Mining Arguments in Presidential Campaign Debates

PM Mining Opinions & Arguments WiSe 21/22, Universität Potsdam

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Outline

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Project Motivation

“Yes, we can! Mining Arguments in 50 Years of US Presidential Campaign Debates”, 2019

Shohreh Haddadan, Elena Cabrio, Serena Villata

- Political debates offer a rare opportunity for citizens to compare the candidates’ **positions on the most controversial topics** of the campaign -> a natural application scenario for Argument Mining

Tasks

Task 1: Binary classification of all sentences, based on whether they contain an argument component or not

Task 2: Binary classification of sentences which contain an argument component, based on whether they contain a claim or a premise

Data

- Dataset USElecDeb60To16 v.01
- 39 debate transcripts from years **1960 to 2016**
- Parts of texts are annotated as either **claims or premises**

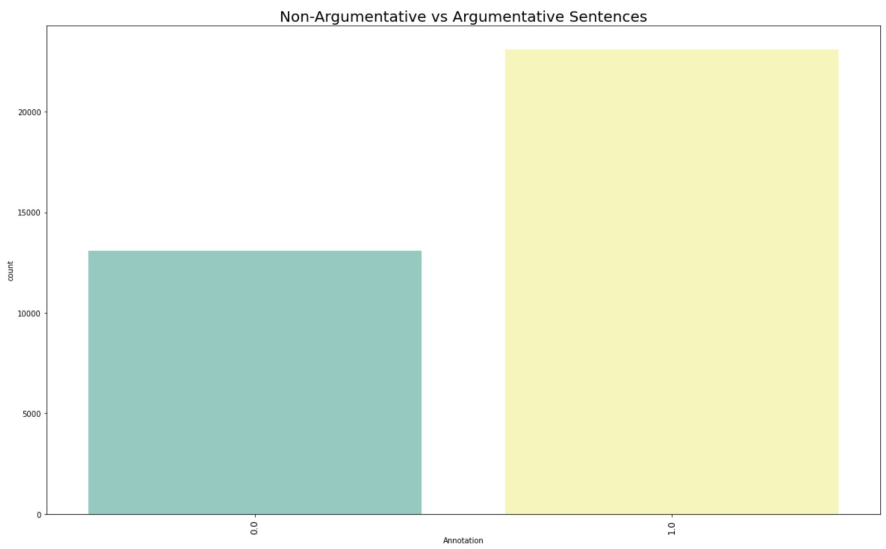
- Annotation was carried out by three experts based on the pre-defined guidelines. Each transcript was independently annotated by at least 2 annotators

- Classification on a sentence level
  - When a sentence contains both a premise and a claim, the length of the longest component determines the label for the sentence (cumulative character count)

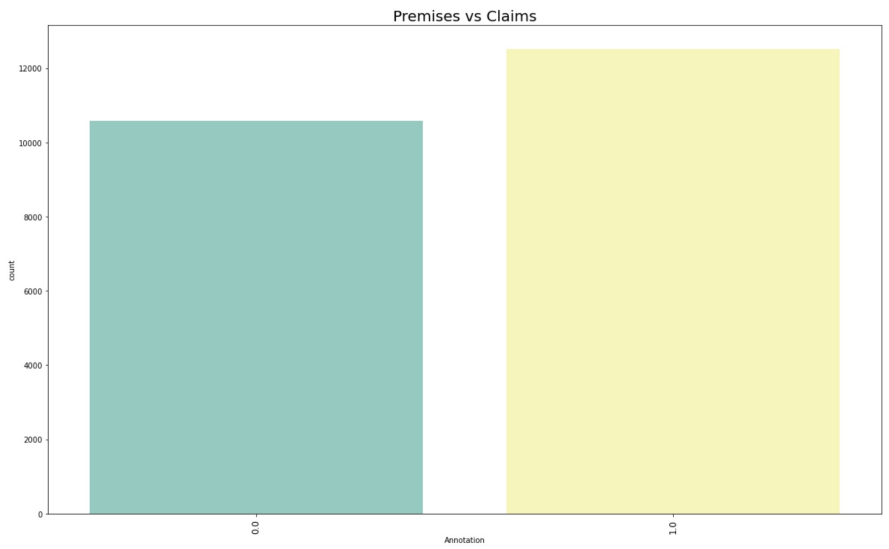
https://github.com/ElecDeb60To16/Dataset

Corpus Statistics

Task 1



Task 2



Total, sent	Non-Arguments, sent	Arguments, sent	Premises, sent	Claims, sent
36.201	13.089	23.112	10.526	12.528

Claims and Premises

- **Claims**

"A claim is a statement that the debater needs to justify by providing evidences to support it. Claims are statements which are not necessarily true but need investigation to be proven"

- **Premises**

"Premises are assertions made by the debaters for supporting their claims (i.e., reasons or justifications)"

In the examples, claims are marked in **red bold**, premises in *blue Italics* and the component boundaries by [square brackets].

