PHIL 478:
Logics for Defeasible Reasoning
Syllabus Version #1
January 14, 2016

Description

Philosophy and artificial intelligence often rely on logical models of reasoning, yet standard logic, originally designed to systematize reasoning in mathematics, applies only in domains where information is certain. In many scientific fields, as well as in ordinary commonsense reasoning, both people and machines must reason on the basis of information that is uncertain, incomplete, or even inconsistent. This course is focused on logics—sometimes known as “defeasible” or “nonmonotonic” logics—designed for reasoning with information of this kind. Course prerequisites: PHIL 370 or equivalent work in formal logic or permission of the instructor.

Time and place

Thursday, 2:00 - 4:30, PLS 1164

Contact information

Office: Skinner Building, Room 1101. Office phone: I don’t use my office phone. Cell phone: 301-408-8963 (you are welcome to call my cell). Email: horty@umiacs.umd.edu. Office hours: I’ll let you know my exact office hours once they’ve sorted themselves out.

Course materials

I will make electronic copies of the readings available as the course progresses.

Course work and grades

Students will be required to turn in weekly homeworks. These will be checked but will not affect your course grade. The homeworks will be nuts and bolts, nothing tricky. Their main function, in fact, is to show me how well you’re understanding the material.

Grades will be based on three short exams and a final—also nuts-and-bolts, and some or all of which may be take-home—each counting for roughly 25% of your grade. I cannot be sure exactly when the exams will be scheduled yet—this depends on how things go in class. But I will try to distribute them evenly over the term, will give you plenty of notice, and will be flexible if you run into conflicts with other work or with religious observances.
Details

You are not required to attend class, but I have no idea how you could learn the material we will cover if you don’t. You must abide by the University’s Honor Code. All disabilities will happily be accommodated in any way necessary, and we will maintain a classroom atmosphere that encourages the equitable participation of all students regardless of age, disability, ethnicity, gender, national origin, race, religion, or sexual orientation.

Course topics

Here is a tentative, initial list. The list will be undergoing revision throughout the term (be sure to check the version number on the syllabus).

1. Default logic
   (a) Background and motivation
      Readings: Horty [8], Horty [9, Introduction], Reiter [31]
   (b) Default logic
      Readings: Horty [9, Chapters 1 and 2], Reiter [30]
   (c) Alternative default logics
      Readings: Delgrande, Schaub, and Jackson [5]
   (d) Variable priorities and exclusion
      Readings: Horty [9, Chapters 5 and 6]
      Background and related material: Pollock [14], Raz [29, Chapter 1]

2. Pollock’s work on defeasible reasoning
   (a) Roots in epistemology
      Readings: Pollock [14], Pollock [15, Chapters 1 and 2]
      Background and related material: Pollock [21, Chapters 1 and 2], Pollock and Cruz [25]
   (b) The 1987 theory
      Readings: Pollock [16], Pollock [18], Pollock [19]
      Background and related material: Prakken and Horty [27],
   (c) Problems: self-defeat, lottery, preface
      Readings: Pollock [17]
   (d) The 1994/95 theory
      Readings: Pollock [20], Pollock [21, Chapters 2, 3, and 4]
      Background and related material: Prakken and Horty [27]
   (e) Later work
      Readings: Pollock [22], Pollock [23], Pollock [24]

3. Argument systems
   (a) Abstract argumentation: basic definitions
      Readings: Dung [6]
      Background and related: Prakken and Vreeswijk [28]
(b) Abstract argumentation: labelings, dialogue
   Readings: Prakken and Vreeswijk [28]

(c) Argumentation and Pollock’s theories
   Readings: Dung [6]
   Background and related: Jakobovits [10], Jakobovits and Vermeir [11],

(d) Argumentation and default logic
   Readings: Dung [6]

(e) Structured argumentation
   Readings: Prakken [26]

4. Prioritized default logics

(a) Order of application theories
   Readings: Baader and Hollunder [1], Brewka [2], Brewka [3]

(b) Rintanen
   Readings: Rintanen [32]

(c) Brewka and Eiter
   Readings: Brewka and Eiter [4]

(d) An inheritance based theory
   Readings: Horty [9, Chapter 8]

(e) Hansen’s approach
   Readings: Hansen [7]

(f) Parent’s approach
   Readings: Parent [13]

(g) Tucker’s approach
   Readings: Tucker [33]

5. Possible additional topics, depending on student interest, readings to be supplied

(a) Prioritization in argumentation
(b) The lottery and preface paradoxes
(c) Formalization of legal reasoning
(d) Some issues in lexical semantics
(e) Computation issues: Answer Set Programming

References


