

Argumentation within Software Agents

Tools to facilitate agent reasoning and interaction



Daniel Bryant, Paul Krause and Sotiris Moschoyiannis
 Department of Computing, University of Surrey, Guildford, GU2 7XH



Software Agents are often cited as a key enabling technology for the next generation of online services, such as large-scale e-commerce and Service-Oriented Computing (Web-service, Grid Computing etc...)

Agents are software components that are capable of *autonomous* (i.e. independent) action on behalf of their user or owner.

They are situated within (and sense) an environment, acting upon it over time in pursuit of their own goals.

“Argue tuProlog”

A Lightweight Argumentation Engine for Agent Applications

We have developed “Argue tuProlog”, a prototype lightweight Java-based argumentation engine (based on tuProlog¹) that can be used to implement a non-monotonic reasoning component in agent applications.

- Facilitates autonomous decision-making
- Supports the process of practical reasoning

Ultimately we plan to create a general purpose engine that can be configured to support a range of argumentation schemes.

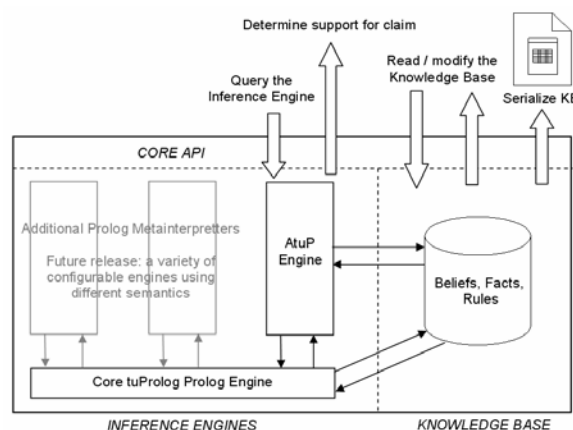


Figure 1. “Argue tuProlog” application architecture

Enforcing Argumentation-based Dialogue Protocols

An Implementation of a Dialogue Manager

We have created a prototype application that demonstrates how existing limitations in ensuring an agent’s compliance to an argumentation-based communication dialogue protocol can be overcome.

The current application utilises a flexible distributed protocol enforcement framework (with a sound theoretical background), which blocks any illegal utterances an agent attempts to make.

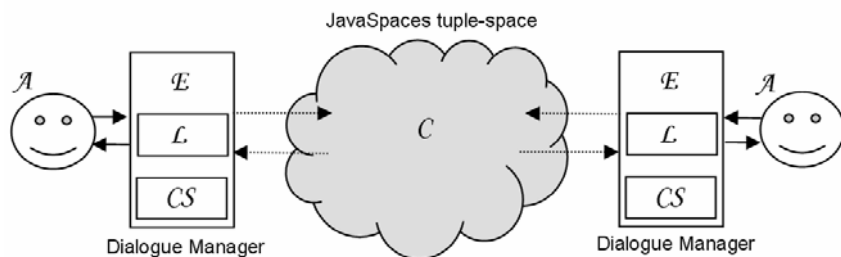


Figure 2. Dialogue Manager application overview

C is the tuple-space communication medium
 \mathcal{A} is a set of agents interacting together via C
 CS is a set of Control States - one associated with each agent
 L is the global law (current dialogue protocol) which governs the interactions
 \mathcal{E} is a mechanism that enforces the law.

