying. Fundamental to decide, convince, explain, . . .

- **Interdisciplinary topic**

Artificial Intelligence [Loui (1987), Pollock (1987)]

Philosophy [Aristotele, Toulmin (1958)]

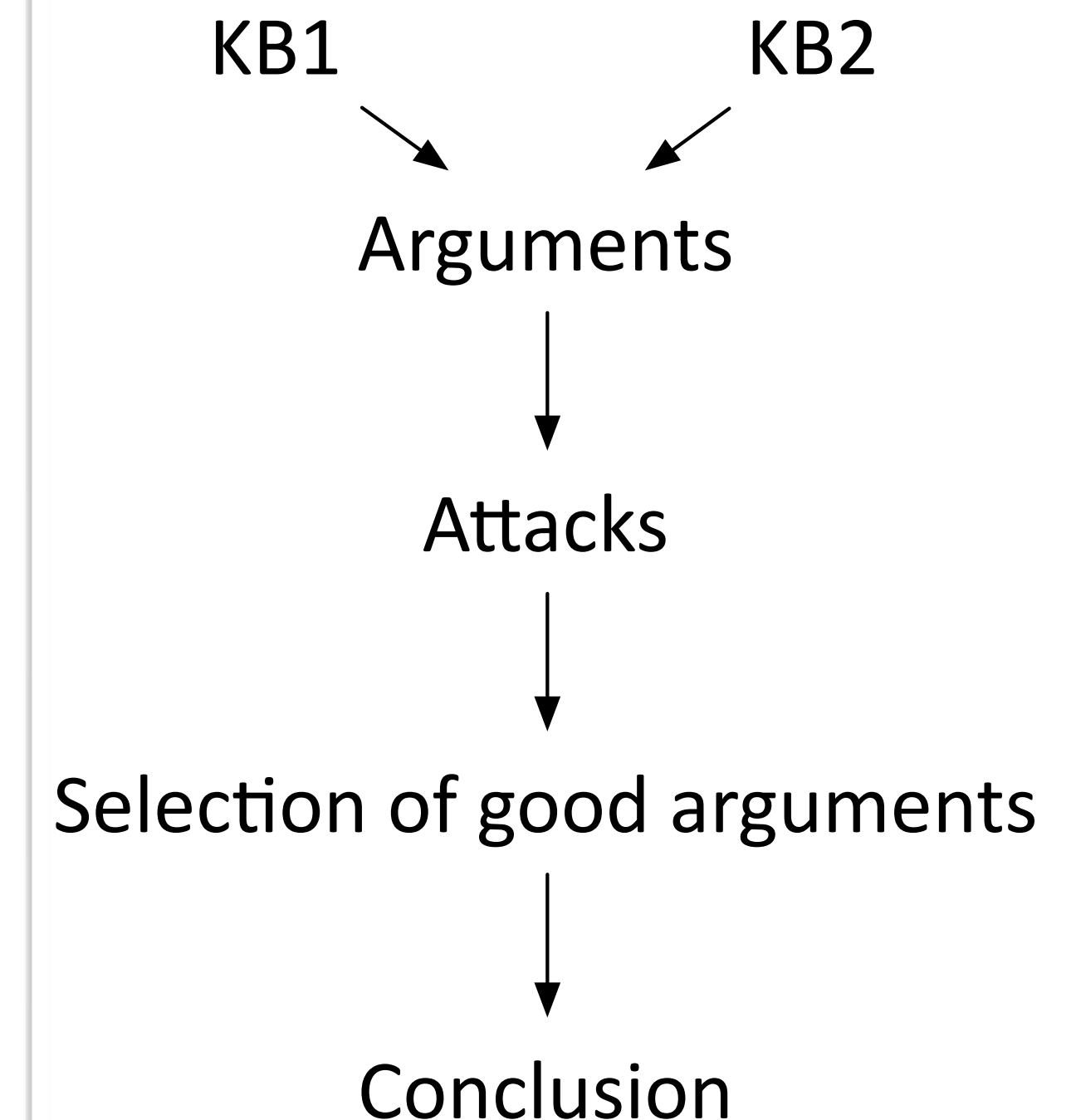
Psychology [McGuire (1960)]

Linguistics [van Eemeren et al. (1996)]

- **Examples of Applications**

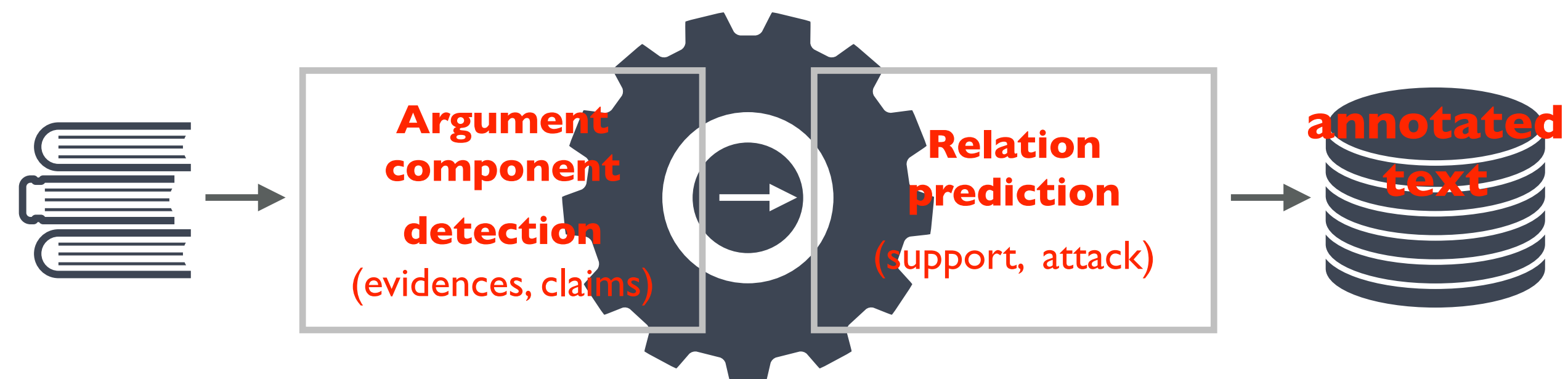
- **Medical domain:** support systems for argumentative diagnosis
- **Legal domain:** argumentative decisions based on laws
- **Online debate platforms** (e.g., idebate.org, debategraph, ProCon.org)
- **Online systems for conflicts resolution** (e.g., CyberSettle)

Argumentation Theory

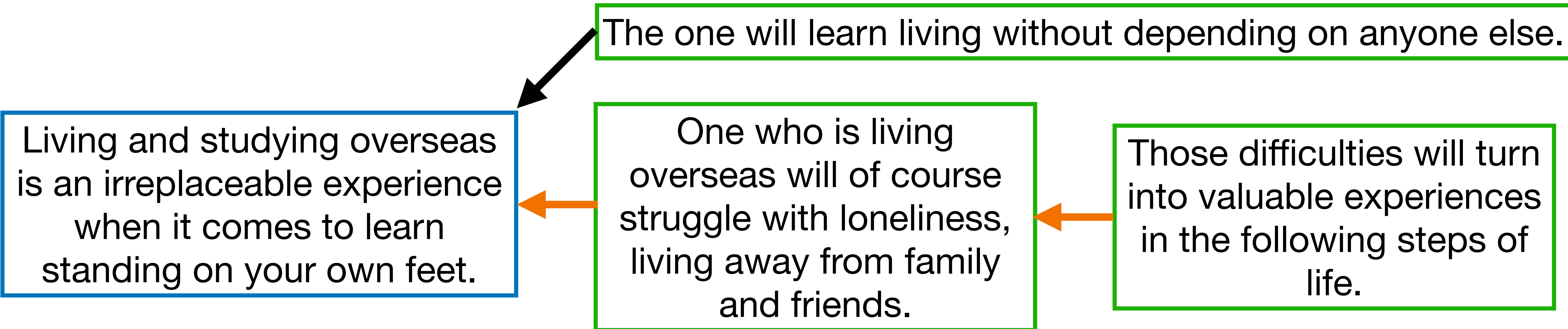


Argument Mining

- The **task** of analysing discourse on the pragmatics level and applying a certain argumentation theory to model and automatically analyze the data at hand.
- Providing structured data for computational models of argument.
- Large resources of natural language texts: user-generated arguments on blogs, product reviews, newspapers,...
- Computational linguistics and machine learning advances.
- Argument mining IS NOT opinion mining.



A Complex Argument Structure



[...] Second, living and studying overseas is an irreplaceable experience when it comes to learn standing on your own feet. One who is living overseas will of course struggle with loneliness, living away from family and friends but those difficulties will turn into valuable experiences in the following steps of life. Moreover, the one will learn living without depending on anyone else. [...]

