Chapter 40

An Architecture Proposal for Residential Care Home Environments

Juan Enrique Garrido Navarro
University of Castilla-La Mancha, Spain

Víctor Manuel Ruiz Penichet
University of Castilla-La Mancha, Spain

María Dolores Lozano Pérez
University of Castilla-La Mancha, Spain

ABSTRACT

A residential care home is a suitable environment to implement a software system providing users the functionality and the information required at any time, whichever place, and circumstance. The advances of technology in the last few years have made the design of the system possible; the system will employ features regarding collaboration, ubiquity, and context-awareness. Firstly, defining the architecture of the system is necessary to guarantee a proper design and implementation. This chapter deals with those subjects. The architectural proposal is described from the hardware and software perspectives. The hardware architecture shows the distribution of the hardware components to be used: mobile devices, servers, communications, etc.; on the other hand, the software architecture shows the distribution of the system components by layers based on the functionality and information processing. Awareness is a key issue to be considered in the design of the proposed system from the point of view of collaboration; therefore, an analysis about how to handle and consider this feature on both architectures is depicted.

INTRODUCTION

Computer users do not use systems in order to know their functionality but to perform their tasks. Users need systems with a simple and easy to remember operation; they give increasingly more importance to systems that provide help automatically to complete tasks. To this respect, the present technology allows to offer environments with systems where users can automatically obtain information and functionality based on their state (i.e. location, current task, etc.). In this way, we propose a col-
laborative ubiquitous and context-aware system which will allow users at any place and any time the possibility to access the necessary information and functionality whether by selection or being automatically offered by the system.

Residential Care Homes (RCH) represent a suitable environment for the system proposed. Daily needs make RCH management essential for the correct center operation. Residents’ care can be affected negatively without a correct RCH management. In this sense, a ubiquitous, collaborative, and context-aware system will help employees with the adequate protocols’ tracking, which users have to complete in any situation and task. The system, as it is collaborative, will allow employees to perform their tasks in a joint way. Collaboration possibility will unify efforts and improve the coordination between employees. Ubiquity will allow employees to access to information and functionality offered by the system at any place and any circumstance. Regarding context-awareness, this is a feature that provides the system capacity to adapt its functionality and content based on the employee’s environment. Employees do not require having exhaustive knowledge of the operation of the system; it will help and guide them every time by offering the functionality and information that employees need according to their location and current task. For example, if a user cannot find the resources he needs or he has doubts about his current tasks, the system will indicate who can help him and the way to contact that workmate.

Bearing in mind how the proposed system can help in RCH for everyday operation, RCH have been selected as the adequate environment for this system application for the following benefits and reasons:

- Employees must control a set of task protocols. Each protocol needs a high level of collaboration between employees. Therefore, RCH require a collaborative system to manage them.
- Ubiquitous systems facilitate RCH management. Employees will be able to access any information or functionality they need at any time and any place. In their devices, users will always have the adequate functionality for their current tasks or location.
- Employees will be able to know at each moment what is happening in the system, what other users are doing and the resources state. Awareness means to know all that information and this is essential in a collaborative environment. Hence, as we consider fundamental to emphasize that concept, it will be analysed independently.
- The system will reduce human errors. For example, it will remember important tasks and the steps to be followed. The system will indicate what has been previously done and what has to be done.
- Additionally, the aim to introduce ubiquitous and context systems in health environments is an important reason. The purpose will be always to improve the operation of such environments.

In order to be able to develop the proposed system, a previous definition of architecture is essential, which will be based on its development. This chapter describes an architecture proposal carried out by the authors. Two parts compose the architecture: the physical architecture, which describes the hardware distribution; and the software architecture, which shows the layer distribution of the components’ system where each layer has its own information and functionality. That description is part of the objective of the first chapter.

A collaborative and context-aware system must manage awareness correctly (users must know what is happening). Therefore, the objective of the second chapter is to present an analysis