Analyzing the interactions between spaces of argumentation in different contexts

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Overview

1. School Curriculum

2. Internship : Multiagent Dynamics of Gradual Argumentation Semantics
   - Abstract Argumentation
   - Our Protocol
   - Gradual Semantics

3. PhD Project : Analyzing the interactions between spaces of argumentation in different contexts

School Curriculum

School Curriculum

- **Master of Computer Science - Artificial Intelligence**
  CentraleSupélec
  with Vincent Mousseau and Annaëlle Wilczynski
- **Internship - Multiagent Dynamics of Gradual Argumentation Semantics**
  Lip6, Sorbonne Université
  with Nicolas Maudet and Elise Bonzon (LIPADE)
- **PhD - Analyzing the interactions between spaces of argumentation in different contexts**
  Lamsade, Université Paris Dauphine
  with Gabriella Pigozzi and Juliette Rouchier

Internship : Multiagent Dynamics of Gradual Argumentation Semantics

Abstract Argumentation Theory [1]

- Arguments are abstract: no content is analyzed.
- Arguments are nodes of a graph, attack relations are edges.
- For an argument of the graph, we can define direct attackers.

(A) Diesel cars should be banned from in the city centre
(B) Artisans cannot change their vehicles
(C) The city can offer financial assistance to artisans
(D) Autonomy of electric cars is poor, as there are not enough charging stations around
(E) The city can set up more charging stations
(F) The city should not spend additional money
(G) Health and climate change issues are important

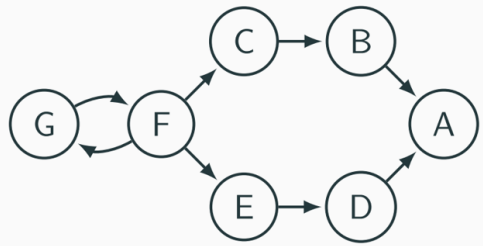


Figure: An example of Argumentation Graph built from a discussion.

[1] Dung, P. M. (1995). On the acceptability of arguments and its fundamental role in nonmonotonic reasoning, logic programming and n-person games. Artificial intelligence, 77(2), 321-357.

Gradual Semantics

- Formal methods to assess the acceptability of arguments.
- Gradual (or scoring) semantics : recent, quantitative way to assess arguments.

Definition

The **weighted h-categorizer** [a] is defined as:

$$Hbs(a) = \frac{w(a)}{1 + \sum_{b \in Att(a)} Hbs(b)}$$

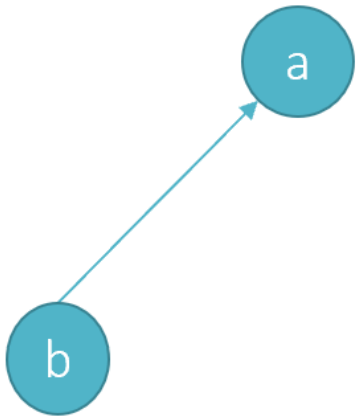
[a] Amgoud, L., Ben-Naim, J., Doder, D., Vesic, S. (2017, August). Acceptability semantics for weighted argumentation frameworks. In Twenty-Sixth International Joint Conference on Artificial Intelligence.