Mining Arguments from Political Debates

Mining argument from political debates

IJCAI19 demo, ACL19 short



39 political debates
from the last 50 years
of US presidential
campaigns (29k
argument components)



Argument Mining
for fallacies detection

The dataset

- Collected from the website of the **Commission on Presidential Debates**.
- **Transcripts of debates on TV among the candidates for the presidential and vice-presidential nominations in the US (1960-2016)**.
- **29521 argument components**: 16087 claims and 13434 premises.
- **25012 relations**: 3723 attacks and 21289 supports
- **3 expert annotators** defined the annotation guidelines, then three other annotators carried out the annotation task.
- Each transcript has been independently annotated by at least two annotators
- 19 debates have been independently annotated by three annotators to measure the IAA: **$\kappa = 0.57$ (moderate agreement) for argumentative-non argumentative sentences, $\kappa = 0.4$ (fair agreement) for the argument components, average observed agreement = 0.99 for relation-no relation, and = 0.756 (0.387 Fleiss' κ) for attack-support.**

The dataset

Year	Types	Candidates	Speech No	Sent No	Token No
1960	4 pres	Kennedy - Nixon	257	2,313	48,445
1976	3 pres	Carter - Ford	270	2,090	46,583
1980	2 pres	Anders. - Carter - Reagan	201	1,247	28,775
1984	2 pres + 1 vice	Mondale - Reagan	362	2,605	49,574
1988	2 pres + 1 vice	Bush - Dukakis	491	2,828	53,202
1992	3 pres + 1 vice	Bush - Clinton - Perot	928	4,713	78,878
1996	2 pres + 1 vice	Clinton - Dole	280	2,381	39,090
2000	3 pres + 1 vice	Bush - Gore	564	3,331	55,320
2004	3 pres + 1 vice	Bush - Kerry	598	4,806	78,310
2008	3 pres + 1 vice	Mccain - Obama	669	3,849	76,591
2012	3 pres + 1 vice	Obama - Romney	1,102	4,997	82,921
2016	3 pres	Clinton - Trump	944	3,171	50,565
Total	33 pres + 8 vice=41		6666	38,331	688,254

Example of argument components

Kennedy-Nixon, September 26, 1960:

NIXON: [I believe the programs that Senator Kennedy advocates will have a tendency to stifle those creative energies], [I believe in other words, that his program would lead to the stagnation of the motive power that we need in this country to get progress].

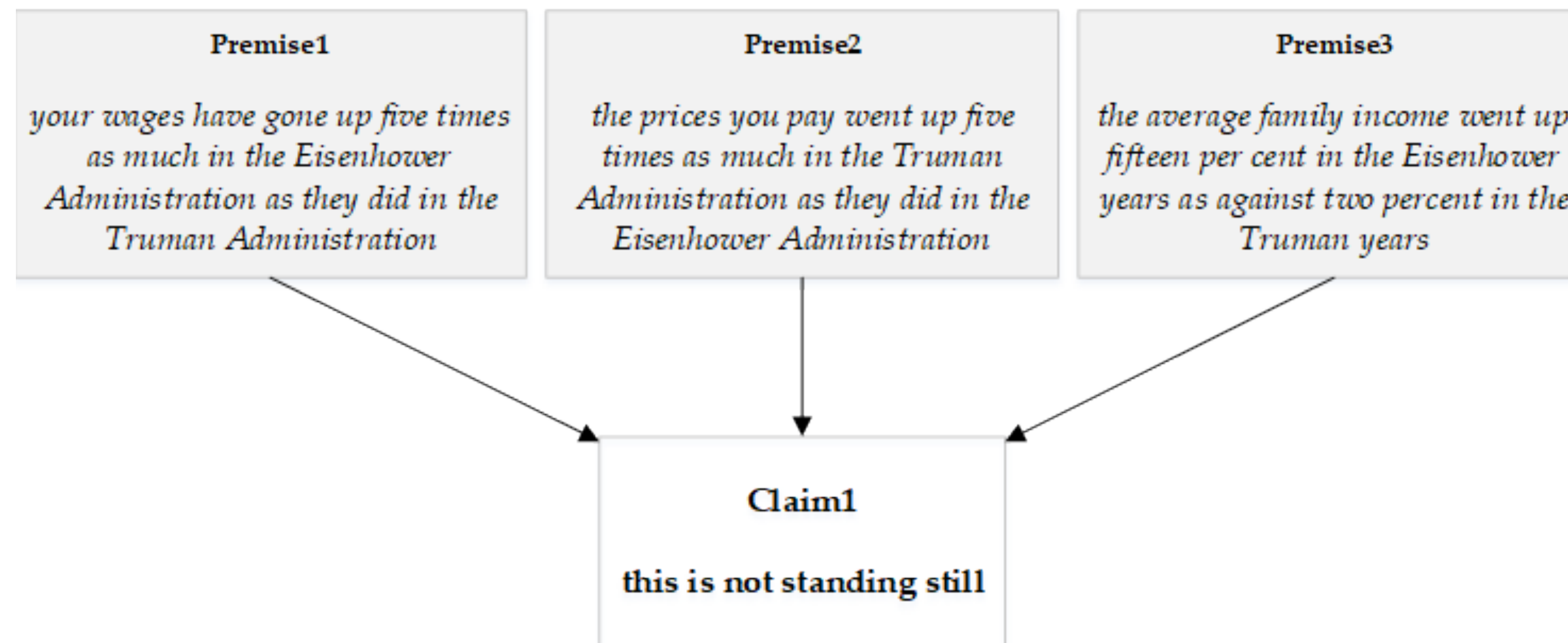
Kennedy-Nixon, October 13, 1960:

NIXON: Senator Kennedy's position and mine completely different on this. [**I favor the present depletion allowance**]. [*I favor it not because I want to make a lot of oil men rich*], but because [*I want to make America rich*]. Why do we have a depletion allowance? Because [*this is the stimulation, the incentive for companies to go out and explore for oil, to develop it*].

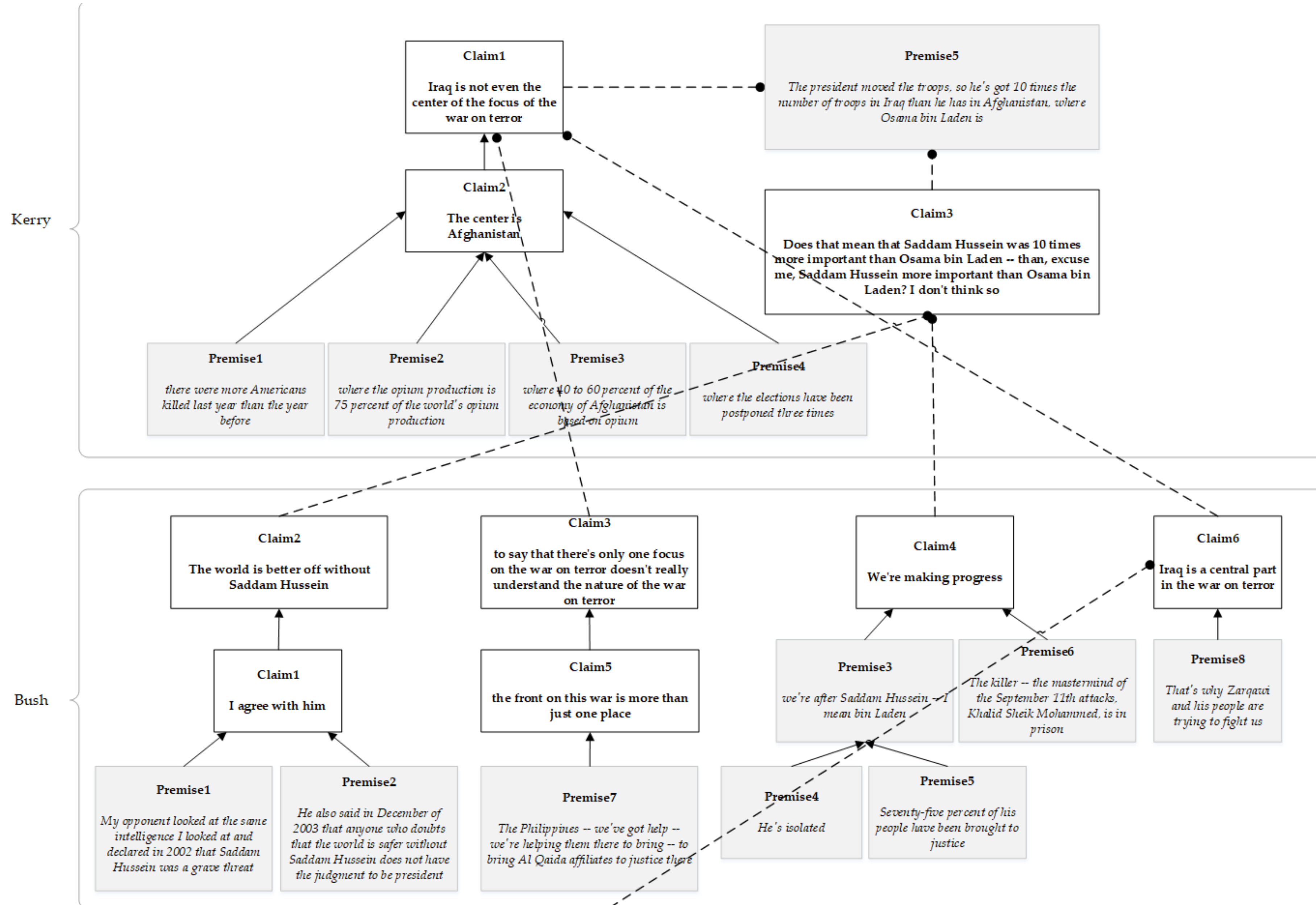
Example of relations

Kennedy-Nixon, September 26, 1960:

