Enhancing NetLogo to Simulate
BDI Communicating Agents

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Abstract. The implementation process of complex agent and multi-agent systems (AMAS) can benefit significantly from a simulation platform that would allow rapid prototyping and testing of initial design ideas and choices. Such a platform, should ideally have a small learning curve, easy implementation and visualisation of the AMAS under development, while preserving agent oriented programming characteristics that would allow to easily port the design choices to a fully-fledged agent development environment. However, these requirements make such a simulation platform an ideal learning tool as well. We argue that NetLogo meets most of the requirements that suit our criteria. In addition, we describe two extra NetLogo libraries, one for BDI-like agents and one for ACL-like communication that allow effortless development of goal-oriented agents, that communicate using FIPA-ACL messages. We present one simulation scenario that employs these libraries to provide an implementation in which agents cooperate under a Contract Net protocol.

Key words: Multi-Agent Systems, Simulation Platforms

1   Introduction

Development of Agents and Multi-Agent Systems (AMAS) is a challenging and complex task. Due to the complexity that AMAS exhibit, simulation of AMAS models becomes an important step that can facilitate understanding of how the intended system will perform when it will be actually implemented, since it allows rapid prototyping and testing of initial design ideas and choices. It is crucial that simulation output should be meaningful enough for the developers to draw conclusions and drive the actual implementation. For instance, in multi-agent systems with spatial reasoning and behaviour, a visual output which displays agents moving in a two or three dimensional space is necessary.

On the other hand, future developers and researchers must be educated in AMAS theory and trained in practice, which presents an equally challenging task. Firstly, the topic is too broad to fit within specific time constraints. Especially at the University level, a course on AMAS can hardly fit itself among a plethora of other mainstream/popular topics, despite the fact that AMAS is