H-Categorizer

$$Hbs(a) = w(a) = 1$$

H-Categorizer

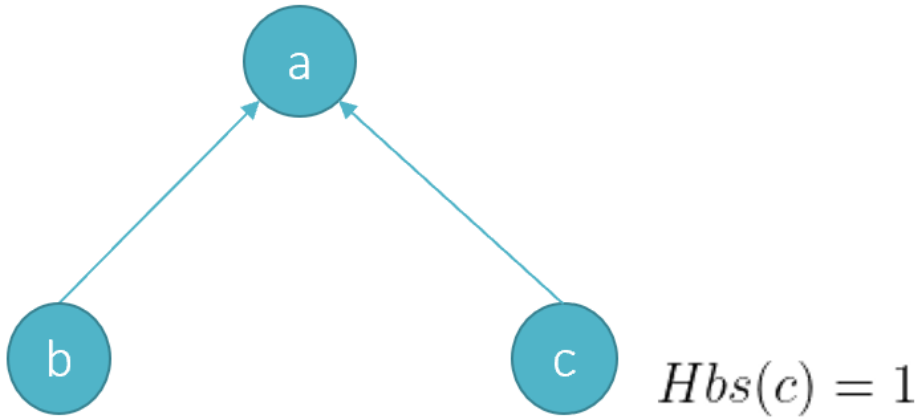
$$Hbs(a) = \frac{w(a)}{1 + Hbs(b)} = \frac{1}{2}$$



$$Hbs(b) = w(b) = 1$$

H-Categorizer

$$Hbs(a) = \frac{w(a)}{1 + Hbs(b) + Hbs(c)} = \frac{1}{3}$$

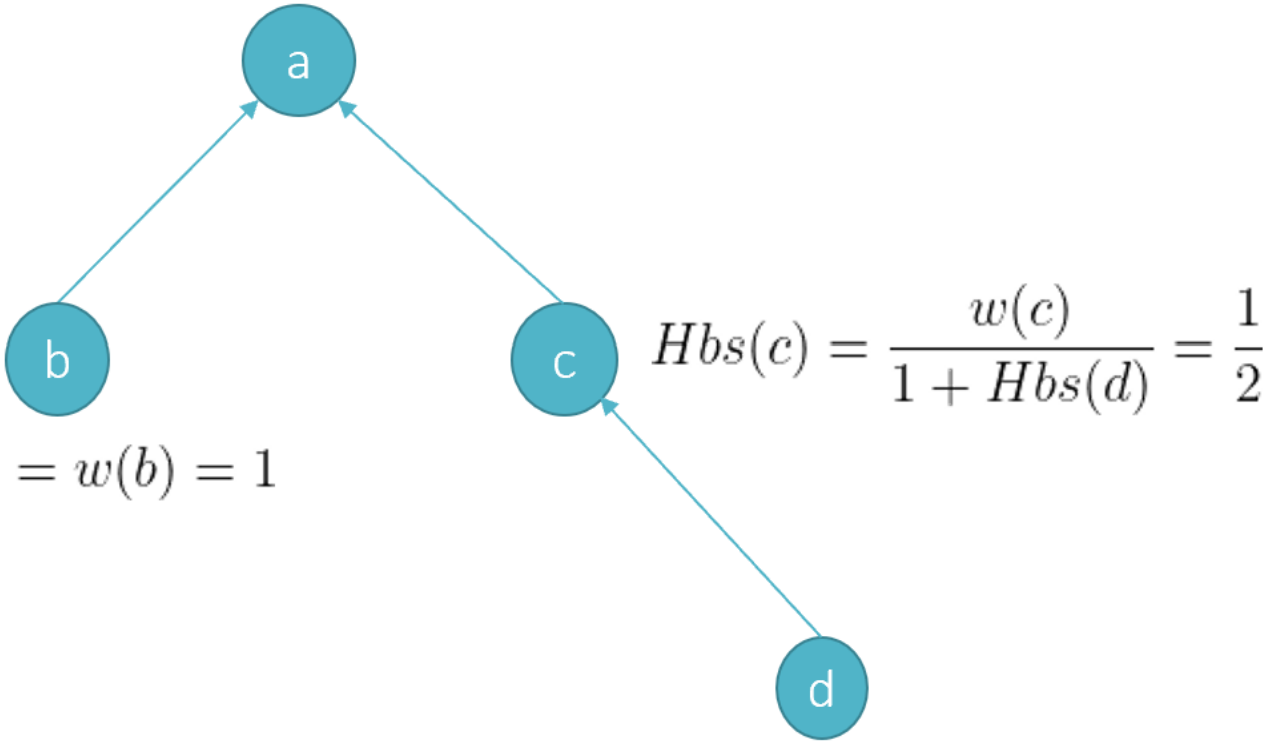


$Hbs(c) = 1$

$Hbs(b) = w(b) = 1$

H-Categorizer

$$Hbs(a) = \frac{w(a)}{1 + Hbs(b) + Hbs(c)} = \frac{1}{1 + 1 + \frac{1}{2}} = 0.4$$



