Representing Online Debates in the Context of E-Journalism

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Short Bio

Elisjana Ymeralli received her master's degree in Computer Science from the University of Computer Science Department, Greece 2017. She is currently working as a Research & Development (R&D) Engineer and she is involved in all stages of design and development cycle of National and European projects.

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

Publications

[1]. **E.Ymeralli** , G.Flouris, T.Patkos, and D.Plexousakis. APOPSIS: A Web-based Platform for the Analysis of Structured Dialogues. ODBASE-17: In OTM Confederated International Conferences" On the Move to Meaningful Internet Systems" (pp. 224-241). 2017.

[2]. I.Chrysakis, G.Flouris, G.Ioannidis, M.Makridaki, T.Patkos, Y.Roussakis, G.Samaritakis, A.Stan, N.Tsabanaki, E.Tzortzakakis, and **E.Ymeralli**. Evaluating the Data Privacy of Mobile Applications Through Crowdsourcing. In proceedings of the 33rd International Conference on Legal Knowledge and Information Systems (JURIX 2020) (Vol. 334, pp. 219-222).

[3]. Y.Roussakis, G. Flouris, D. Zografistou, and **E.Ymeralli**. Extending the ArgQL Specification. RuleML+RR'22: In proceeding of the 18th Reasoning Web Summer School (RW 2022) and 14th DecisionCAMP as part of Declarative AI. Berlin, Germany 2022.

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.

