

Chapter 82

Perspectives on the Viable Mobile Virtual Community for Telemedicine

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INTRODUCTION

A *virtual community* is an electronically supported social network: it can be seen as a group of people who have regular social interaction, independent of time and space, because of a common interest such as a problem, task, or feeling exchange (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004; Rheingold, 1993). When independence of time and space is achieved through the use of mobile devices and wireless communication technologies, such a virtual community is called a *Mobile Virtual Community* (MVC). Existing research interests in the MVC domain are grouped into *technology-centered interest*, *user-centered interest* and *business-*

centered interest (El Morr & Kawash, 2007). The technology-centered aspects include issues such as platform design, development framework, mobile network bandwidth limits and intelligent agents. The user-centered issues include user interface, behavior, personalization, privacy, data security and trust. Business-centered aspects include marketing, investment and business models.

In another paradigm known as *telemedicine*, information and communication technologies are being investigated and employed in applications such as health discussion & maintenance, alleviation, cure and prevention of diseases. In recent telemedicine scenarios, sensors attached to the patient's body collect patient's vital signs, transmit them to a mobile gateway device being carried by the patient, which in turn uses wireless communication

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technologies to transmit the data to a healthcare center, for purposes like vital signs analysis and offering emergency assistance to the patient if needed. The sensors and the gateway mobile device together form a so called *Body Area Network* (BAN). Konstantas, van Halteren, & Bults (2004) describe such a BAN for telemedicine purposes. Other supporting actors involved in such a scenario are the technicians, healthcare specialists, doctors and (informal) caregivers.

According to the definition, the telemedicine scenario may be viewed as a virtual community if the patient and other actors could communicate with each other for the purpose of providing medical assistance and counseling to the patient. In situations where patient and caregiver mobility exists, this virtual community, may be said to correspond to a MVC. Such a MVC is an aggregated kind of community as defined in Demiris 2006, where communities of healthcare professionals only, patients/informal caregivers only, combinations of them, and general public communities are defined. The technical system that supports the realization of MVC is referred to as MVC platform (Van Beijnum, Pawar, Dulawan, & Hermens, 2009).

Considering the architecture of the MVC platform, it can be argued that the MVC potentially revolves around a set of services based on the principles of Service Oriented Architecture (SOA) (Papazoglou, 2003; Pawar, Subercaze, Maret, Van Beijnum, & Konstantas, 2008).

Based on the findings of Broens et al., (2007) and Maloney-Krichmar and Preece, (2005) we argue that to be a viable MVC, it should have a tailored focus and robust technical platform: it should be of clear interest to the users and the technology incorporated should be reliable. This chapter contributes to this area in general and mobile patient monitoring and treatment in particular, by 1) analyzing in detail the robustness and other requirements to be fulfilled by the technical platform for MVCs, 2) providing guidelines for MVC platform development based on service

orientation, and 3) discussing the actors, front-end views and service components involved.

The reminder of this chapter is organized as follows. The second section of the chapter illustrates a possible telemedicine scenario focused on patient monitoring and treatment which help to elicit the specific requirements to be supported by the MVC platform. Based on the requirements and services elicited in that section, the third section of this chapter presents a possible graphical user interface (GUI) for the platform depicting the requirements to be fulfilled from an end-user perspective. The fourth section discusses the internal design of the possible MVC platform and conclusions are presented in the last section.

SCENARIO BASED REQUIREMENTS ELICITATION

Scenario analysis is the process of understanding, analyzing, and describing system behavior in terms of particular ways the system is expected to be used (Hsia et al., 1994). Drawing use cases from the scenarios and relating requirements to the use cases is a popular approach in the system design process (Whittle & Krüger, 2004). We use a similar approach here to elicit the requirements for the MVC platform based on a scenario.

Scenario Description

Herewith we present a visionary scenario showing the intended use of the MVC platform. On the MVC platform, a number of different sub-communities could function independent of each other. Member can join these sub-communities as well as the aggregate MVC. One of the sub-communities is used by the persons Bob and Alice in the following scenario.

Bob (patient) and Alice (caregiver) join a MVC. The local healthcare center creates a sub-community called as telemedicine community. The MVC

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