

Mesh-t: an on-going project on ubiquitous and context-aware technologies in tourism

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Abstract

Challenges presented by current and constantly evolving technological, interaction and human variables linked to e-tourism have led to the need of understanding this industry as a living ecosystem. This paper presents an overview of an ongoing research project underdevelopment in Aveiro, Portugal in which e-tourism services and applications are being looked at according to core concepts such as ubiquity, participatory culture, transmedia storytelling and where understanding of human experience is being used to shape its interaction, functional and technical outline. These core concepts, some preliminary results and conclusions and future work are described throughout this paper.

Keywords: ubiquity; e-Tourism continuum; Social media; participatory culture; transmedia storytelling

1 Introduction

This paper presents an overview of an ongoing project called **mesh-t**: pervasive, ubiquitous and context-aware technologies in tourism. It explores current and future trends in the use of Information and Communication Technologies (ICT) in tourism contexts, such as: the use mobile technologies, large surface interactive displays, recommendation systems based on context-aware principals and Web 2.0 concepts; and it is concerned with core concepts such as ubiquity, transmedia interaction and storytelling and participative culture.

The project, developed with the support of a National Strategic Reference Framework (NSRF) grant (<http://www.qren.pt/index.php?lang=1> [Jun. 3, 2011]), was thought out according to current strategic concerns within Portuguese tourism. Its consortium includes partner members of the University of Aveiro (<http://www.ua.pt> [Jun. 3, 2011]), from Portugal, in this case the Centro de Estudos das Tecnologias e Ciências da Comunicação (CETAC.MEDIA: <http://www.cetacmedia.org/> [Jun. 3, 2011]) and the Institute of Electronics and Telematics Engineering of Aveiro (IEETA: www.ieeta.pt/ [Jun. 3, 2011]) research groups, and a company partner Ubiwhere (<http://www.ubiwhere.com> [Jun. 3, 2011]).

The project encompasses the development of 4 technological solutions: a museum mobile multimedia guide; a travel mobile multimedia guide; a solution based on large scale interactive surfaces (interactive wall); and a web portal, which will connect/support all the services shared within mesh-t. During the experience and interaction with these technological solutions we hope that tourists will learn more and be able to recall their experiences (Marty, 2007) in what author Barry (2006, p.2) defines as a "virtuous circle" relationship. Each one of the above listed solutions, despite their differentiated nature, is expected to result in a unified transmedia system and experience. Figure 1 illustrates the mesh-t project, focusing on the technical devices and the interaction between content and users.

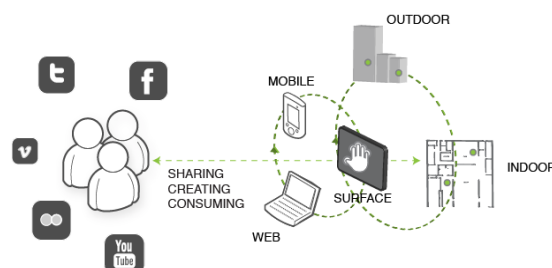


Fig. 1. The mesh-t project outline with its human, technological and social variables

The remaining of this paper includes the description of the core concepts used to define much of the theoretical and practical framework adopted. Work done on the project may be followed on Facebook¹ and on Twitter².

2 The project's theoretical framework and core concepts

The mesh-t project has been developed according to a transdisciplinary approach. Work done in scientific areas such as human-computer interaction, sociology, psychology, informatics and information visualization, has helped define some of the core concepts used to position the project. The following sections compile part of the theoretical framework adopted.

2.1 The e-Tourism ecosystem, the Before, During and After experience continuum and its rhizomes

ICT has led to major shifts in numerous contexts and Tourism has included it as a key variable, in a wide range of its intrinsic activities, as pointed out in work by Buhalis and Law (2008), Shanker (2008) and Georgeta and Amelia (2008). E-tourism, as defined by Buhalis (2003) and further discussed according to specific particularities within it (Pereira & Raposo, 2011), may be understood, at a broader scope, as the application of ICT on the tourism industry. However, if looked at a closer range we may probably define e-tourism as a living ecosystem made up of more than just technology. It is, in fact, a dynamic living system constantly changing and growing according to additional variables, which include users and their emotions, their will to communicate and establish relationships and fulfil desires and needs. This assumption originates the need to approach this ecosystem and try to understand its dynamics. The result is the establishment of what may be defined as the e-tourism ecosystem, made up of the tourists' experience continuum and a multitude of rhizomes created on the basis of relationships and influencing through sharing.