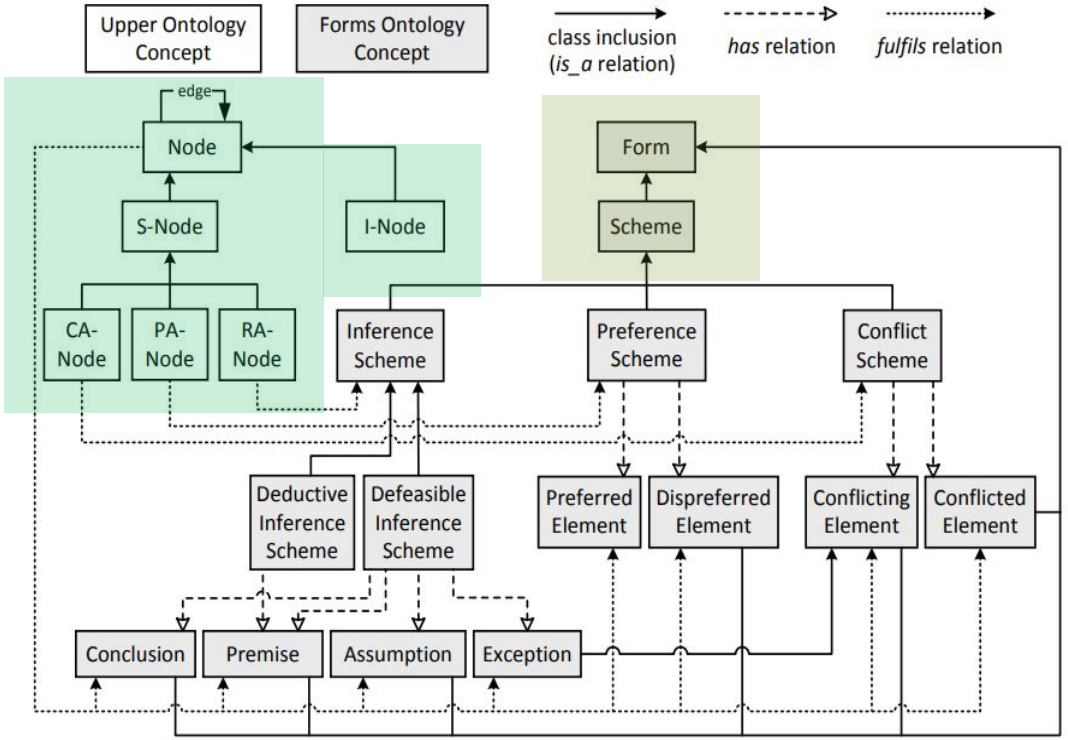
Main concepts in AIF

Types of Nodes

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

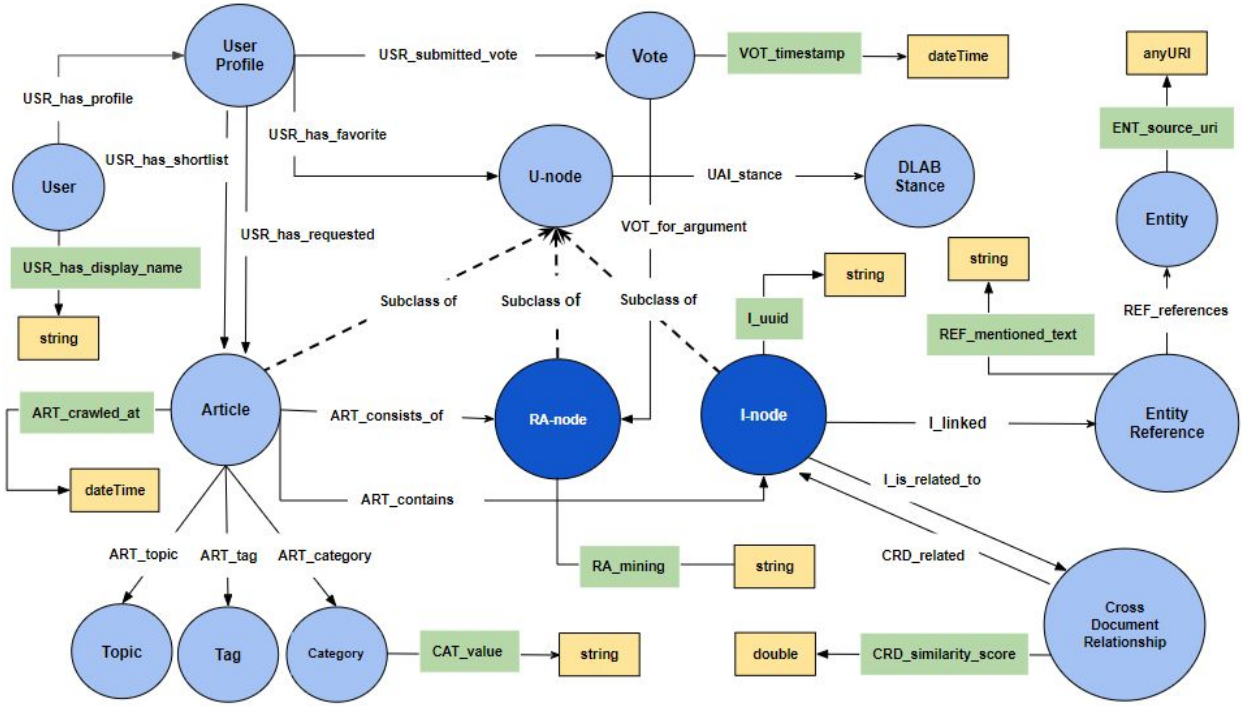
Type of Schemes

- Patterns of reasoning schemes.
- Used to represent the types of statements used in argumentation.



