An agent framework for teaching an introductory course in AI

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Abstract

Some sort of agent framework is an obvious requirement for teaching the basics of multi-agent systems to first year undergraduate students. This framework should be capable of supporting all vital properties that are needed for the intended course, yet remain simple enough to teach to first year undergraduates. Although numerous agent frameworks have been suggested in the large body of literature, none of these are simple enough for usage by the undergraduates. Hence we set out to create a new framework, which would realize all the requirements of the intended course without sacrificing simplicity. The students' evaluation and subsequent research into the current state of java-based agent frameworks has led to the current version of our framework. We will demonstrate both the framework, which embodies the concepts of multi-agent systems, concurrency, persistency, distribution and mobility, and the content of the pertinent course teaching the basic concepts of AI using our framework.

1. Introduction

As a part of a new educational program at Delft University of Technology, an introductory first-year undergraduate course on Knowledge Engineering has been introduced in the academic year 2001-2002. The main aim of this course is to achieve the following:

1. Introducing the basic concepts of knowledge engineering and relevant artificial intelligence (AI) techniques including search algorithms, knowledge representation techniques, rule-based reasoning algorithms, and agent technology.
2. Explaining and instructing on issues related to AI programming in general and intelligent multi-agent systems in particular.

In contrast to the classic notion of AI, which represented a promise of intelligent machines with abilities comparable or possibly superior to those of humans [1], this course has been envisioned to approach AI as a set of techniques for making software that is more intuitive and easier to use and which makes users more productive (e.g., as proposed in [2]).

2. Fleeble

The current version of the Agent Framework (we've named it 'Fleeble') is in its third generation. It has been designed based upon the feedback given by the students who took part in the course during 2002 and 2003 [3].

3. Coursework

The coursework consists of 3 separate exercises. The first exercise, partly meant to identify those students without sufficient programming experience to complete the course, introduces epistemic logic and agent technology by letting the students play a game of Rock-Paper-Scissors [4] against the computer. The second exercise is designed to use rule based reasoning to sort students participating in the course according to their suitability to be 'the perfect project partner'. The design of the rule base is left to the students themselves. The third exercise introduces semantic networks as a tool for 'understanding' text that the students should use to filter the live BBC news feed for those articles that appear to be of interest to the user. The fourth exercise introduces the concepts of ad-hoc networks and non-deterministic routing algorithms by letting students implement the behaviour of agents who's task it is to route messages on an ad-hoc network.

4. Demonstration

We will demonstrate Fleeble using the coursework specified above.

The application runs on a PC with Windows (2000 or XP), sun's java 1.4.2 JDK or higher. Due to its live nature, the third exercise requires an internet connection.

References

[1] J. Haugeland, Artificial Intelligence: The Very Idea. Cambridge, MA: MIT Press, 1985.

[2] J.P. Bigus and J. Bigus, Constructing intelligent agents using java. New York: John Wiley & Sons, 2001.

[3] M. Pantic, R.J. Grootjans, R. Zwitserloot, Teaching Introductory Artificial Intelligence Using a Simple Agent Framework, *Research Report DKS04-06,Delft University of Technology*.

[4] http://en.wikipedia.org/wiki/Rock,_Paper,_Scissors