NIXON: But let's not put it there; let's put it in terms of the average family. What has happened to you? We find that [*your wages have gone up five times as much in the Eisenhower Administration as they did in the Truman Administration*]_{Premise1}. What about the prices you pay? We find that [*the prices you pay went up five times as much in the Truman Administration as they did in the Eisenhower Administration*]_{Premise2}. What's the net result of this? This means that [*the average family income went up fifteen per cent in the Eisenhower years as against two percent in the Truman years*]_{Premise3}. Now, [**this is not standing still**]_{Claim1}.



The results are huge argumentation graphs



Evaluation

- **Argument component detection and classification:** BIO-tagging scheme for pre-trained bi-directional transformer language model, sentence representation passed into a RNN (GRU) and then into a CRF —> **f1-score 0.79**
- **Argument relation prediction:** sequence classification problem models the relations by classifying all the argumentative component combinations using a bi-directional transformer architecture —> **f1-score 0.60**

Topic modelling and argumentation framing

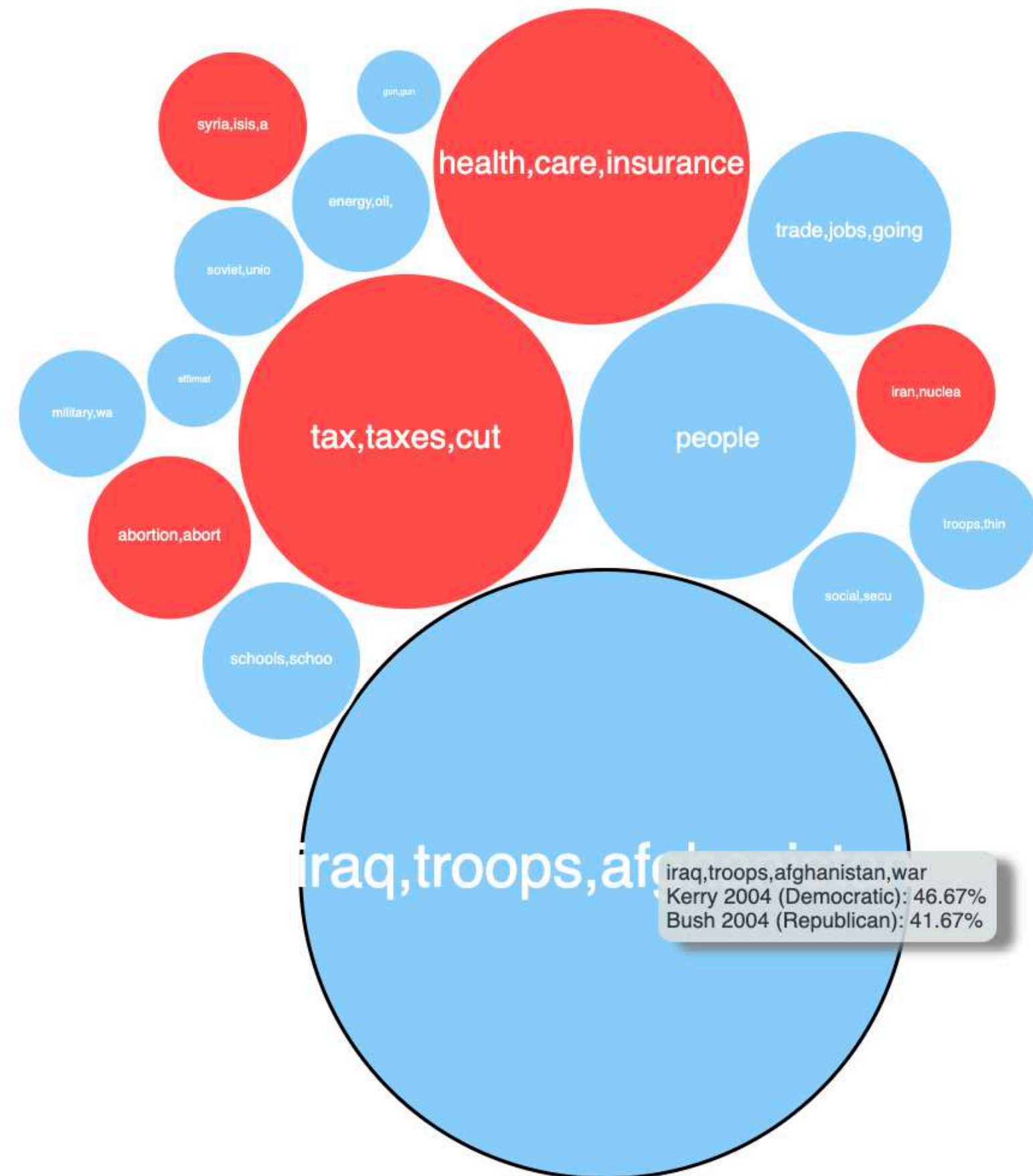
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- **Two different viewpoints** on the arguments put forward in the debate:
 - **topic modelling:** keywords that make them distinct from the other topics, they are the same regardless of the stance the debater is taking towards this topic.
 - Example: Iraq, war, military, Saddam Hossein.
 - **Framing:** how an argument by a debater is put forward through selected words to react to the discussion about the topics in debate.
 - Example: term “tax relief” by George W. Bush’s administration puts the topic of “taxation” in a frame which implies that the party who is advocating taxation is a villain, while the (Republican) party against it is relieving people from this affliction.

Visualisations

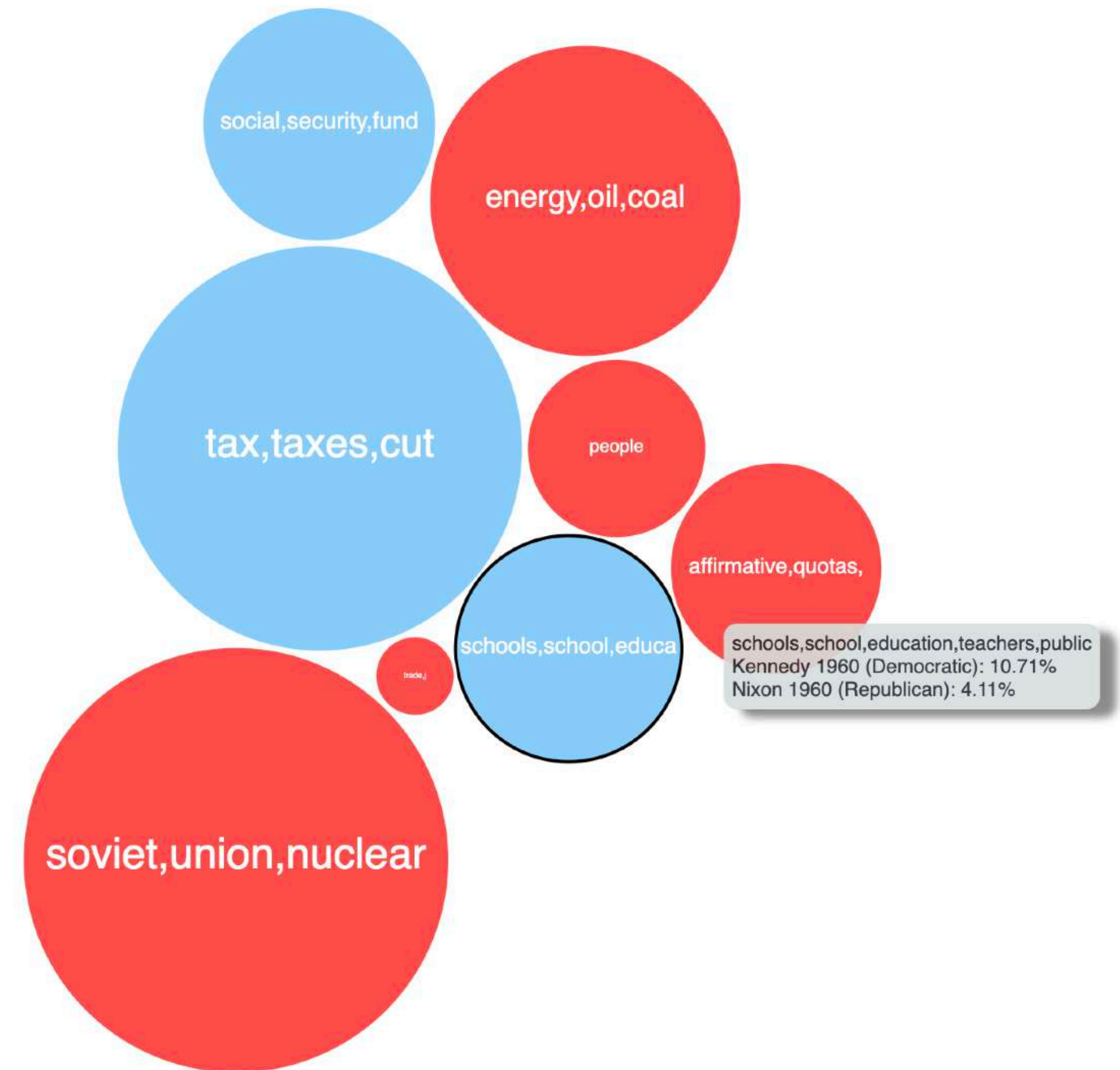
Choose a Year:

