

# UCL—Universal Communication Language

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**Abstract.** For successful cooperation to occur between agents they have to be able to communicate among themselves. To enable this communication an Agent Communication Language (ACL) is required. Messages coded in an ACL should adequately express their meaning from a semantic point of view. The Universal Communication Language (UCL) can fulfill the role of an ACL and, at the same time, be convertible to and from a natural language. UCL design is concerned with the description of message structures, their underlining semantic context and the support for protocols for agent interaction. The key point about UCL is that the language can be used not only for communication among software agents but among humans too. This is possible because UCL is derived from the Universal Network Language (UNL), a language created to allow communication among people using different languages. UCL was defined using the Extended Markup Language (XML) to make it easier to integrate into the Internet. In addition, an enconverter-deconverter software prototype was written to serve as a tool for testing and experimenting with the language specifications.

## 1 Introduction

The technology of software agents can be an interesting tool for the creation of new models for complex software systems. In the project of software agents, many of the traditional techniques of artificial intelligence can be mixed with techniques from the field of distributed computer systems, theories about negotiation and theories about working teams [2]. Software agents are basically designed to cooperate (either with others or with humans) in a seemingly intelligent way. But for cooperation to occur a communication language is necessary.

What does it mean to be able to communicate with someone? Simplifying it, useful communication requires shared knowledge. While this includes knowledge of language, words and syntactic structures, meaningful communication is even more focused on knowledge about a problem to be solved. To interact with a florist you need some knowledge about flowers.

The widespread use of the World Wide Web (WWW) and growing Internet facilities have sparked enormous interest in improving the way people communicate using computers. To date, communication among software agents and