Representing Online Debates in the Context of E-Journalism

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Her interests lie mainly in the broad area of computational argumentation, knowledge and argument-aware representation, reasoning and management using Semantic Web technologies.

Publications


Aims and contributions of our work

➢ In our paper, we aimed at:
  ○ Offering the means for online opinions to be structured and linked semantically.
  ○ Developing an Argumentation-based ontology, called ONTO4JARGs.

➢ Contributions of our study:
  ○ Basic research (e.g., Greek news articles and sources).
  ○ Software solutions to aid argumentative needs of a user.
  ○ Assist the professional journalist understand arguments in real-context of deliberation.
AIF - Argument Interchange Format

➢ History
  ○ Proposed in 2006 as a representation tool.
  ○ A state-of-the-art ontology for representing arguments and their relationships.
  ○ Has been used in the Argument Web idea (mainly from Chris Reed and his team in Dundee).

➢ Objective
  ○ An abstract model, widely applicable.
  ○ Satisfaction of different argumentation needs.

➢ Versions
  ○ AIF: original in 2006, at least one extension (walton schemes in 2007).
  ○ AIF+: extended to support dialogues and dialogue histories.
Main concepts in AIF

➢ Types of Nodes
  o **I-Node**: is an “object” that holds the textual information of the nodes.
  o **S-Node**: is a “property” that can connect other S-Nodes directly.
  o **CA-Node**: defines conflicts applications among I-Node.
  o **RA-Node**: defines inference applications among I-Node.
  o **PA-Node**: defines preference applications between nodes.

➢ Type of Schemes
  o Patterns of reasoning schemes.
  o Used to represent the types of statements used in argumentation.
What is ONTO4JARGs ontology?

- **A data model**
  - An argumentation-based ontology used for argument representation.
  - Compatible with AIF.

- **Nodes**
  - AIF nodes (i.e., dark blue).
  - Other nodes (i.e., light blue).

- **Relations**
  - Node-to-node relations.
  - Node-to-literals relations.
Argumentative Discourse Units (ADUs)
- Represented through the I-Node.
- **Major Claim**: a major conclusion related to an article.
- **Claim**: a statement that can be inferred or follows as a conclusion within an argument.
- **Premise**: a statement that provide a reason for or against some claim.

Arguments
- Represented through the RA-Node.
- Consist of ADUs.

Contradictory arguments
- Consist of conflicted ADUs (i.e., conclusion), represented through the CA-Node.
Main concepts in ONTO4JARGs - Relations

➢ Relationships between ADUs
  ○ Used to determine relations between arguments.
  ○ Two types of relations i.e., attack (rebut, undercut), support (endorse, backing).

![Diagram of relationships between ADUs](image-url)
News article detection

➢ Objective
  ○ Detect and identify argumentative structures in articles.

➢ Article
  ○ Consists of arguments (i.e., RA-Node).
  ○ Contains a number of propositions (i.e. I-Node).
  ○ A list of metadata (i.e., identifier, content, datetime, title, etc).
  ○ A list of topics, tags and categories.
News article detection - Approach

➢ **Argument Mining**
  - Argument spans and relations are extracted with token and text attention-based classifiers.

➢ **Topic Extraction**
  - Enriching mining information with thematic topics conveyed in the article.
  - Identifying via sentence-based clustering and salient word extraction.

➢ **Cross-document Relation Extraction**
  - Identifying similar argumentative components across different documents.
Creating structured arguments

➢ Three different cases (A, B, C)
  ○ Depending on the type of relation (i.e., sup / att) between the ADUs (i.e., major claim, claim, premise).
  ○ Identify supportive and attacking arguments.

Case (A)

```
  c
 / \
<table>
<thead>
<tr>
<th>sup</th>
</tr>
</thead>
<tbody>
<tr>
<td>sup</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>sup</td>
</tr>
</tbody>
</table>
```

- a1 : < {p1, p2, p3}, c >

Case (B)

```
  c
 / \
<table>
<thead>
<tr>
<th>att</th>
</tr>
</thead>
<tbody>
<tr>
<td>att</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>att</td>
</tr>
</tbody>
</table>
```

- a2 : < {p1, p2, p3}, ¬c >

- a3 : < {p1}, c >
- a4 : < {p2, p3}, ¬c >

Legend

- Blue: Premises
- Red: Conclusion (Claim or Major Claim)
Entity detection and linking

- Enrich arguments with links to external sources from a variety of datasets from Linked Open Data (i.e., DBpedia, Wikipedia, etc).
- Assess article’s quality and trustworthiness.
- Identify relevant real-world events (i.e., named entities) per each individual I-node.
- Associate them with external sources using links to related articles.
Entity detection and linking - Example

I-node: “Stop the procedures for a new airport in Kastelli, Crete.”

Named entities
i.e., representing real-world events

https://el.wikipedia.org/wiki.airport
http://el.dbpedia.org/page/Kastelli
Quantitatively characterising arguments

➢ **Argument Evaluation**
  - Employ a scoring mechanism (i.e., sm-DiCE).
  - Assess arguments along various dimensions (i.e., relevance, informativeness, etc).
  - Consider relations between arguments, and votes placed on arguments.

➢ **Votes**
  - **Positive vote**: the user agrees fully with the content of the argument.
  - **Negative vote**: the user needs to specify the reasons that he disagrees.
User - related information

User interaction

➢ Vote on arguments.
➢ Mark an article as favorite, for easy access in the future.
➢ Manage and organise a list of personal preferences.
➢ Ingest a new article for enriching the database with new documents.
Conclusion and future work

Conclusion:
➢ An argumentation-based model (called ONTO4JARGs) used to store real arguments.
➢ Identification of arguments (and their constituents) in the text.
➢ Evaluated and linked arguments with external data sources.

Future work:
➢ Use this ontology in different scenarios and domains where argumentative information is relevant.
➢ Perform more evaluations with large datasets of news articles and arguments.
➢ Extend this approach to be applicable to other languages.

Ontology Visualization via the WebVOWL link:
➢ https://isl.ics.forth.gr/debatelab_ontology/