2004 ▾



Choose a Year:

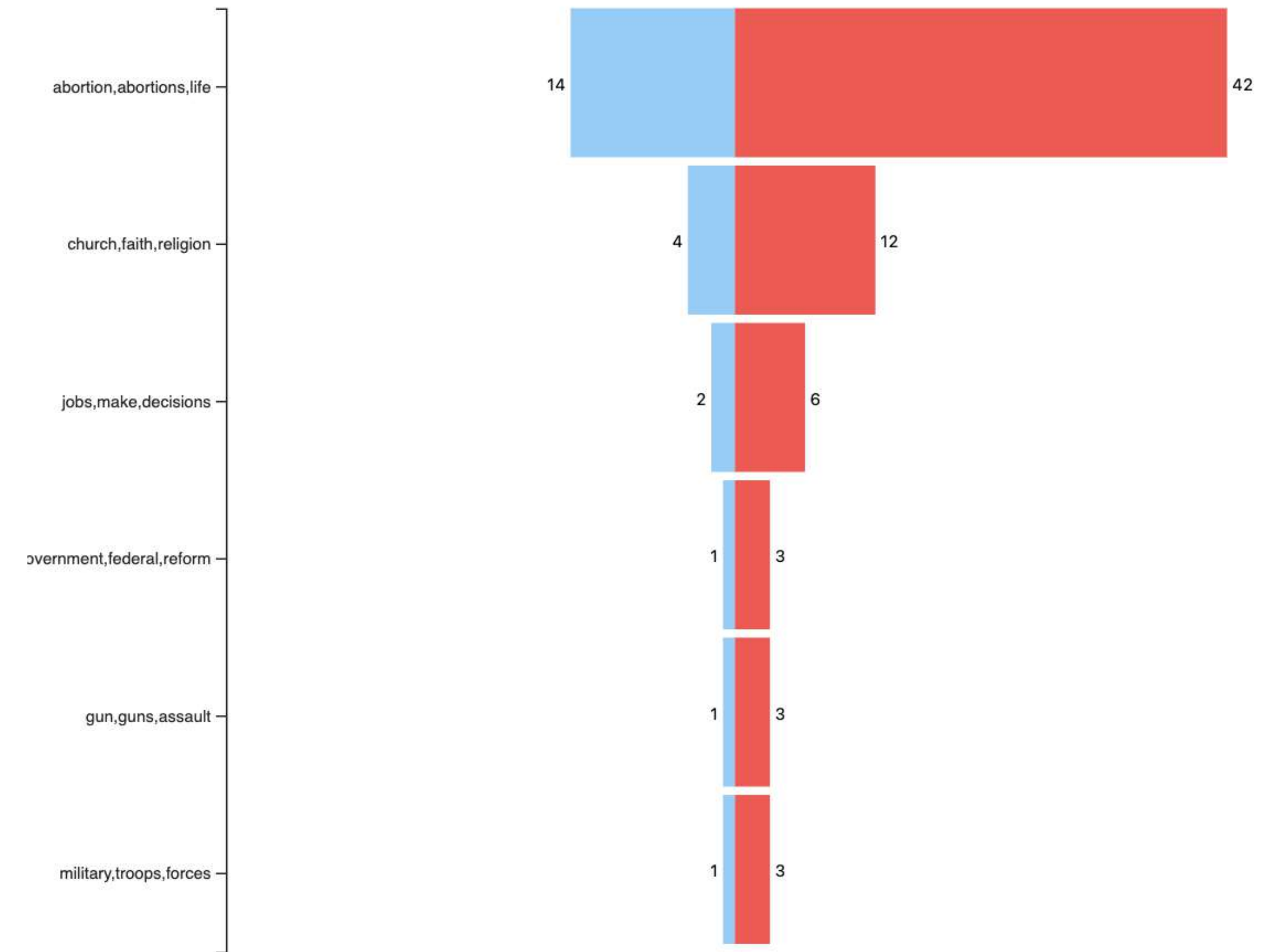
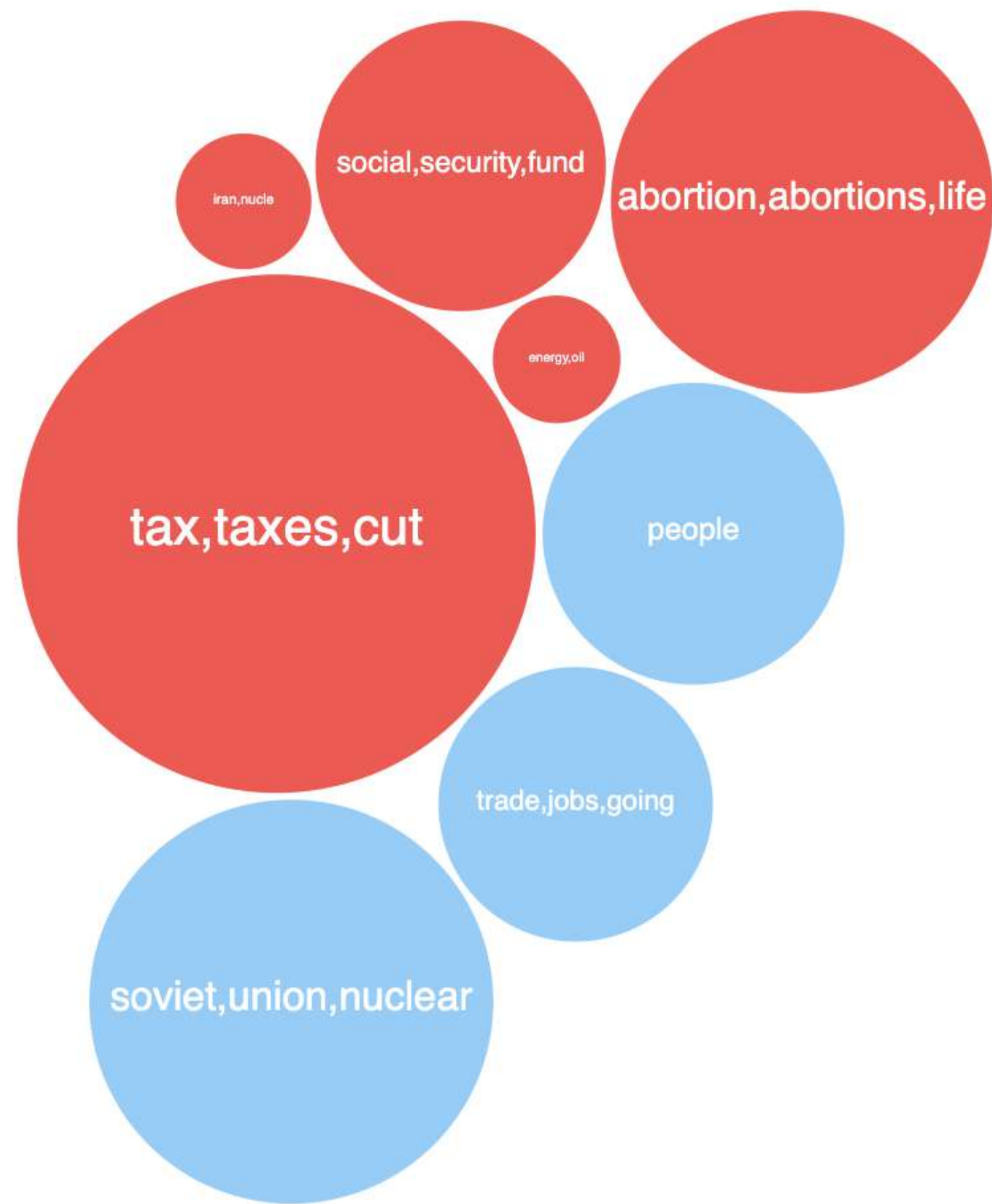
1960 ▾



