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An object-oriented analysis method for customer relationship management information systems

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Abstract

For the advances of Internet technologies in recent years, Electronic Commerce (EC) has gained many attentions as a major theme for enterprises to keep their competitiveness. Amongst all possibly desired endeavors for the EC, research has shown that effective management of customer relationships is a major source for keeping competitive differentiation. Therefore, it is commonly recognized as an important goal for an enterprise to promote its management of customer relationships through a prospect information system on the Internet to achieve the so-called Business-to-Customer EC. In this paper, we propose an object-oriented analysis method for the development of such a Customer Relationship Management Information System (CRMIS). The approach starts from the identification of prospect customers and their desired behaviors under preferable execution environments, and ends with the specification of system—internal objects/entities that collaborate to satisfy these behaviors and environments. The method is a use case driven approach with UML utilized and extended as its tool. To illustrate, the method is applied to an exemplified CRMTS for house agency.

Keywords: Electronic commerce; Customer relationship management; Information system; Object-oriented analysis; Method

1. Introduction

For the advances of Internet technologies in recent years, Electronic Commerce (EC) has gained many attentions as a major theme for enterprises to keep their competitiveness. Amongst all possibly desired endeavors for the EC, research has shown that effective management of customer relationships is a major source for keeping competitive differentiation. Therefore, it is commonly recognized as an important goal for an enterprise to promote its management of customer relationships through a prospect information system on the Internet to achieve the so-called Business-to-Customer EC. Also, as a common recognition, such a Customer Relationship Management Information System (CRMIS) that realizes the B-to-C EC application needs to explicitly capture and manage for prospect customers their desired behaviors under preferable execution environments.

In the literature, many discussions related to CRMIS have been presented such as personalization methods [1–5] and customer decision support systems [6,7]; it is therefore no lack of technical solutions about CRMIS. Nonetheless, any thorough analysis and design methods for CRMIS, which may contributively result in the system effectively satisfying the requirements of prospect customers under their preferable execution environments, are still few nowadays; such methods are explicitly needed in that it has well been recognized in the literature that analysis and design are important in developing a computer-based application where analysis plays a more significant role for collecting user requirements about the application domain (e.g., desired behaviors and execution environments of the application)—failure to identify appropriate requirements usually results in late delivery, poor quality, and high maintenance costs. In general, system analysis can be accomplished by using function- [8–10] or data- [11,12] or object-oriented [13–16] methods where the development of object-oriented ones is specifically motivated by the drawbacks and problems in the other two kinds: the significant features and benefits of object-oriented

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techniques such as inheritance of object specifics and information abstraction/hiding in an object would make the system constructed easy to understand, maintain, and reuse.

As CRMIS concerns especially its effectiveness on comprehensibility and maintainability for satisfying customers' (often complex but changeable) requirements, it is therefore not uncommon in our knowledge to take advantage of object-oriented techniques for enhanced analysis and design of a CRMIS. Amongst those existing object-oriented methods, the well-known use case driven one in [16] has already been ascertained by many researches and implementations for its robust process and resultant sound UML [17–19] artifacts. Therefore, in this paper, we propose such a use case driven method that extends UML notations for specifically supporting an enhanced analysis for CRMIS. The approach starts from the identification of prospect customers and their desired behaviors under preferable execution environments; those artifacts identified will be explicitly specified in the use case and activity diagrams adapted from UML. With desired behaviors, the method ends with the specification of system-internal objects/entities that collaborate to satisfy these behaviors. For illustration, the method is applied to an exemplified CRM for house agency.

This paper is organized as follows. Section 2 presents our method that results in the creation of four diagrams, including the use case, activity, class, and sequence diagrams. The method is then illustrated in Section 3 by applying it to the analysis and specification of a CRMIS for house agency. Finally, Section 4 has the conclusions and our future work.

2. The analysis method

Our method is use case driven with the following steps: (1) creating a use case diagram that specifies the prospect customers of a CRMIS and their desired behaviors of using the system under preferable execution environments; (2) creating an activity diagram that presents how such behaviors proceed interactively to satisfy the expectations of these customers; (3) modeling a class diagram that describes any system-internal objects/entities that collaborate together to support these behaviors; and (4) modeling a sequence diagram that specifies how such objects/entities collaborate to support these behaviors. As mentioned above, these diagrams are UML based with desired extensions for the analysis of a CRMIS.

