Finding Claims

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Finding Claims

Argumentation mining is not a single unified task but a constellation of subtasks.

One of this subtasks is the task of finding the claim statements made by the writer.

This can also be broken down into three subtasks :

1. **Classifying text** as argumentative vs. non-argumentative
2. **Segmenting text** into argumentative units
3. **Identifying claims**

1. Classifying Text as Argumentative

Document Level :

When dealing with traditional kind of documents the task of classifying text as argumentative can be reduced to **Genre-Classification**.

Karlgren and Cutting [1994] and Kessler et al. [1997]:

Work on the Brown Corpus with the goal of distinguishing different categories from each other. One Setting was Editorials vs. Reportage

Using document/sentence length type/token ratio punctuation symbols and frequencies of specific words they achieved accuracies of 83% and 61% for reports and editorials.

1. Classifying Text as Argumentative

Document Level :

Habernal and Gurevych [2017]:

Compiled a corpus consisting of a set of wikipedia articles on a predefined topic.

Annotators labeled 990 documents and achieved a Fleiss k of 0.59 this led to a set of 529 persuasive on topic documents.

Task: Distinguish between persuasive and non-persuasive documents

SVM-classifier using lexical n-gram features achieved an F-Score of 0.69

1. Classifying Text as Argumentative

Sub-Document Level:

Sentence-Level: Majority of research tries to decide if a span of text is argumentative or not taking sentences as the default unit.

Sub-Sentence-Level: Deciding the question if a span of text is argumentative or not on the sentence level is often a simplification, because a complex sentence may contain more than one component of an argument

2. Segmenting Text into Argumentative Units

Segmenting text into units, that can later be identified to play a certain role in the argumentation, is a difficult task and is often circumvented by taking sentences as the default units.

Using sentences as default units has two consequences:

- Argumentative units smaller than a sentence can not be processed
- Argumentative units that consist out of more sentences are difficult to process

2. Segmenting Text into Argumentative Units

Human Annotation: Assign the task of demarcating argumentative minimal units, without setting any restrictions on pre-defined unit candidates, to humans and later try to reproduce it by automatic means.

Computation: Divide text into minimal argumentative units automatically, for instance use a syntax parser to supply clauses which then serve as candidates for minimal units.

Observation: notion of argumentative minimal units is not the same across different corpora, high variance in the size of argumentative minimal units across different domains

3. Identifying Claims

Claim detection is the first of two indispensable tasks for an argumentation mining system.

Problem: Often claims are not explicitly stated but must be inferred by the reader

Research is focused on **identifying explicitly stated** claims.

3. Identifying Claims

Two families of methods that have been applied to claim detection :

1. **Classification**

2. **Sequence Labeling**

3. Identifying Claims

Classification :

Given a minimal unit of analysis it can be classified in different ways :

- **Binary Classification**: claim or no claim
- **Binary Classification**: claim or premise
- **Multi-Class Classification**: more types of arguments components are classified by a single classifier with the possibility of the class “none”, when a unit is not argumentative

3. Identifying Claims

Sequence Labeling :

Identification of arguments components is approached as an IOB-Labeling problem.

Words are tagged as B-premise, B-claim, I-premise, I-claim or O. (B: Begin, I: Inside, O: Outside, not part of claim or premise)

3. Identifying Claims

Identifying Claims in Legal Documents :

Hachey and Grover [2006]:

Annotation of 7 different rhetorical roles in sentences in judgements of the UK house of lords.

SVM achieved an F-Score of 0.6 using cue phrases, location, entities, sentence length, quotations and thematic words as features

Decision Tree Classifier achieved an F-Score of 0.65 only using positional features

3. Identifying Claims

Identifying Claims in Legal Documents :

Palau and Moens [2009]:

Distinguish between conclusions and supporting statements.

