Resolution and Consistency in Dialogical Reasoning

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The system of argumentation we have implemented, models the dynamics of epistemic states, as depicted in P. Gardenfors' *Knowledge in Flux*. He described three types of epistemic states: expansion, revision and contraction. He modelled the relation between the agent and the epistemic states, and used a three- value logic:

1. A sentence may be accepted in the belief set;
2. A sentence may be rejected;
3. The attitude is ambiguous.

The model of attitudes depicted in *Knowledge in Flux* is in the domain of argumentation.

This has been shown by the function of the Expert System of Argumentation.

In pursuance of Professor C. Popa's view, we define an argumentation system as a structure of the type:

SAarg = < Sit, X, Kf, Kr, C, T, f, g, Dec, Cali, Sc >

The semantics of this argumentation system is:

1. Sit represents the operational state
2. X represents the two agents (Ag1 and Ag2)
3. Kf represents the set of accepted clauses, knowledge facts
4. Kr represents the set of accepted rules, knowledge rules
5. f represents the set of the transition functions which inferences make use of
6. g represents the exit function
7. Dec represents the Supervisor of the system
8. Cali represents the set of values of the system
9. Sc represents the goal of the system
10. C represents the set of the argumentation thesis
11. T represents the set of reasons.

Supervisor is a complex system of organisation, management, resolution and decision.

We define the *inferential resolution machine* as an operational system, using a finite set of premises (Kf) and a finite set of rules (Kr), and generating a new set of consequences, to be added to Kf.

If the criterion is the exit function, then our classification of the inferential machine will be:

1. Mono -inferential
2. Polyinferential

The first type runs until a result is obtained, and then stops.

The second one runs until all the results are obtained, and then stops.

We name the second type as *Logic Machine*. *Logic Machine* is dedicated to the solution of consistency.

Operational Theorem for the Maximal Systems

The decision of consistency of the logic system is always correct if and only if the system is maximal

Supervisor also generates the sets of argumentation.

We define the set of *argumentations* as a subset of Kf or Kr, which attaches an owner.

In our system the owners are the two agents.

For any finite set of Kf and Kr we may create the set of our subsets.

8 subsets of argumentation, with classical signification, have been selected:

/A/ , the rules set of which owner is Ag1,

/B/, the rules set of which owner is Ag2,

[a], the set of clauses that is accepted for Ag1,

[b] the set of clauses that is accepted for Ag2,

{Aa} the set of results of /A/ and [a], which belongs to Ag1,

{Ba} the set of results of /B/ and [b],which belongs to Ag2,

{Ab} the set of results of /A/ (rules) which belongs to Ag1 with [b] (clauses) which belong to Ag2,

{Ba} the set of results of /B/ (rules) which belongs to Ag2 with [a] (clauses) which belong to Ag1.

For the whole set and for all these subsets, the Supervisor decides on consistency.

If no consistency is remarked, this is because an agent has accepted two sentences of type +p and -p, and Supervisor decides whether this agent is defeated or not.

REFERENCES

GARDENFORS, P., **Knowledge in Flux: Modelling the Dynamics of Episystemic States**, MASSACHUSSETTS INSTITUTE OF TECHNOLOGY, USA, 1988.

OANCEA, M., **Logic and Formal Structures**, PRINTECH PUBLISHING HOUSE, Bucharest, 1998 (in Romanian).

POPA, C., **Symbolic Logic and Knowledge Bases**, "Politehnica" University of Bucharest, 1998 (in Romanian).

VREESWIJK, G.A.W., **Abstract Argumentation Systems**, ARTIFICIAL INTELLIGENCE 90, Elsevier Science, 1997.