Visualisations

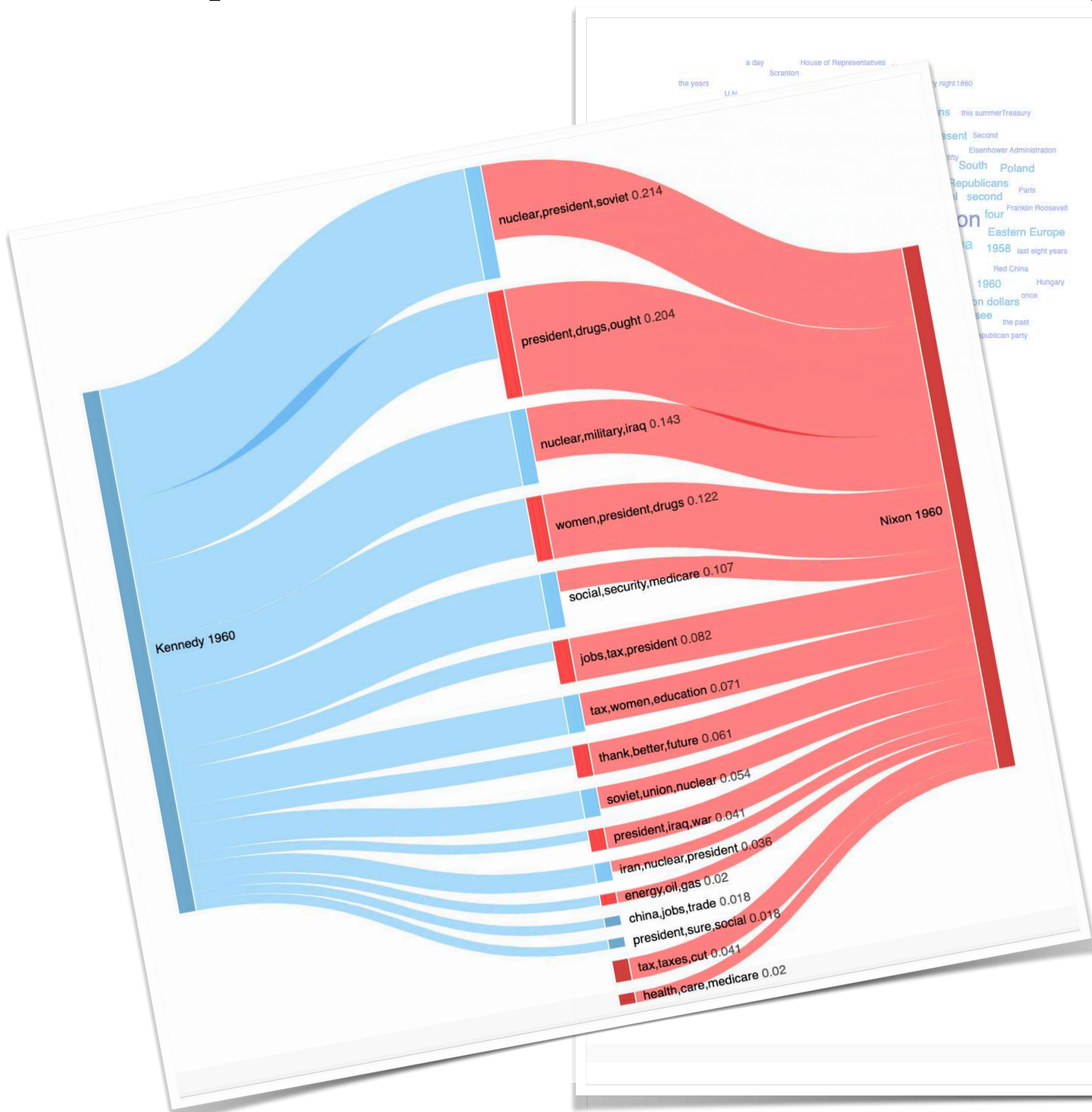
Choose a Year:

1984 ▾



DispuTOOL

http://3ia-demos.inria.fr/disputool/



Filter data

Based on Year:

- 1960
- 1976
- 1980
- 1984
- 1988
- 1992
- 1996
- 2000
- 2004
- 2008
- 2012
- 2016

Based on NER Type:

- LOCATION
- NATIONALITY
- ORGANIZATION
- PERSON
- RELIGION

Based on Speaker:

- Albert A. Gore
- Barack H. Obama
- Donald J. Trump
- George H. W. Bush
- George W. Bush
- Gerald R. Ford
- Geraldine A. Ferraro
- Henry Ross Perot
- Hillary D. R. Clinton
- Jack F. Kemp
- James B. Stockdale
- James D. Quayle
- Jimmy E. Carter
- John B. Anderson
- John F. Kennedy
- John F. Kerry
- John S. McCain
- Johnny(John) R. Edwards
- Joseph I. Lieberman
- Joseph(Joe) R. Biden
- Lloyd M. Bentsen
- Michael S. Dukakis
- Paul D. Ryan
- Richard M. Nixon
- Richard(Dick) B. Cheney
- Robert J. Dole
- Ronald W. Reagan
- Sarah L. Palin
- Walter F. Mondale
- Willard(Mitt) M. Romney
- William(Bill) J. Clinton

APPLY FILTER

21 Oct 1960

Filter

- Highlight Claims.
- Highlight Premises.

Our policies are very different. **I think that Senator Kennedy's policies and recommendations for the handling of the Castro regime are probably the most dangers- dangerously irresponsible recommendations that he's made during the course of this campaign. In effect, what Senator Kennedy recommends is that the United States government should give help to the exiles and to those within Cuba who oppose the Castro regime - provided they are anti-Batista. Now let's just see what this means. We have five treaties with Latin America, including the one setting up the Organization of American States in Bogota in 1948, in which we have agreed not to intervene in the internal affairs of any other American country - and they as well have agreed to do likewise. The charter of the United Nations - its Preamble, Article I and Article II - also provide that there shall be no intervention by one nation in the internal affairs of another.** Now I don't know what Senator Kennedy suggests when he says that we should help those who oppose the Castro regime, both in Cuba and without. But I do know this: that **if we were to follow that recommendation, that we would lose all of our friends in Latin America, we would probably be condemned in the United Nations, and we would not accomplish our objective.** I know something else. **It would be an open invitation for Mr. Khrushchev to come in, to come into Latin America and to engage us in what would be a civil war, and possibly even worse than that. This is the major recommendation that he's made.** Now, what can we do? Well, **we can do what we did with Guatemala. There was a Communist dictator that we inherited from the previous Administration. We quarantined Mr. Arbenz. The result was that the Guatemalan people themselves eventually rose up and they threw him out. We are quarantining Mr. Castro today. We're quarantining him diplomatically by bringing back our Ambassador, economically by cutting off trade, and Senator Kennedy's suggestion that the trade that we cut off is not significant is just one hundred percent wrong. We are cutting off the significant items that the Cuban regime needs in order to survive. By cutting off trade, by cutting off our diplomatic relations as we have, we will quarantine this regime so that the people of Cuba themselves will take care of Mr. Castro. But for us to do what Senator Kennedy has suggested would bring results which I know he would not want, and certainly which the American people would not want.**



Richard M. Nixon



John F. Kennedy

Mr. Nixon uh - shows himself I- misinformed. He surely must be aware that most of the equipment and arms and resources for Castro came from the United States, flowed out of Florida and other parts of the United States to Castro in the mountains. There isn't any doubt about that. Number one, **I believe that if any economic sanctions against Latin America are going to be successful they have to be multilateral. They have to include the other countries of Latin America. The very minute effect of the action which has been taken this week on Cuba's economy - I believe Castro can replace those markets very easily through Latin America, through Europe, and through Eastern Europe. If the United States had stronger prestige and influence in Latin America it could persuade - as Franklin Roosevelt did in 1940 - the countries of Latin America to join in an economic quarantine of Castro. That's the only way you can bring real economic pressure on the Castro regime** - and also the countries of Western Europe, Canada, Japan and the others. Number three, **Castro is only the beginning of our difficulties throughout Latin America. The big struggle will be to prevent the influence of Castro spreading to other countries - Mexico, Panama, Bolivia, Colombia. We're going to have to try to provide closer ties, to associate ourselves with the great desire of these people for a better life if we're going to prevent Castro's influence from spreading throughout all of Latin America. His influence is strong enough today to prevent us from joining getting the other countries of Latin America to join with us in economic quarantine. His influence is growing** - mostly because **this Administration has ignored Latin America. You yourself said, Mr. Vice President, a month ago, that if we had provided the kind of economic aid five years ago that we are now providing we might never have had Castro.** Why didn't we?

