
Management Ubiquitous of Messages and Documents Organizational through Intelligent Agents

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Abstract. In the context of artificial intelligence, the multiagent systems are an alternative solution to address complex problems and distributed. PAINALLI is an multi-agent architecture for managing messages and documents organizational anywhere and anytime. To formalize, the management makes use of international standards such as ISO 15489 and MoReq specification. The ubiquity gained in the architecture is due to the use of intelligent agents deployed in fixed and mobile technologies: personal computers, smart phones and personal digital assistants.

Keywords: Multi-agent architecture, ubiquitous computing, messages and documents management, MoReq, ISO 15489.

1 Introduction and Motivation

This paper presents PAINALLI, a multi-agent architecture developed to provide automatic management of internal documents and communication processes in business. The aim of PAINALLI is to formalize and speed up communication among members of an organization, which is commonly based on exchange of messages and documents. Messages are written based on several templates which contain all required and satisfactory elements in order to achieve a better understanding of what is said; documents are attached to the messages after having been cataloged, manually or automatically, depending on their origin. If the document's origin is paper, cataloging is done manually, and if it is electronic, it will be cataloged automatically by the system. The cataloging process is supported by the ISO 15489 standard, this norm establishes requirements for the creation and maintenance of documents: authentic, reliable, honest and available, as well as the context or system that must be managed [1]. It helps to ensure quality in an organization, Formby means of a specific guide for managing documents used as a basis for quality systems. An e-mail system is just a communication device, not a document management system. PAINALLI merges an architecture for managing messages (email) and document management.

Sending and receiving documents and messages can be done from both mobile and desktop platform. Such feature is one of the PAINALLI's advantages over other related

products, using personal computers, PDAs (Personal Digital Assistant) or smart phones. The use of a formal process to design the architecture, the use of templates as a base for message encoding, the feedback that ISO 15489 standard and MoReq, this specification describes a model of requirements for managing electronic documents and archives and affects especially in functional requirements for managing electronic documents and archives through a system of electronic document management file (SGDEA) [2] both provided for documents management and the support of desktop and mobile technologies make PAINALLI a robust system, reliable in its functional performance and employment.

The communication process is a key element in current organizations. In order to understand it we will take the elements quoted in the definition introduced by [3]: message, channel, sender, receiver, transmission, encoding and decoding, meaning, feedback and communication effects. The last five ones are the most relevant elements for this project, because they are the focus of our investigation work's hypothesis. A message encoding must be formalized so the receiver can decode it and interpret the exact meaning of what the sender is expressing. Any message's aim, being accompanied by a document or not, is at generating one or more actions as a result or effect from the communication. For this purpose, the sender must receive some feedback from the receiver; we will call this messages exchange as "conversation". At the present time, organizations demand tools not only for making the communication process easier. It is essential to add them some obligatory and sufficient features to provide them with intelligence, being able to support every element of the process.

A very useful and suitable technology to develop multi-platform systems consist on agents and multi-agent systems (MAS), which are composed by several agents interacting with each other, making able together to reach the desired functionality [4]. An agent is an entity that must have certain characteristics, like: autonomy, situation, reactivity, proactivity, social ability, learning capacity, mobility or organization [5]. BDI agents have got the mental states of Beliefs, Desires and Intentions [6]. It has likely been the most spread and studied model among agents reasoning models, and because of that it is the most advisable one for agent-based applications development [7]. A critical drawback for development an agent-based architecture is that, at the present time, we lack of clear standards or completely developed methodologies that set up the steps to realize correct analysis and design [8]. Based on the experience of the BISITE (Biomedicine, Intelligent Information Systems and Educational Technology) research group from the University of Salamanca, a suitable combination for multi-agent architectures development is to use the Gaia methodology and the AUML modeling language.

One of the advantages provided by the multi-agent systems is the ability of agents to run on mobile devices. Nowadays there is a growing need to find more effective ways to offer services in mobile devices [9] such as digital personal assistants and mobile phones, using communication technologies like GPRS (General Packet Radio Service), UMTS (Universal Mobile Telecommunications System), Bluetooth, etc. The versatility of mobile devices offers an opportunity that has to be taken into account in order to make the personnel an organization come closer. By means of those, a person will be able to, whenever or wherever he is access organizational information as if he was in his own office. Software systems that integrate the use of mobile technologies to their solutions, as PAINALLI system does, are more robust because provide users the possibility of accessing the system from any place and at any moment they may require.