SVM model for premise/conclusion classification, that takes input sentences that already have been predicted to be argumentative

F-Score for premise and conclusion were 0.68 and 0.74

Features : syntactic, domain specific cues, token counts, position, contextual feature, with the prediction for the previous and following segment

3. Identifying Claims

Identifying Claims in Legal Documents :

Rooney et al. [2012]:

SVM sequence kernel classifier, kernel compares subsequences of sentences, where a word is tagged with its root form and a PoS label

Araucaria DB dataset, 1299 premises, 304 claims, 161 premise and claim, 1686 none

Overall accuracy 0.65, accuracy for claims only around 0.3

3. Identifying Claims

Identifying Claims in Instructional Text :

Instructions include advice and warnings, which are backed up with an explanation.

Claim -> Advice/Warning, Supporting Statement -> Explanation

Saint-Dizier [2012]:

Manually constructed rules, that exploit linear order of the statements and a set of common lexical patterns.

Accuracy for Advice were 79%/84% and for Warnings 88%/91% (Claim/Support)

3. Identifying Claims

Identifying Claims in Student Essays :

Falakmasir et al. [2014]:

432 essays with 8 different topics, human annotators labeled sentences that were candidate **thesis** or **conclusion** statements

Goal was to identify the most predictive features.

Positional features, features based on syntactic/semantic analysis, a set of frequent words and essay level features were most useful

3-Way Classification: Decision-Tree achieved F-Score 0.83 for Thesis and 0.59 for conclusion

3. Identifying Claims

Identifying Claims in Student Essays :

Stab and Gurevych [2014a]:

Essay has one **major claim** and arguments related to the major claim, which consist out of **claims** and **premises**.

Persuasive Essay Corpus: 90 Major Claims, 429 Claims

Four-Way-Classifier: Structural-, Lexical-, Syntactic-Features but also cues and attributes of preceding and following sentences

SVM performed best: F-Score of 0.63 (major claim), 0.54 (claim), 0.83 (premise) and 0.88 (non-argumentative)

3. Identifying Claims

Identifying Claims in Wikipedia :

Aharoni et al. and Levy et al. [2014]:

IBM Debater: System that searches web pages for arguments given a topic

-> Claim detection is dependent on predefined topic

Dataset on the basis of 32 debates with 326 relevant wikipedia articles was constructed, annotators labeled 976 topic related claims (kappa = 0.39)

Pipeline out of 3 modules.

3. Identifying Claims

1. **Module:** Identifies sentences that contain a claim, passes 200 top scoring sentences to the next module
2. **Module:** Generates the 10 best candidate sub-sentences using a maximum likelihood model
3. **Module:** Ranks the identified claims for all the sentences

3. Identifying Claims

Identifying Claims in Social-Media and User-Generated Web Text :

Kwon et al. [2007]:

Detecting claims in a corpus of user comments on a proposed legislation.

Boosting algorithm beat an SVM and achieved an agreement with an human annotator of k = 0.55

3. Identifying Claims

Identifying Claims in Social-Media and User-Generated Web Text :

Rosenthal and McKeown [2012]:

Claim detection in LiveJournal weblogs and Wikipedia discussion pages

- Human annotators labeled 2000 sentences as claims k=0.50 for 663 LiveJournal sentences and k=0.56 for 997 Wikipedia sentences
- Focused on the influence of sentiment- vs. committed-belief-features
- Found out that committed-belief-features are more predictive for wikipedia discussions, sentiment features are more predictive for LiveJournal

3. Identifying Claims

Identifying Claims in Social-Media and User-Generated Web Text :

Habernal and Gurevych [2017]:

Work on **Web Discourse Corpus** with the goal of identifying backing, claim, premise, rebuttal and refutation.

11-class IOB-Tagging using an SVM.

Features: Lexical, Structure and Syntax, Topic and Sentiment, Semantics and Discourse and Embeddings

Achieved **F-Score of 0.25** (Human annotator achieved 0.6)

4. Summary

Relatively broad range of statements are treated as claims in different text types and genres.

In some genres there is a strong position-in-document tendency that can be exploited.

If a sentence is a claim is strongly dependent on the context of a sentence.

Most commonly used algorithms are SVMs and Decision Trees.