How do fallacious arguments look like in these political debates?

Fallacious arguments

Definitions

- **Standard dictionaries** (Oxford English Dictionary): "invalid argument" or "faulty reasoning".
- In **logic**: formally invalid arguments;
- In **cognitive science**: on faulty, biased reasoning;
- In **communication science** on the deceptive and persuasive nature of fallacious discourse.
- In the **pragma-dialectical theory of argumentation**: "derailments of strategic manoeuvring", meaning **speech acts that violate the rules of a rational argumentative discussion for assumed persuasive gains**.
 - These derailments of strategic manoeuvring are **particularly significant in political discourse**, where informal fallacies are strategically employed by politicians to put forward their own positions.
 - This deceptive strategic manoeuvring **can lead to faulty and biased reasoning** by the audience as well as to the **subsequent formulation of further invalid arguments derived from those** proposed by politicians.

Fallacy detection in political debates

Correlation thus causation



I would remind Senator Kennedy of the past fifty years. I would ask him to name one Republican president who led this nation into war. There were **three Democratic presidents who led**

us into war. I do not mean by that that

one party is a war party and the other party is a peace party. But I do say that

any statement to the effect that the Republican party is trigger-happy is belied by the record.

Fallacy detection in political debates

Correlation thus causation



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any state

Repub

b

**Correlation thus
causation
"Cum hoc ergo propter
hoc"**

Fallacy detection in political debates

Ad Hominem



October 9, 2016

It was locker room talk, as I told you. That was locker room talk. I'm not proud of it. I am a person who has great respect for people, for my family, for the people of this country. And certainly, I'm not proud of it. But that was something that happened.

If you look at Bill Clinton, far worse. Mine are words, and his was action. His was what he's done to women.

There's never been anybody in the history of politics in this nation that's been so abusive to women. So you can say any way you want to say it, but Bill Clinton was abusive to women.

Fallacy detection in political debates

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There has never been anybody in the history of politics in the United States who has done what Bill Clinton has done to women. So you can see that Bill Clinton was

**Personal Attack Fallacy
(Ad hominem)**

Fallacy detection in political debates

Appeal to emotion

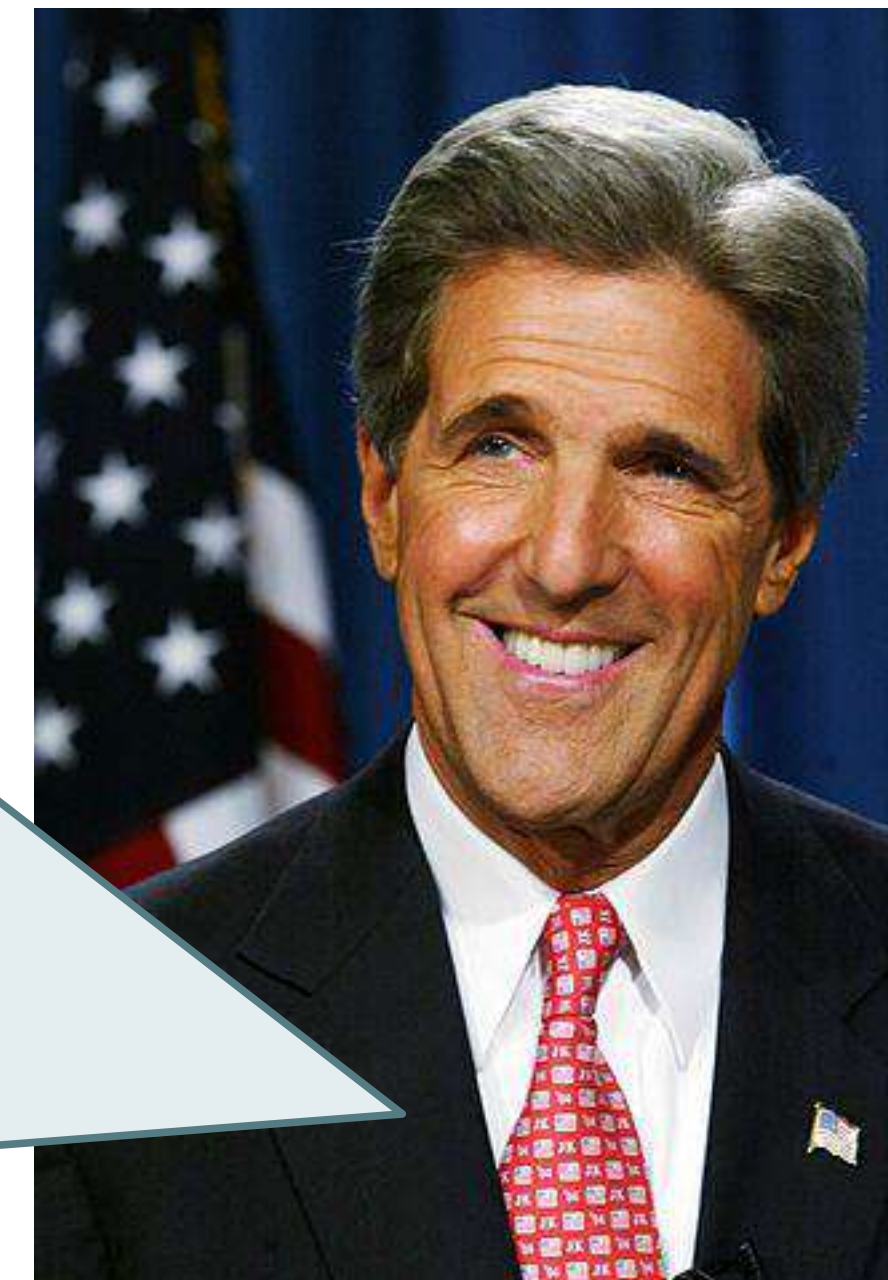
I was at a forum with Michael J. Fox the other day in New Hampshire, who's suffering from Parkinson's, and he wants us to do stem cell, embryonic stem cell.

And this fellow stood up, and he was quivering. His whole body was shaking from the nerve disease, the muscular disease that he had.

And he said to me and to the whole hall, **he said, "You know, don't take away my hope, because my hope is what keeps me going."**

Chris Reeve is a friend of mine. Chris Reeve exercises every single day to keep those muscles alive for the day when he believes he can walk again, and I want him to walk again.

I think we can save lives.