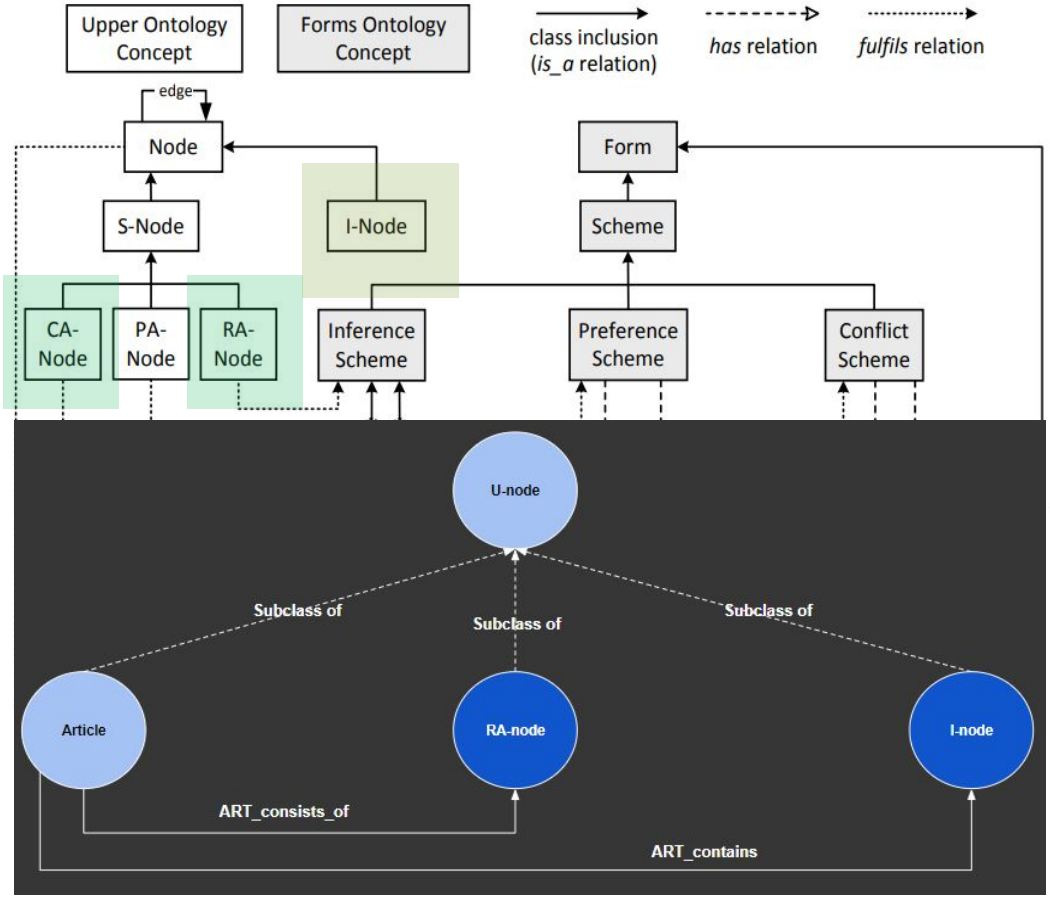
What is ONTO4JARGs ontology ?

- 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.



