

Multi-Agent Systems for Natural Language Processing

Ariadne Maria Brito Rizzoni Carvalho*

ariadne@dcc.unicamp.br

Daniel da Silva de Paiva

Daniel.Paiva@itri.brighton.ac.uk

João Luís Tavares da Silva

jtavares@andros.inf.pucrs.br

Vera Lúcia Strube de Lima

vera@andros.inf.pucrs.br

Vera-Lucia.De-Lima@imag.fr

September 5, 1998

Abstract

This paper investigates the use of multi-agent systems (MAS) for natural language processing (NLP). We have investigated two approaches for distributing linguistic knowledge among agents which interact in order to interpret a sentence: (1) a lexical-structural distribution approach; and (2) a cognitive-linguistic distribution approach. In order to test both approaches, we have developed two systems. In the first case, agents are associated with the morpho-syntactic categories of the words and behave accordingly, exchanging messages and trying to find other agents with whom they can establish associations, forming higher and higher structures until the entire sentence structure is represented. When all agents have been connected, a solution is found. The system deals with the following linguistic constructions: *topicalization*, *relative clauses* and *gapping*.

In the second case, agents are originally associated with levels of linguistic knowledge (morphological, syntactical and semantical). The system has been specifically used to solve *categorial ambiguity* and it is now being augmented to incorporate agents that deal with linguistic phenomena, such as *ellipsis* and *possessive pronominal reference*. The paper starts with a definition of *agents* and *multi-agent systems*; then we describe the two approaches in detail, comparing them in terms of agents organization, sub-societies construction, “agentification¹”, knowledge distribution, dictionary composition, partial results communication and systems augmentation.

*The authors names are in alphabetical order.

¹Agentification is considered to be the process of identifying the entities which will constitute the agents.