October 8, 2004

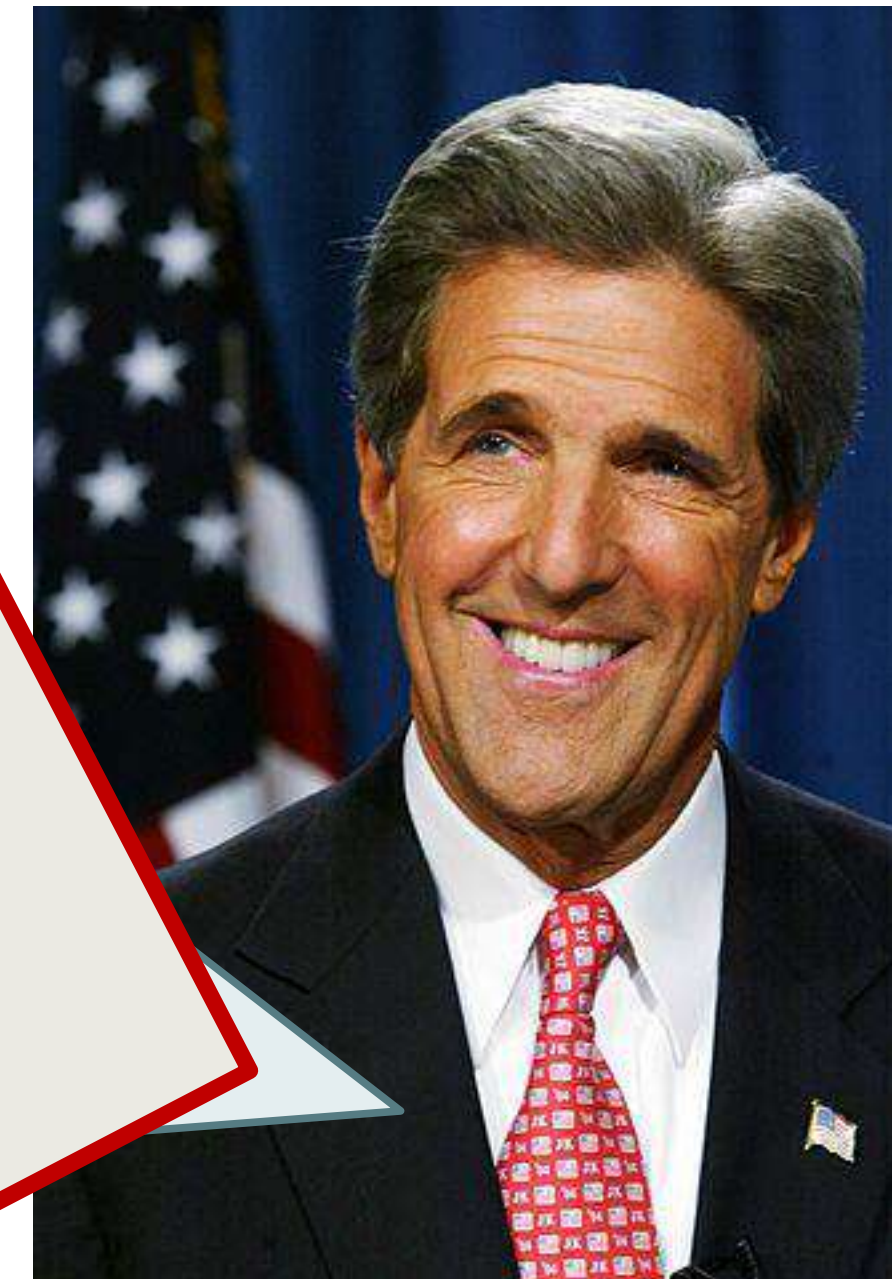
Fallacy detection in political debates

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**Appeal to emotion
Fallacy
"argumentum ad
passiones"**



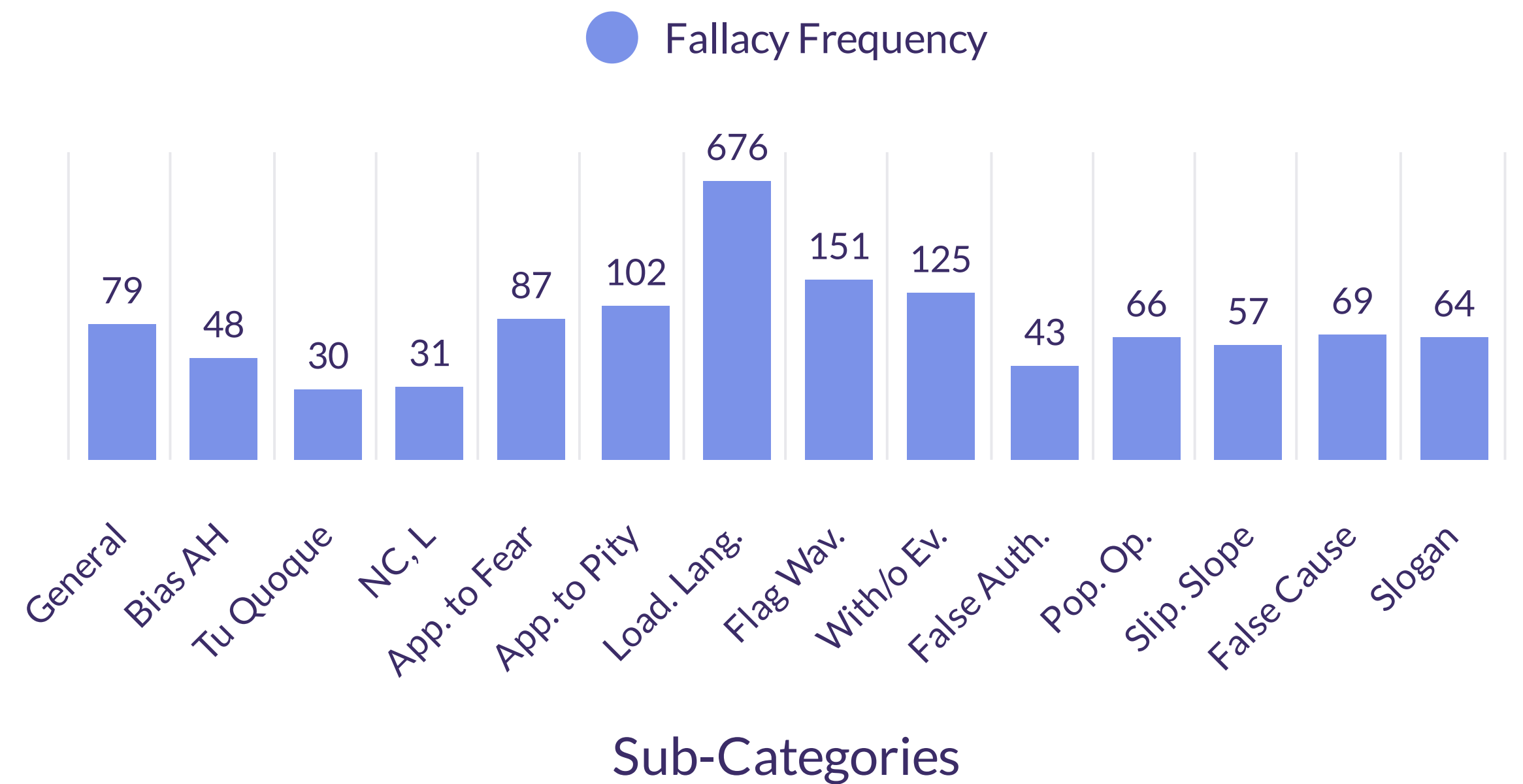
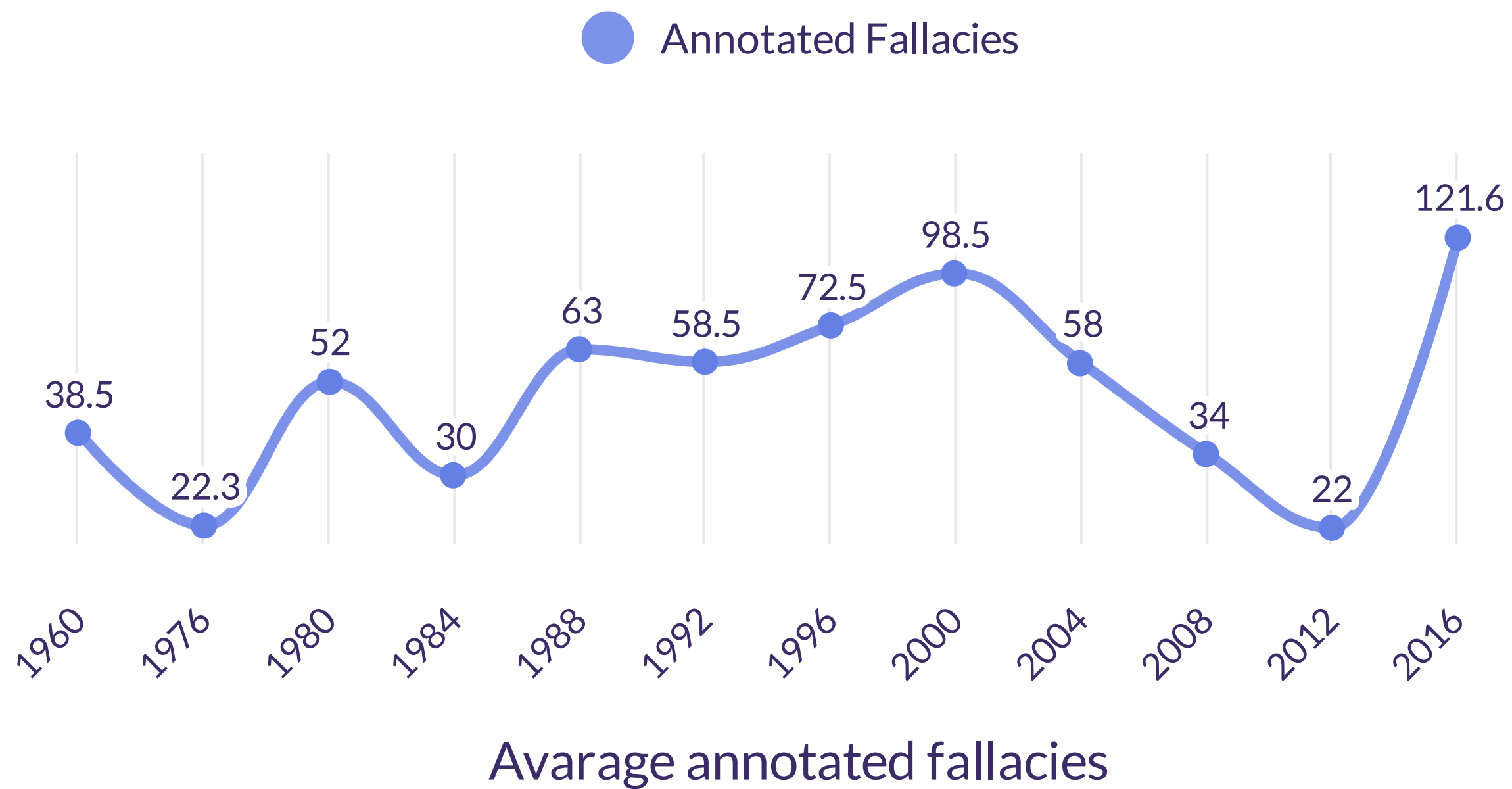
October 8, 2004