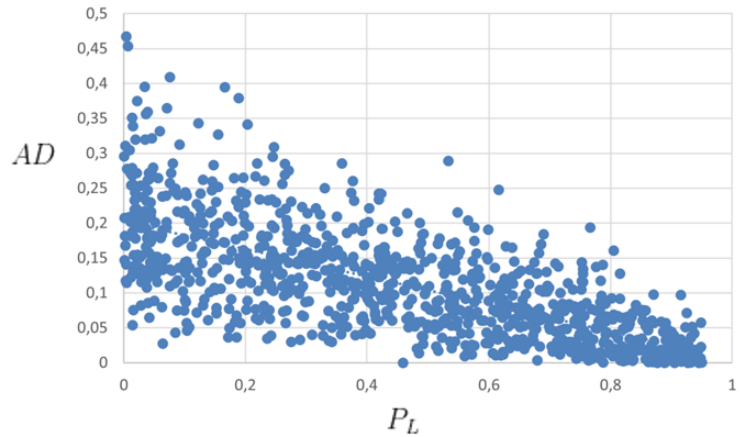
$$Hbs(b) = w(b) = 1$$

$$Hbs(c) = \frac{w(c)}{1 + Hbs(d)} = \frac{1}{2}$$

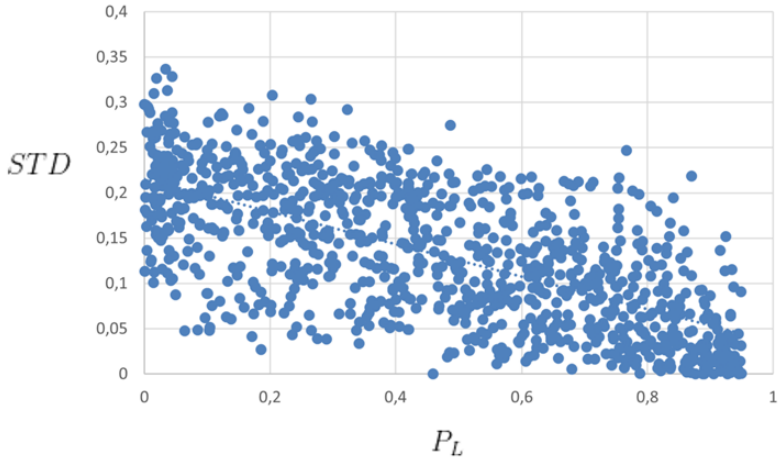
$$Hbs(d) = w(d) = 1$$

Our Protocol

- Each agent has an argument graph representing their knowledge/beliefs.
- Agents use the semantic to evaluate their opinion and the state of the debate.
- Agents can learn arguments.



H3 «Open Mind » : Average Dissatisfaction vs Learning Probability.



H6 « Convergence of Views » : Standard Deviation of agent's opinions vs Learning Probability.

PhD Project : Analyzing the interactions between spaces of argumentation in different contexts

Project Idea

The Covid crisis highlighted fundamental differences in the way the scientific world and the media treat argumentative discussions.

Can we formalize/model these differences using tools form Argumentation Theory ?

Possible Directions

- Study a particular debate : the HCQ debate in France.
- Modelize the types of arguments used in the media eg. Authority argument, sliding arguments...
- Network Epistemology Models [2]
- Not many epistemology models of the media !

[2] O'Connor, C., Weatherall, J. O. (2020). False beliefs and the social structure of science: some models and case studies. Groupthink in science, 37-48.