Teaching Intelligent Agents using NetLogo

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In the context of an Agent and Multi-Agent Systems course, satisfying the students demands for hands-on practice presents an interesting challenge. Educators have reported a variety of environments and techniques they use in order to increase active learning. In this paper we record our experience using NetLogo as part of the practical coursework that students need to carry out within an Intelligent Agents course. We argue that NetLogo meets most of the requirements that suit our criteria. In addition, we describe two extra NetLogo libraries provided to students, one for BDI-like agents (goal-oriented agents) and one for ACL-like (Agent Communication Language) communication. We present a few scenarios that we use in coursework handouts and how the partially developed environment we provide for each scenario facilitates practical agent design and simulation, thus satisfying the learning outcomes of the practical work and the course as a whole.

Keywords

Artificial Intelligence, Intelligent Agents, Practical Assessment, Agent Simulation Platforms

1. Introduction

Courses on Agents and Multi-Agent Systems (AMAS) have started to complement Computer Science and other related curricula during the last decade. AMAS is listed in the ACM/IEEE Computing Curricula [12] as part of Intelligent Systems and University Departments have chosen to offer a course on AMAS (under a wide variety of titles) either as a core or an optional course during undergraduate and/or postgraduate studies. Some chose to integrate AMAS principles into other courses. Due to the wide foundations and applicability of AMAS, it is expected that there is also a lot of diversity with respect to the learning outcomes and content (focus on theory or applications) as well as the context (Artificial Intelligence related or mainstream Computer Science related) in which such course is offered. This also explains the variety of valid options (teaching and assessment methods, practical work, tools, demonstrations etc.) when designing the syllabus as well as the wide variety of experiences reported in teaching.

It is therefore important to briefly define first the context to which this paper refers to. We introduced a course entitled "Intelligent Agents" (IA for short) 7 years ago in our 3 year Computer Science undergraduate curriculum. This is a final year, final semester course obligatory for all students, ranging from 25 to 50 since 2001. It covers a wide range of standard topics in AMAS (mixture of theory and practice as shown below) with no particular emphasis on any, and is assessed through coursework (practical work) and unseen final examinations. We felt that exposing the students to advanced technologies like those involved in AMAS would significantly broaden their horizons on cutting-edge information technologies.

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