A plug and play spoken dialogue interface for smart environments

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Abstract. In this paper we present a plug and play dialogue system for smart environments. The environment description and its state are stored on a domain ontology. This ontology is formed by entities that represent real world contextual information and abstract concepts. This information is complemented with linguistic parts that allow to automatically create a spoken interface for the environment. The spoken interface is based on multiple dialogues, related to every ontology entity with linguistic information. Firstly, the dialogue system creates appropriate grammars for the dialogues. Secondly, it creates the dialogue parts, employing a tree structure. Grammars support the recognition process and the dialogue tree supports the interpretation and generation processes. The system is being tested with a prototype formed by a living room. Users may interact with and modify the physical state of this living room environment by means of the spoken dialogue interface.

1 Introduction

In the last years, computational services have abandoned a centralized structure, based on the desktop metaphor, to be omnipresent in our environments. Following these changes, interfaces are transforming very fast to adapt to the new user necessities [1]. Leaving behind some old command line and graphical interfaces, systems have changed to provide new user-friendly approaches. The new interfaces have to adapt to the users, so that users may communicate with the system as naturally as possible.

Among these interfaces, spoken dialogue systems offer a wide range of possibilities, but also new challenges [2]. Dialogue interfaces (spoken or not) are frequently tied to a specific domain and, even more, are specially designed for the tasks they have to deal with. They are usually based on hand crafted dialogue designs. On the one hand, this makes harder to build a dialogue interface, increasing considerably its cost, on the other hand, changes in the system may necessarily imply modifications in the interface.

An approach to solve this problem is the automatic dialogue generation, based on ontological domain knowledge [3]. These systems provide plug and play spoken interfaces, avoiding the necessity of creating them from scratch and making them more easily reconfigurable.