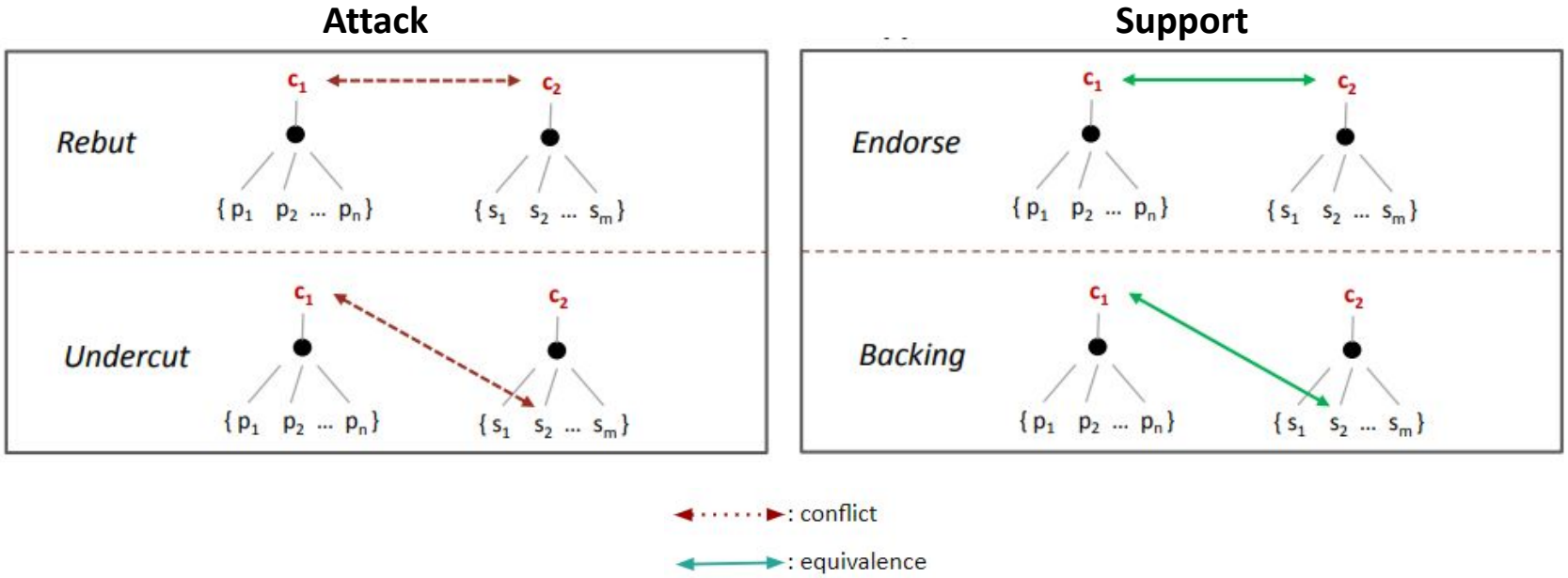
Main concepts in ONTO4JARGs - Nodes

- **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.



