Chapter 14
Adapting Medical Content to the Terminal Capabilities of Wireless Devices

Spyros Panagiotakis
Technological Educational Institution of Crete, Greece

Robert Agoutoglou
Technological Educational Institution of Crete, Greece

Kostas Vassilakis
Technological Educational Institution of Crete, Greece

ABSTRACT

In the forthcoming wireless world of E-healthcare systems, the medical staff should be able to seamlessly access medical services from a variety of terminals while on the go with the same "look and feel" and with highly diverse capabilities (e.g., mobile phones, smartphones, PDAs, laptops, PCs). In that context, the knowledge of terminal capabilities is essential for service provision so users are only offered customized services and content supported by the device they currently use for network access. The challenge is how the mediating application server detects the effective level of capabilities of the requesting devices, so each client receives the requested content in a form that its terminal device can properly present. This contribution focuses on the issue of dynamic adaptation of medical services and content to the terminal capabilities of the requesting device, so with a generic service design all possible client devices can be served.

INTRODUCTION

The era of ubiquitous and pervasive communications that has emerged recently, also affects the structure and quality of modern healthcare systems as a consequence of the wireless and mobile revolution we experience, as well as the all-time-classic requirement for remote medical services. Wireless medical innovations are being introduced at a fairly rapid pace, and wireless medicine is expected to play an increasingly greater role in helping to reduce healthcare costs.

DOI: 10.4018/978-1-61350-123-8.ch014

Telemedicine, e-health, m-health (using mobile devices), and other aspects of wireless medicine are becoming state-of-the-art elements for the most effective patient care. Mobile healthcare covers everything from cellular phones to ambulance-based telemedicine to home-based patient monitors and implantable sensors. Technological developments of wireless devices and systems enable diagnoses to be made more rapidly and at the point of care. They also allow physicians and healthcare providers to connect remotely with patients and caregivers. But no matter what the device or technology, "m-health" is all about opening up channels of communication among healthcare professionals and patients to improve people's health and wring some inefficiency from the system (Neil Versel, 2010; Eric Topol 2009; Louis Basenese 2010).

Hence, in the forthcoming wireless world of E-healthcare systems, the concept of service environment portability across network boundaries and between terminals is emerging (3GPP TS 22.121). This essentially means that the medical staff should be able to seamlessly access medical services with the same "look and feel", while roaming, and from a variety of terminals with highly diverse capabilities (e.g., mobile phones, smartphones, PDAs, laptop computers, PCs). In that context, the knowledge of terminal capabilities is essential for services provision, so users are only offered customised services and content that can be supported by the devices they currently use for network access (Spyros Panagiotakis et al., 2009). Practically this means that services may need to be adapted to the terminal capabilities. The challenge is how a mediating application server detects the effective level of capabilities of the requesting devices, so each client receives the requested content in a form that its terminal device can properly present (Spyros Panagiotakis et al., 2006; Laakko T., Hiltunen T., 2005).

The present chapter focuses on the issue of adaptation of medical services and content, including multimedia, to the terminal capabilities of the requesting device so with only one service design all the possible client devices can be served. Definitely it is neither practical nor fruitful to implement different versions of a service for each different device category. Hence, this certain requirement should be fulfilled during service development, since services should be implemented in a generic way that will make them portable and extendable to practically all of the terminals and networks universally available, thus increasing the potential profit from their development.

With respect to the state of the art, the standardized mechanism for terminal capabilities negotiation is the one based on the W3C CC/PP specification (CC/PP home page) for the announcement mechanism and the OMA UAProf (UAProf specification) standard for the format of capability data. Additionally, RDF (RDF home page) is used to enable the interoperable encoding of terminal profile metadata in XML (Elliotte Rusty Harold, W. Scott Means, 2004) and the extensibility of the data representation schema. MPEG-21 (MPEG-21 home page) is another similar standardized technology for context capabilities exchange. In both standards, the terminal capabilities data can embed in HTTP/1.1 headers (IETF RFC 2616) and send to the provisioning entity. Our contribution at first introduces to the terminal capabilities adaptation issue and the associated technologies and fairly evaluates them. Then it proposes a different approach to the CC/PP and MPEG-21 proposal for the server-side attempt to detect and understand the capabilities of an attached wireless client device. In specific, our proposal is a combination of the WURFL (Wireless Universal Resource FiLe) repository of device attributes (WURFL home page) with a CGI technology (JAVA servlet) (Jason Hunter, William Crawford, 2001), for dynamic adaptation of the content that the server presents to the clients, according to the associated client device's capabilities.