Chapter 15

Augmented Reality Edutainment Systems for Open-Space Archaeological Environments: The Case of the Old Fortress, Corfu, Greece

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ABSTRACT

In this chapter we discuss the development of edutainment systems supported by augmented reality applications, in order to enable augmented reality technologies for archaeology within the so-called communication engine for museums and cultural tourism. The task in hand is interdisciplinary and its successful implementation relies heavily on information technology as a detailed analysis of content-user needs and sound interaction design capable to support edutainment scenario is needed. This work identifies the role of each building component, describes their interrelationship within the wider context and adopts a suitably designed framework in order to develop multiple guided-tour types. Real-life case study scenario on a specific case, that of the Old Fortress in the UNESCO-listed Old Town of Corfu, Greece, are used to demonstrate the adaptive nature of content and how the system and developers handle different uses. The proposed approach offers new narration tools for content experts while it may be used to support personalised visitor experiences.

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INTRODUCTION

Handheld devices and social software influence greatly the area of information science, where the following shift pattern is commonly observed: older information-centered systems featuring single access-points are replaced with new dynamic systems allowing physical navigation and information-exchange in real spaces (Graube, Ziegler, Urbas, & Hladik, 2013; Vlist, Niezen, Rapp, Hu, & Feijs, 2013). The wide availability of handheld multimedia-enabled networked devices (Stobbe, Just, Heng, Kaiser, & Walter, 2006), the rise of networking and social software (Chatti, Jarke, & Froh-Wilke, 2007; McLoughlin & Lee, 2007), the changing trends in mobile (Kenteris, Gavalas, & Economou, 2009) and urban tourism (Wang, 2013) may be identified as the main drivers of the convergence process introduced in the area of cultural tourism (Smith & Richards, 2013). However, existing content is for most instances not suitable for interactive augmented-reality based navigation within physical spaces (Hable et al., 2012; Ledermann & Schmalstieg, 2005; Takacs et al., 2008; Van Krevlen & Poelman, 2010), as it is designed for access within existing information-organization paradigms (linear, tree-based or graph-based). Take for example a narration designed to cover a specific museum collection using a multimedia kiosk or a mobile headset using headphones. Designers of such systems base the functionality of their end-systems on a specific hierarchical tree of information or a pre-determined visitor route. As a result the user is forced to follow a pre-determined guided route (Abas & Badioze Zaman, 2010; Blanton & Design II, 2011; Garrand, 2010; Lombardo & Damiano, 2012; Ursu et al., 2008), where deviation from this path is either not allowed or it creates inconsistent and loose navigation paths as narration is reduced to the minimum and fails to present content through a rewarding experience. On the other hand, the use of mobile devices enables users to employ event-driven sensing mechanisms for direct content exploration (I. Deliyannis, 2013) and their social software applications (Ioannis Deliyannis & Kanellopoulos, 2008; Ioannis Deliyannis, Karydis, & Anagnostou, 2011) for the identification of user-preferences and even advertising purposes. Users are accustomed to the use of such applications today in a wide array of domains. In those implementations utilize different sensing devices provided by the hardware. Commonly such software is designed to collect various streams that are aveluated in order to produce the appropriate user-content interaction mode (Blanton & Design II, 2011; I. Deliyannis, 2013; Khan, Xiang, Aalsalem, & Arshad, 2012; Timmerer, Waltl, Rainer, & Hellwagner, 2012; Tsiridou, Zannos, & Strapsatsakis, 2012; Waltl, Rainer, Timmerer, & Hellwagner, 2012a, 2012b). As a result, a pre-determined navigational route does not always have to bind the system’s interaction capabilities, but it may be used as a new and adaptive content access method for interaction with content (Ioannis Deliyannis, 2012a). From the narration point of view, it is necessary to advance beyond the linear or the top-to-bottom hierarchy of content to a local-to-global information organization paradigm that covers multiple user-paths (Abas & Badioze Zaman, 2010; Blanton & Design II, 2011; Garrand, 2010; Lombardo & Damiano, 2012). In short, a single information trigger (user action) may have to be linked to multiple content entities (multiple system reactions), serving various user needs and content presentation requirements (Deliyiannis, Floros, & Webster, 2009). Some view the convergence process as the combination of existing “content” with new “delivery” mechanisms (Flattum, 2011). Although correct in principle, this definition is oversimplified and often underestimates the scope of change introduced with convergence (Ioannis Deliyannis, 2014a). As a result, the need for information re-engineering (Pino & Di Salvo, 2011) supported by the development of adaptive systems, are both significant factors that need to be implemented in order to cover the interactive information access requirements that arise by state of the art experimental multimedia applications (Weyns, Malek, Andersson, & Schmerl, 2012).