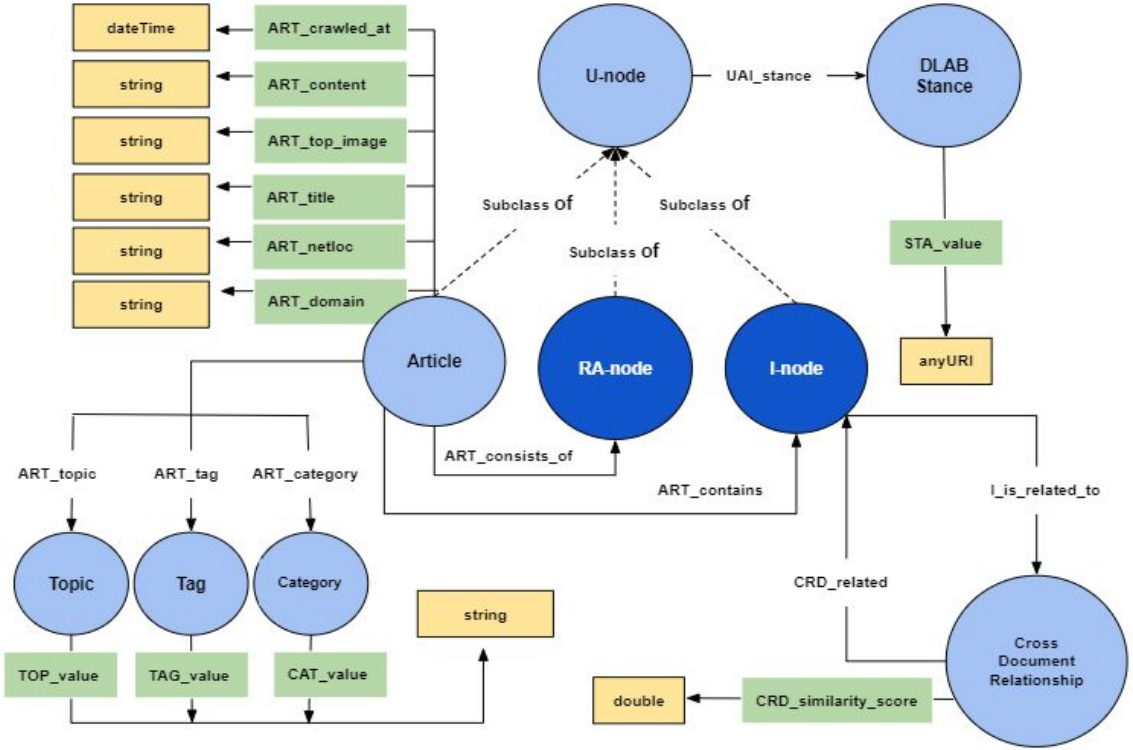
Main concepts in ONTO4JARGs - Relations

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



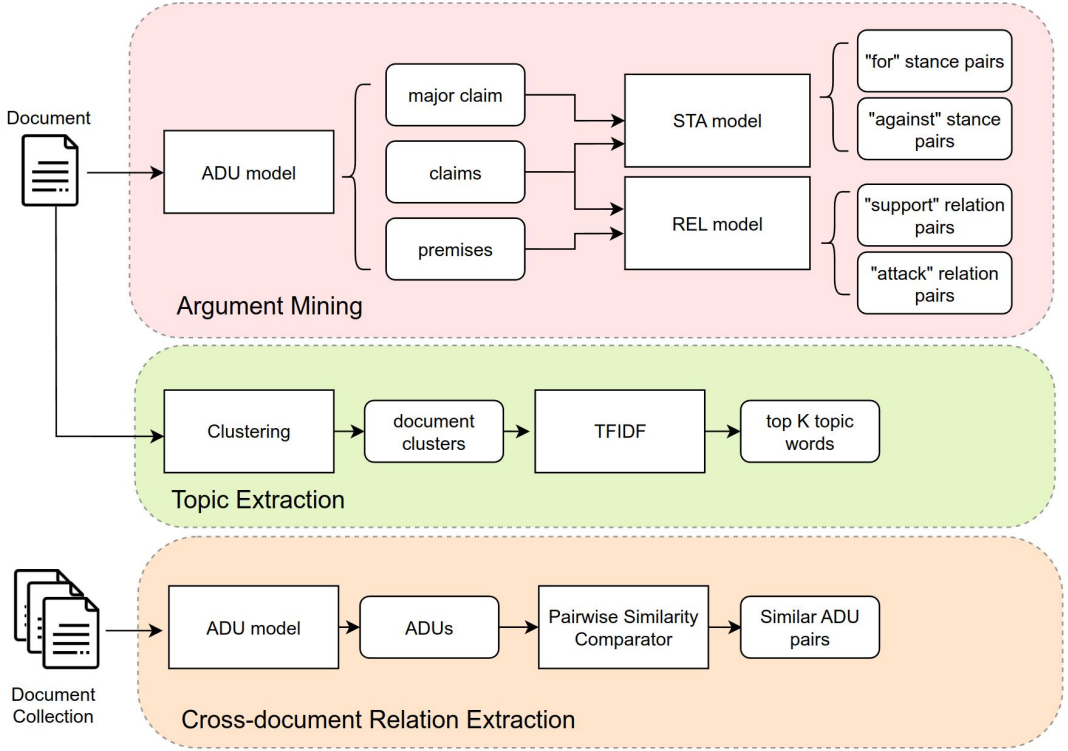
News article detection

- **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.