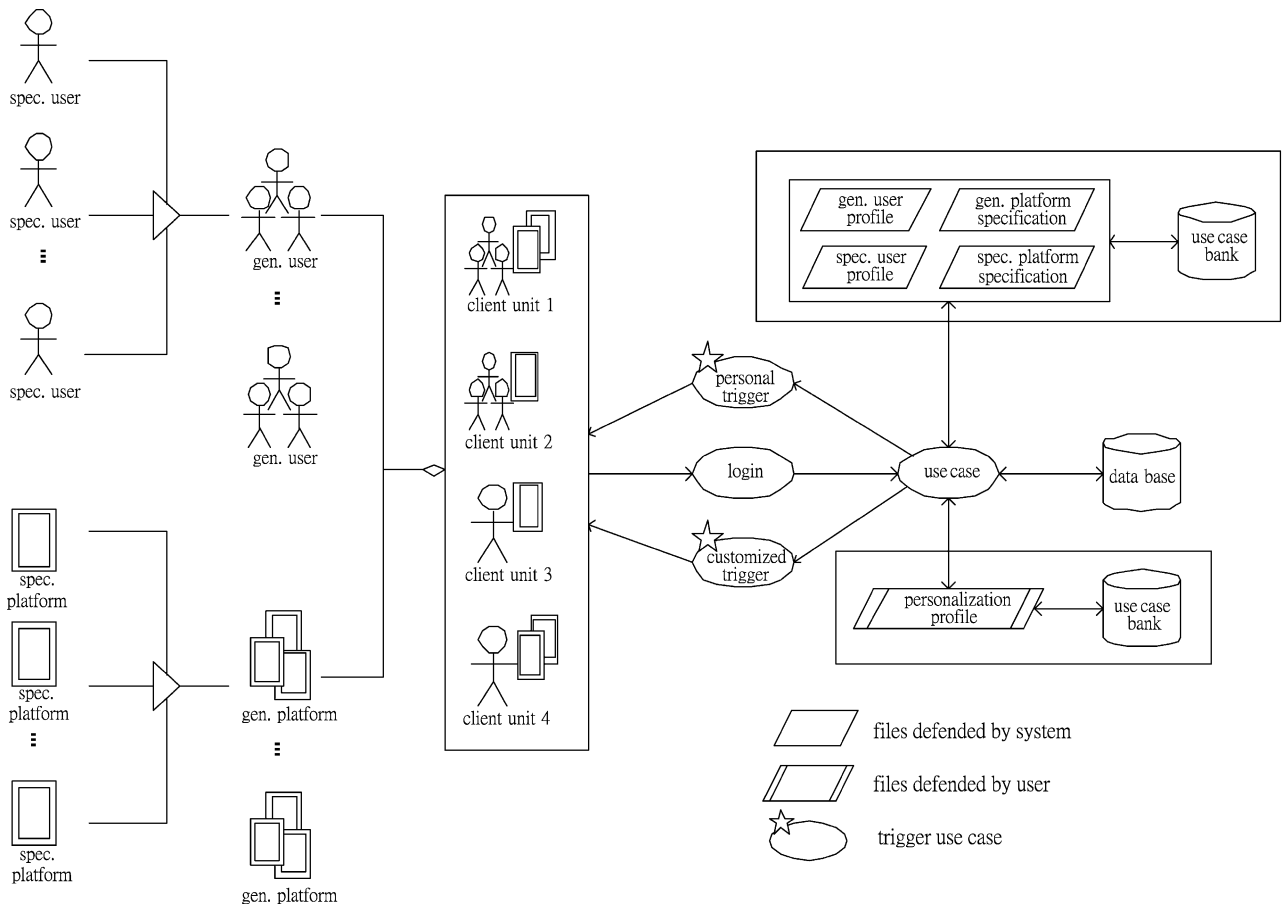

Fig. 1. Use case diagram.