ABSTRACT

A software agent acts on behalf of someone to carry out a particular task which has been delegated to it. In order to fulfill the interaction requirements of delegation, the agent needs to provide for collaborative natural language interaction added with the feature of multilingualism to facilitate a flexible form of interaction in the language required by the user.

In the existing agents, the contributions from the fields of computational linguistics and multilingual computing are rendered to provide natural language interaction and multilingualism. But, the language ability requirements of an agent, considered from an agent perspective, necessitates a revamping in the requirements from both conceptual and architectural perspectives. The process of fulfillment of requirements inevitably leads to attributing two dimensions of language autonomy namely, language ability management autonomy and language behavior autonomy to the language ability of an agent. This results in an evolved form of language ability which is comparable to that of humans and hence termed as a language faculty.

The two dimensions of autonomy and the solutions found for other relevant issues are used in building the conceptual model of the language faculty. A new Belief, Task, Behavior paradigm for representing the internal states of the language faculty is derived from the conceptual model. Based on this paradigm, a new Behavior Management Architecture for the language faculty of an agent is designed. The architecture is supported with appropriate Role-Based design and Aspect-Oriented implementation models so that an agent with the required form of language ability could be realized.

Using the architecture and its design and implementation models, a Multilingual Natural language Agent Interface (MULLAI) for Email server is developed to illustrate the use of the solutions developed. The developed architecture is also extended in order to attribute a language faculty suitable for a multi-agent system, namely the Multilingual Multi-Agent System (MMAS). An evaluation of the agent with two-dimensional language autonomy with the existing multilingual dialoguing agents is also performed.

A secondary contribution of this work is that the developed solutions/models are generic in nature and not specific to a language faculty.