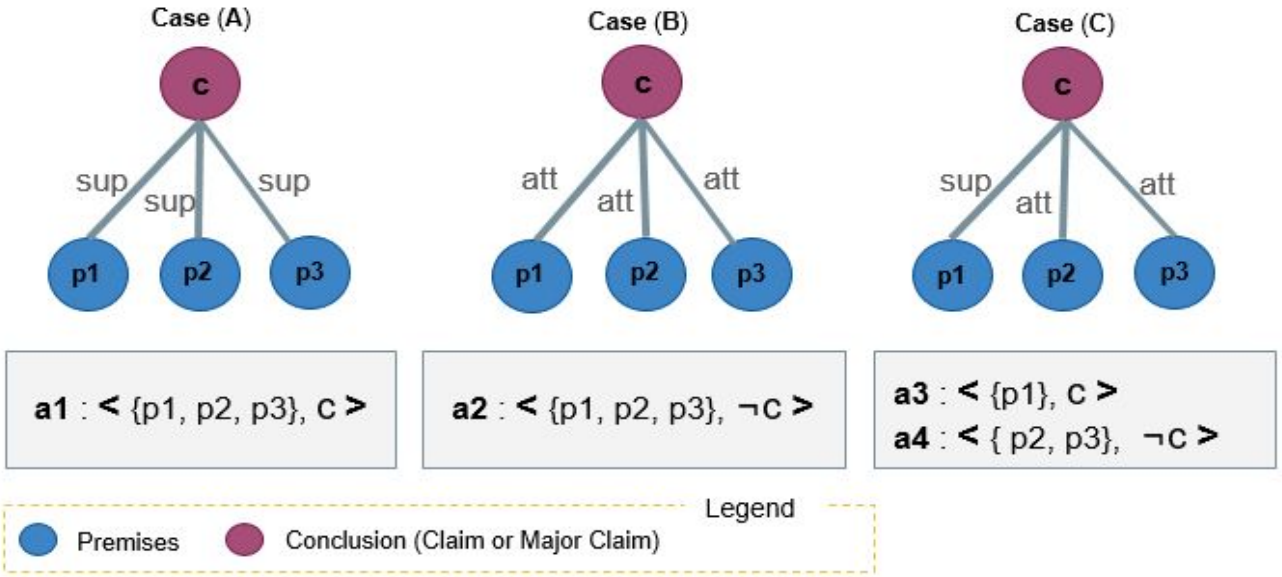
News article detection - Approach

- **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.



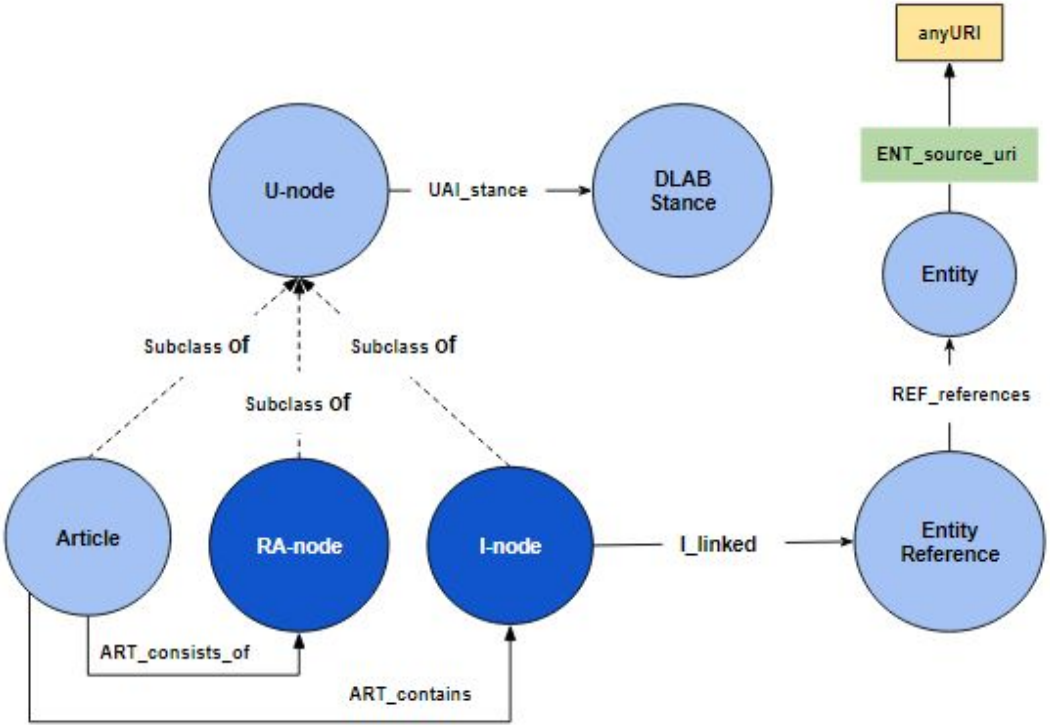
Creating structured arguments

- 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.



