

Programa de Apoyo al Departamento de Graduados

Nombre del Curso:

Abstract Concepts in Argumentation

Temario básico:

Argumentation semantics: traditional and alternative semantics proposals

In argumentation theory, Dung's framework provides a general unifying view able to encompass most of the existing approaches to argumentation. This high level of generality is achieved by leaving unspecified the origin and the structure of arguments, and by modeling the interaction between them simply as a binary relation indicating that an argument attacks another one, making it possible to focus exclusively on semantics issues.

In the first part of the lecture, the semantics proposals that can be considered as traditional (including stable, grounded and preferred semantics), all of them relying on the notion of admissibility, will be briefly reviewed and the relevant properties will be examined. In particular, it will be pointed out by means of examples that preferred semantics, while able to overcome the limitations of the previously proposed grounded and stable semantics, gives rise to questionable results in some cases concerning cyclic attack relationships.

Motivated by the need of searching alternative proposals, in the second part of the lecture a general recursive schema, called SCC-recursive because based on a decomposition along the strongly connected components of the argumentation framework, will be introduced focusing on its underlying principles. It turns out that all Dung's admissibility-based semantics are SCC-recursive, and therefore a special case of the proposed schema. Moreover, the SCC-recursive schema supports in a rather straightforward way the definition of new semantics, since basic desirable properties of extensions can be easily guaranteed.

On these grounds, in the third part of the lecture a particular SCC-recursive semantics, called CF2, will be introduced and it will be shown by means of examples that it is able to overcome the limitations of preferred semantics previously pointed out.

Abstract principles for argumentation semantics evaluation and comparison

The variety of argumentation semantics proposed in the literature raises the issue of identifying and systematically applying general principles to evaluate and compare them. In fact, comparison and evaluation of argumentation semantics is often carried out in the literature by means of specific problematic examples that bring to light patently different behaviors exhibited by the semantics under discussion. However, as pointed out by several authors, this example-based analysis suffers from several significant

drawbacks, among them the fact that it relies on intuition concerning the "desired" outcome of the examples, on which there may not be a general agreement. To fill this gap, this lecture investigates the definition of some general example-independent criteria for evaluating and comparing extension-based argumentation semantics in the framework of Dung's theory.

In the first part, in order to complete the picture including non-traditional semantics, semi-stable, ideal and prudent semantics will be introduced, focusing on the underlying motivations.

In the second part of the lecture, a set of general criteria for semantics evaluation will be introduced by proposing a formal counterpart to several intuitive notions related to the concepts of maximality, defense, directionality, and skepticism. It will be shown how such criteria are met by several literature proposals, thus providing a principle-based systematic assessment of state-of-the-art approaches in argumentation semantics.

Finally, the third part of the lecture will be devoted to the issue (partially) ordering argumentation semantics with respect to their skepticism, according to different possible relations based on both a skeptical and a credulous perspective in the justification state of arguments.

Fundamentals of distributed defeat status computation

The role of argumentation in supporting various forms of interaction among possibly conflicting autonomous agents has been explicitly recognized in the literature. In argumentation, conflict management is carried out by the formal process of defeat status computation. This lecture considers the generalization of this process to a distributed setting.

First, it will be shown by means of examples that significant stabilization problems may arise even in relatively simple cases. Driven by these examples, a fundamental negative result, proved in a recent paper, will be introduced and discussed, i.e. that no general self-stabilizing algorithm exists for distributed defeat status computation, indicating that self-stabilizing algorithms for this problem can be defined only under specific conditions.

Accordingly, the remainder of the lecture will focus on two cases: an algorithm tailored to a specific family of inference graphs, that include only rebutting defeaters, and an algorithm that applies to any inference graph, also including undercutting defeaters, but may provide (cautiously) incorrect results for some nodes. For both algorithms the worst-case round complexity will be analyzed and a relevant optimality result will be discussed.

Programa de Posgrado de la Escuela de Graduados al que estaría destinado:

Doctorado y Magister en Ciencias de la Computación.

Duración (en horas): 60 (teórico-prácticas)

Fechas de Iniciación y Finalización del Curso:

15 de Septiembre al 16 de Octubre de 2008.

Lugar Físico de realización: Departamento de Ciencias e Ingeniería de la Computación, Universidad Nacional del Sur.

Nombre y Lugar de procedencia del profesor a cargo:

Dr. Massimiliano Giacomini, University of Brescia, Italy.

Curriculum Vitae del Profesor a cargo: Se adjunta.

Disciplina Científico-Tecnológica a la que se refiere el curso y grado de inserción de esa disciplina en el proyecto de crecimiento Departamental:

La disciplina en la que se inscribe el curso es Ciencias de la Computación, con más precisión Programación en Lógica.

Este curso servirá para consolidar la formación teórica y práctica de los alumnos de posgrado en Ciencias de la Computación.

Factibilidad de participación del responsable en otras actividades departamentales:

Además del dictado del curso, el Dr. Verheij participará en tareas de investigación en el marco del Laboratorio de Investigación y Desarrollo en Inteligencia Artificial.

Presupuesto Requerido

- **Gastos de transporte (pasajes): us\$ 2.000.**
- **Gastos de viáticos: \$ 1.800.**
- **Gastos de Material:** no se requieren
- **Otros Gastos:** no se requieren
- **Fuentes de co-financiación:** Fondos asignados al PGI departamental dirigido por el Dr. Guillermo Simari.

Fundamentación:

El curso para el que se solicita apoyo desarrolla temas centrales en la disciplina de Inteligencia Artificial.

La Argumentación ha tenido un desarrollo sostenido en los últimos veinte años representando una de las elecciones más frecuentes para la implementación del razonamiento en sistemas inteligentes.

El Laboratorio de Investigación y Desarrollo en Inteligencia Artificial ha trabajado en estos temas desde hace más de quince años y la visita solicitada ayudará a la consolidación de líneas de trabajo del laboratorio.