Adding another annotation layer

Fallacious arguments

- **Extension** of the *ElecDeb60To16* dataset that collects televised debates of the US presidential campaign debates from 1960 to 2016
 1. **Portion** of the debate containing the fallacious argument
 2. Fallacious argument **snippet**
- **Exploratory** study on the arguments put forward by the candidates in the *ElecDeb60To16* dataset
- Focus on **six** types of fallacies
 1. Ad Hominem
 2. Appeal to Emotion
 3. Appeal to Authority
 4. Slippery Slope
 5. False Cause
 6. Slogans
- Three fallacies are further divided into **sub-categories**

Statistics and data analysis



9 Sections from 5 different debates from different years were annotated

Observed Agr: Ad Hominem, 0.9961, App. to Auth. 0.9945, App to Emo. 0.9759, Slogans 0.9989
Krippendoff's α : Ad Hominem, 0.5315, App. to Auth. 0.5806, App to Emo. 0.4640, Slogans 0.5995

Fallacious Argument Classification

Task cast as a **sequence classification** problem

- **Multi-class** classification for fallacies
 - **BERT** and **RoBERTa** as baseline
 - **Longformer** and **TransformerXL** as advanced PLMs
- Classifier **enhancing** with argumentation-based features
 - Argument **components** (Premises, Claims)
 - Argument **relations** (Attack, Support, Equivalent)

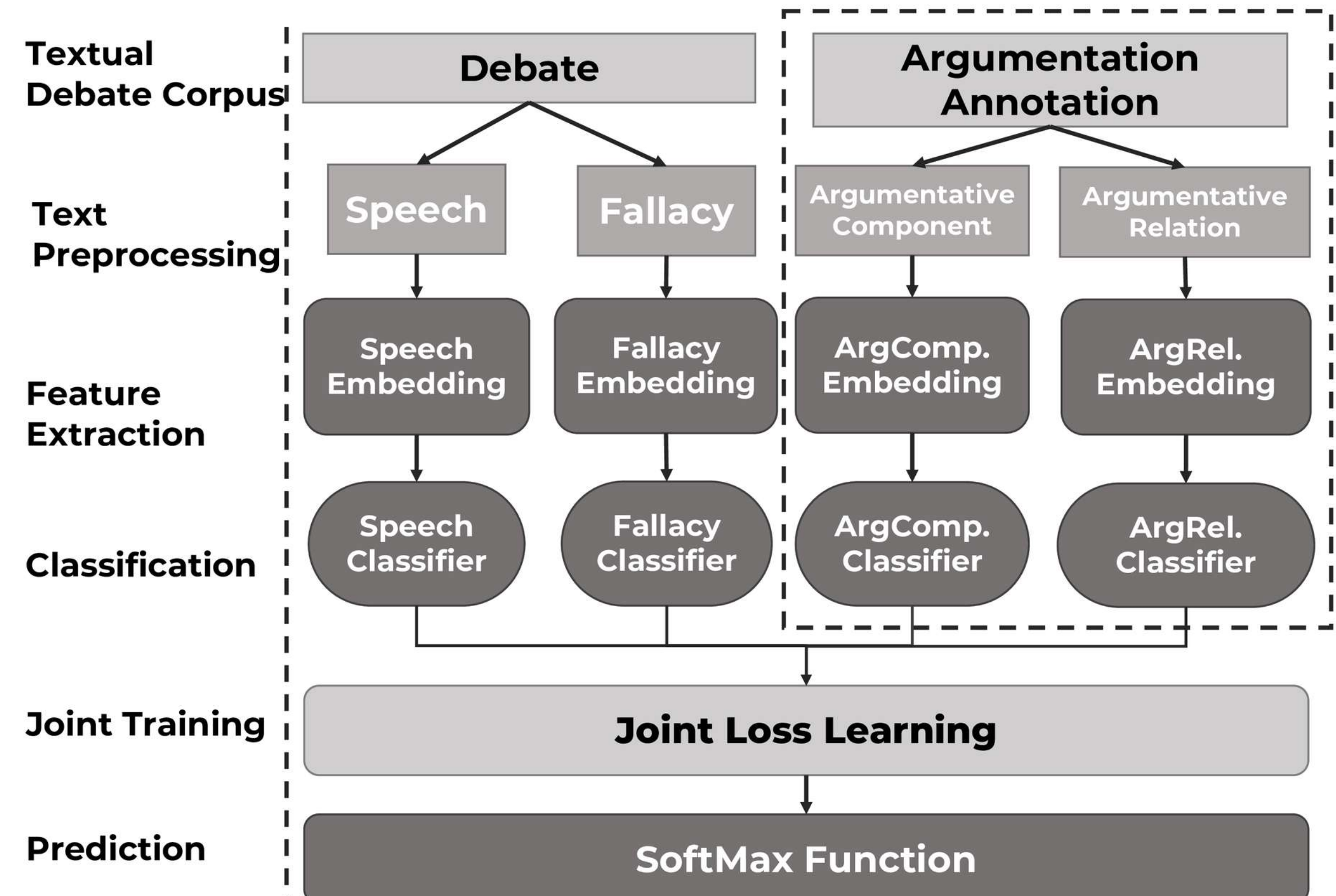


Proposed Architecture

Approach based on the **Longformer** model empowered with **argumentation features** and the **context** of the fallacious argument

Debate processed into four components

- **Dialogue context**
- Fallacious argument **snippet**
- Argumentative **component**
- Argumentative **relation**



Evaluation

Evaluation of the best model on the classification of **main categories** of fallacies, **sub-categories** and main categories with argument component and relation features in **ablation test setting**

Model	Dataset	Joint Loss	Arg. Features	Precision	Recall	Macro avg F1
BERT	Fallacy Main Cat.	No	None	0.62	0.55	0.55
RoBERTa	Fallacy Main Cat.	No	None	0.58	0.56	0.53
Longformer	Fallacy Main Cat.	No	None	0.64	0.60	0.57
Longformer	Fallacy Main Cat.	Yes	None	0.66	0.61	0.61
TransformerXL	Fallacy Main Cat.	No	None	0.61	0.45	0.47
TransformerXL	Fallacy Main Cat.	Yes	None	0.61	0.51	0.53
Longformer	Fallacy Sub-Cat.	Yes	None	0.44	0.45	0.43
Longformer	Fallacy Main Cat.	Yes	Comp. Labels	0.88	0.81	0.83
Longformer	Fallacy Main Cat.	Yes	Rel. Labels	0.87	0.81	0.83
Longformer	Fallacy Main Cat.	Yes	Comp. + Rel. Labels	0.84	0.81	0.84

Ablation Test

Based on multi-class classification setting to show the **impact** of the **argumentative features** on the classification of the main fallacious argument categories

	Original Dataset F1 Score	Arg. Components F1 Score	Arg. Relations F1 Score	Arg. Comp. & Rel. F1 Score
Ad Hominem	0.56	0.85	0.81	0.81
Appeal to Authority	0.65	0.85	0.84	0.91
Appeal to Emotion	0.85	0.93	0.93	0.94
False Cause	0.43	0.80	0.82	0.80
Slippery Slope	0.50	0.78	0.79	0.84
Slogans	0.67	0.76	0.88	0.77
<i>Accuracy</i>	0.75	0.88	0.89	0.89
<i>Macro AVG</i>	0.61	0.83	0.83	0.84
<i>Weighted AVG</i>	0.74	0.88	0.89	0.89

Conclusions

- The structure of (fallacious) arguments is sometimes **hard** to reconstruct (e.g., enthymemes)
- Importance of **common sense knowledge** or **specialised knowledge of the domain** (e.g., U.S. foreign politics)
- Fuzzy classes, single label vs. multi-label?
- Causal inference: how to identify and assess it?
- Investigate the connection between the argumentative **content** and the **context** of the fallacy.
- Almost every known type of fallacy is a close neighbour to **sound arguments** in a debate: how to generate sound arguments out of the identified fallacies?
- Investigate how to counter the **formal invalidity** of these fallacious arguments through newly generated counter-arguments remains a challenge!



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Thanks !