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

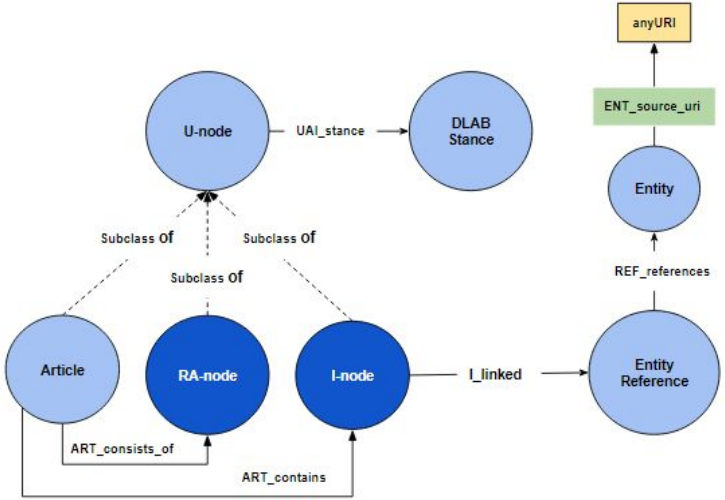
Named entities

i.e., representing real-world events

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

https://el.wikipedia.org/wiki/airport

http://el.dbpedia.org/page/Kastelli



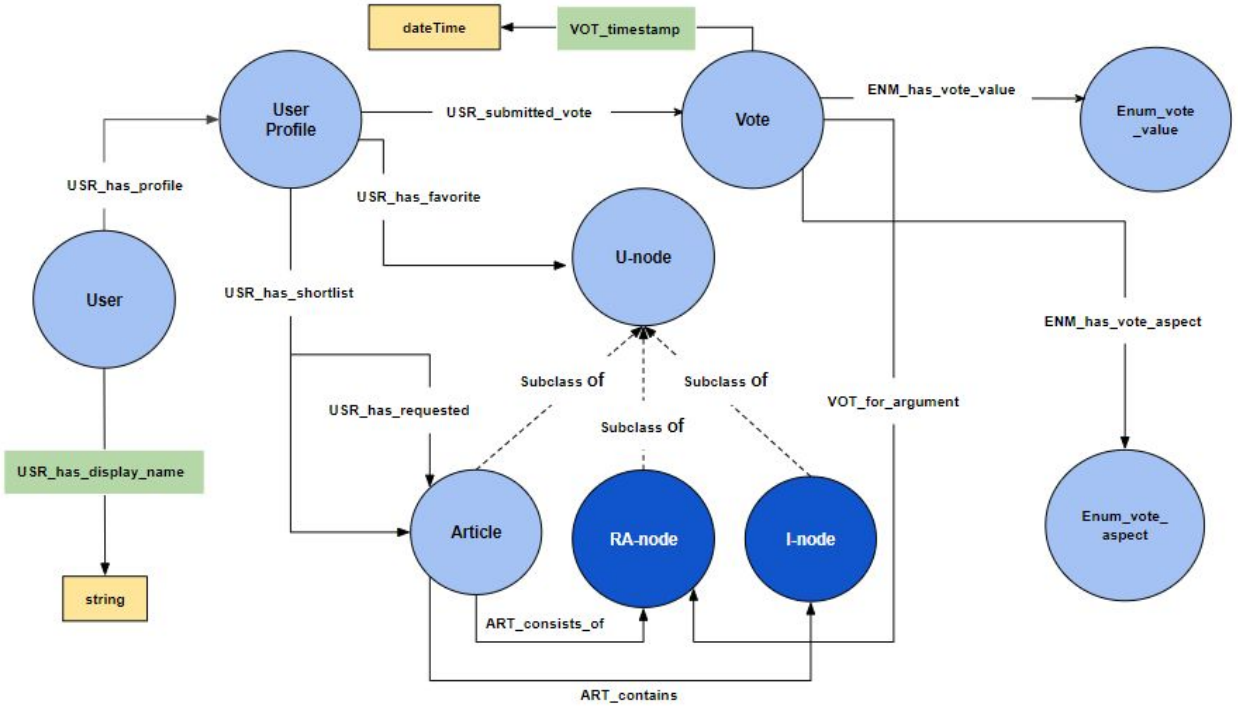