Claims

- *"Claims can be a policy advocated by a party or a candidate to be undertaken which needs to be justified in order to be accepted by the audience"*

- G. Bush: Over 60 nations involved with disrupting the trans-shipment of information and/or weapons of mass destruction materials. And [**we've been effective**]. *[We busted the A.Q. Khan network. This was a proliferator out of Pakistan that was selling secrets to places like North Korea and Libya]. [We convinced Libya to disarm].*

- George Bush is defending the decisions taken by his administration by claiming that his policy has been effective

In the examples, claims are marked in **red bold**, premises in *blue Italics* and the component boundaries by [square brackets].

Claims

- *"Provide judgments about the other candidate or parties"*
  - R. 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**].

In the examples, claims are marked in **red bold**, premises in *blue Italics* and the component boundaries by [square brackets].

Claims

- *"Taking a stance towards a controversial subject, or an opinion towards a specific issue"*

  - R. 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****]***.

In the examples, claims are marked in **red bold**, premises in *blue Italics* and the component boundaries by [square brackets].

Premises

- *"A type of premise commonly used by candidates is referring to past experience."*
  - J. Cartner: ***[****Well among my other experiences in the past, I've - I've been a nuclear engineer, and did graduate work in this field****]***. **[I think I know the - the uh capabilities and limitations of atomic power].**

In the examples, claims are marked in **red bold**, premises in *blue Italics* and the component boundaries by [square brackets].

Premises

- *"Statistics are very commonly used as evidence to justify the claims"*

  - B. Clinton: ***[****We have ten and a half million more jobs, a faster job growth rate than under any Republican administration since the 1920s****]. [****Wages are going up for the first time in a decade****]. [****We have record numbers of new small businesses****]. [****We have the biggest drop in the number of people in poverty in 27 years****]. [****All groups of people are growing****]. [****We had the biggest drop in income inequality in 27 years in 1995****]. [****The average family's income has gone up over $1600 just since our economic plan passed****]*. So [**I think it's clear that we're better off than we were four years ago**].

Methodology

For each of the two tasks, the authors used:

- Bag of Words + linear SVM
- Engineered Features + rbf SVM
- FastText embeddings + LSTM
- Engineered Features + FFNN

- Engineered Features are: tf-idf for each word, n-grams (bi- and tri-grams), NER, POS for adverbs and adjectives, tenses for verbs, syntactic features, discource connectives, polarity of a sentence

Preliminary Results

Model	Our Result, f1-score	Authors' , f1-score
Majority Baseline	Task 1 average **0.55** Task 2 average **0.35**	Task 1 average **0.55** Task 2 average **0.35**
BoW + linear SVM	Task 1 Arg **0.8** Non-Arg **0.43** Average **0.67** Task 2 Claim **0.67** Premise **0.47** Average **0.58**	Task 1 Arg **0.86** Non-Arg **0.49** Average **0.73** Task 2 Claim **0.69** Premise **0.6** Average **0.64**
Engineered Features + rbf SVM		
FastText embeddings + LSTM		
Engineered Features + FFNN		

Preliminary Results

Preprocessing before Bag of Words model:

- Puntuation removal
- Lowercasing
- Lemmatization

- All combined and separetely
- No performance improvement on either tasks -> **preprocessing is not helpful for this problem/on our data**

Features: Preliminary Results

- **Tf-idf for each word** (using scikit-learn)
- **bi- and tri-grams** (using nltk)
- **NER** (using SpaCy)
- **POS for adverbs and adjectives** (using SpaCy)
- **Tenses for verbs** (using SpaCy)
- Syntactic features
- Discource connectives
- **Polarity of a sentence** (using vader)

Next Steps

- Completing the set of engineered features
- Integration of all features, feeding them into SVM
- Hyperparameter tuning
- FastText embeddings + LSTM
- Engineered Features + FFNN

- Possible extension after full replication: new features, other models

Related Materials

Literature

- Haddadan, S., Cabrio, E., & Villata, S. (2018). Annotation Guideline for Argumentation Structure in Political Debates Dataset, https://github.com/ElecDeb60To16/Dataset/blob/master/ElectDeb60To16_Guidelines.pdf
- Haddadan, S., Cabrio, E., & Villata, S. (2019). Yes, we can! Mining Arguments in 50 Years of US Presidential Campaign Debates. *ACL*.

Tools

- Honnibal, M., & Montani, I. (2017). *spaCy 2: Natural language understanding with Bloom embeddings, convolutional neural networks and incremental parsing*.
- Hutto, C.J. & Gilbert, E.E. (2014). VADER: A Parsimonious Rule-based Model for Sentiment Analysis of Social Media Text. Eighth International Conference on Weblogs and Social Media (ICWSM-14). Ann Arbor, MI, June 2014.