Chapter XXII
Situated Multimedia for Mobile Communications

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ABSTRACT

This chapter examines the integration of multimedia, mobile communication technology, and context-awareness for situated mobile multimedia. Situated mobile multimedia has been enabled by technological developments in recent years, including mobile phone integrated cameras, audio-video players, and multimedia editing tools, as well as improved sensing technologies and data transfer formats. It has potential for enhanced efficiency of the device usage, new applications, and mobile services related to creation, sharing, and storing of information. We introduce the background and the current status of the technology for the key elements constructing the situated mobile multimedia, and identify the existing development trends. Then, the future directions are examined by looking at the roadmaps and visions framed in the field.

INTRODUCTION

The rapid expansion of mobile phone usage during last decade has introduced **mobile communication** as an everyday concept in our lives. Conventionally, **mobile terminals** have been used primarily for calling and employing the short message service (SMS), the so-called text messaging. During recent years, the multimedia messaging service (MMS) has been introduced to a wide audience, and more and more mobile terminals have an integrated camera capable of still, and often also video recording. In addition to imaging functions, audio features have been added and many mobile terminals now employ (e.g., an audio recorder and an MP3 player). Thus, the capabilities of creating, sharing, and consuming multimedia items are growing, both in the sense of integrating more advanced technology and reaching

ever-increasing user groups. The introduction of third generation networks, starting from Japan in October 2001 (Tachikawa, 2003), has put more emphasis on developing services requiring faster data transfer, such as streaming audio-video content, and it can be anticipated that the role of multimedia will grow stronger in mobile communications.

The mobile communications technology integrating the **multimedia** capabilities is thus expected to expand, and with this trend both the demand and supply of more specific features and characteristics will follow. In this chapter we concentrate on describing a specific phenomenon under the topic of mobile multimedia — namely, integrating **context awareness** into mobile multimedia.

Context-awareness implies that the device is to some extent aware of the characteristics of the concurrent usage situation. Contextual information sources can be, for instance, characteristics of the physical environment, such as temperature or noise level, user's goals and tasks, or the surrounding infrastructure. This information can be bound to the use of mobile multimedia to expand its possibilities and to enhance the **human computer interaction**. Features enhancing context awareness include such things as the use of context-triggered device actions, delivery of multimedia-based services, exploiting recorded metadata, and so on.

In this chapter we will look into three key aspects—mobile communications, multimedia, and context-awareness—and consider how they can be integrated. We will first look at each key element to understand the background and its current status, including identifying the current development trends. Then the future directions will be examined by looking at the roadmaps and visions framed in the field. The challenges and possibilities will then be summarized.

BACKGROUND

The development of digital multimedia has emerged in all segments of our everyday life. The home domain is typically equipped with affiliated gadgets, including digital TV, DVD, home theaters, and other popular infotainment systems. The content of the digital multimedia varies from entertainment to documentation and educative material, and to users' self-created documents. Learning tools exploiting digital multimedia are evident from kindergarten to universities, including all fields of education (e.g., language learning, mathematics, and history). Digital multimedia tools are used in health care or security monitoring systems. So far, the platforms and environments for the use of digital multimedia have been non-mobile, even "furniture type" systems (i.e., PC-centered or built around a home entertainment unit). The PC, together with the Internet, has been the key element for storing, editing, and sharing multimedia content. User-created documents have involved gadgets such as video cameras or digital cameras, from where the data needs to be transferred to other equipment to enable monitoring or editing of the produced material.

However, the role of mobile multimedia is becoming increasingly important both in the sense of creating, and sharing and monitoring the content. The increased flexibility of use following from the characteristics of a mobile communication device—it is a mobile, personal, and small-size gadget always with the user—has expanded the usage situations and created possibilities for new applications; the connection to the communication infrastructure enables effective data delivery and sharing. Adding the situational aspect to mobile multimedia can be utilized using context awareness, which brings information of the current usage situation or preferred functions, and can