Quantitatively characterising arguments

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

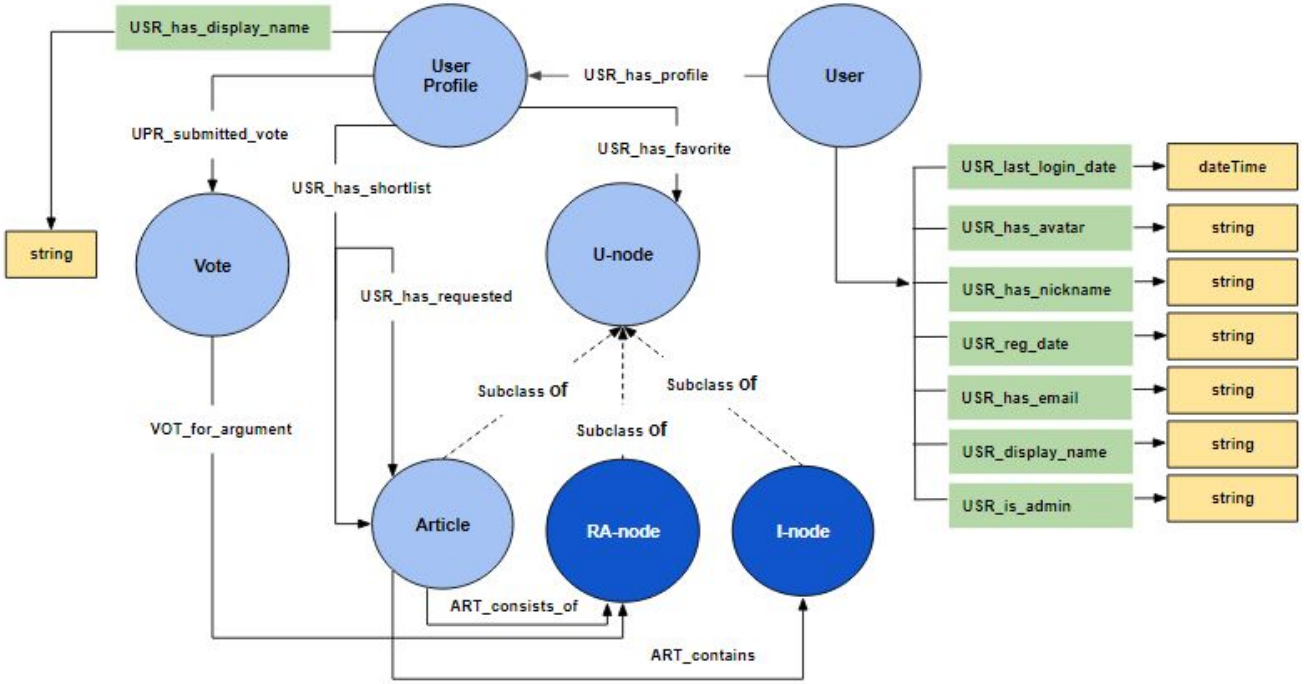
- **Positive vote:** the user agrees fully with the content of the argument.
- **Negative vote:** the user needs to specify the reasons that he disagrees.



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/