At the core of any e-tourism activity we will find the tourist and his or her will to engage in a tourism related activity and the fulfilling of this will in a Before-During-After (BDA) momentum (Niininen, Buhalis, & March, 2007). Tourism is a type of service that consumers cannot experience early, and often only at the destination that tourists are aware of the exact reality. Thus, tourists increasingly seek information via alternative and differentiated channels to reduce the risk in the destination decision process (Min & Sheng-qiang, 2009). It is easily comprehensible that Word Of Mouth (WOM) can be an important influence in the decision process in purchasing or trying a new good or service (Gremler, 1994 apud Arsal, Backman, & Baldwin, 2008; J. Holloway, 2004). The WOM has become an important and influential source of information for tourists when choosing a destination (Arsal, et al. 2008; Sharda, 2010). This may probably be understood as the Before phase in the tourism experience where the tourist searches for information, mainly using the Web as a preferential accessible source for information; without knowing he is also influencing other tourists with actions such as his Youtube video views, possible likes on Facebook content and comments or questions placed in forums or blogs.

The During phase of the experience may be understood as the group of activities undertaken by the tourist from the moment he leaves home until the moment he returns. During the course of this phase, through the progressive use of technology, and mainly mobile technology, the tourist may do such things as use mobile guides, augmented reality applications, consult online content about various types of information (restaurants, accommodation, events, etc.), purchase tickets, make reservations, etc. Yet again it is believed that all these activities, besides having a direct influence on the tourist experience may also influence others, which are sharing the information provided.

It is believed that the After phase of the experience includes all the activities developed when the tourist gets back home. In a nutshell these include sharing content such as photos, videos and comments. Bookmarking and annotation tools are, in these cases, widely used to create a continuity between the before, after, and the tourist experience (S. Bowen & Filippini-Fantoni, 2008; Barry, 2006). The use of such tools can facilitate and enhance the knowledge of visitors, by creating a stronger relationship between people, places and stories and the visitor, encourage a positive response about the visit and increase the visitor satisfaction and desire to learn more (Marty, 2007; S. Bowen & Filippini-Fantoni, 2008). As in previous phases of the experience, through the act of sharing, the user is also influencing in a direct or indirect, voluntary or involuntary manner. It may be said that,

¹ <http://www.facebook.com/mesht.pt>

² http://twitter.com/mesh_t

throughout the e-tourism experience we share and thus we influence. This influence, propagated along the web of relations we establish online, is what we consider to be the e-tourism continuum, for actions taken continue to influence the actions of others beyond our own experience. The mesh-t project has looked towards these concepts in order to define: contexts of use; user expectation according to each phase of the experience; technology and transmedia interaction enabled in each phase; and the information format and flow throughout the experience.

2.2 An easy flow anywhere, anytime and with anything

Kleinrock (2003) predicted that: Internet technology would be everywhere; it would be always accessible; it would be always on; anyone would be able to plug-in from any location with any device at any time; and that it would be invisible. These predictions may be summarized in 3 main concepts: nomadicity, embeddedness and ubiquity.

With advances in mobile technologies and infrastructures, there has been an increasing demand for ubiquitous access to tourist information systems, something already mentioned in 2005 by Dickson and Ho-fung (2005). Currently, with the widespread of existing mobile networks, computers, mobile phones and other devices may connect to these networks and communicate with each other with gradually fading time and/or location restrictions. One may say that the technology cloud is getting larger and that everyone is getting more immersed in it by the second. Today's challenge, the so called Internet of Things, is to allow objects and devices used in our day-to-day life to connect with each other and all types of networks, thus establishing a platform support for information and communication flow in various contexts of use. The connection of all these objects introduces a new dimension to communication, leading to a new era of ubiquitous networks, something presently not looked for in the mesh-t project but that has taunted much of our "what if" discussions. For the time being our Internet of Things is a bet on the development of a solution capable of enabling transmedia interaction and storytelling, in part as presented by Henry Jenkins (<http://bit.ly/n1B43B> [Aug. 23, 2011]), but with a greater emphasis on the possibility of sharing personal stories based on tourism related experiences across multiple platforms and formats through the use of current digital technologies commonly used in e-tourism scenarios. One of our main concerns is working towards this possibility of sharing without the risk of stumbling over virtual gaps at an interaction, visualization and communication level when crossing from one technological setup to another.

3 Conclusions and Future Work

In this work, an innovative approach is being used to design a tourism service in which the users can consume/produce/share content anytime/anywhere with other users in a highly interactive and transmedia manner. Thus, the mesh-t project is expected, in the eyes of its team, to provide a solution that combines emerging technologies and platforms and new communication standards, aiming to achieve results both appealing and ubiquitous.

Future work encompasses the complete development of the listed components of the overall solution – interactive wall, mobile application, web portal – supporting an innovative, personalised and fully integrated mechanism to improve user experience through user profiling and personalization. As tourists are continuously interacting with nearby environments, while on the move, it is important to offer them personalized services, adapted to their current context, explicit or implicit needs and preferences. Secondly, usability and user experience evaluation will take place in different phases of the development, concluding with a field evaluation with end-user tourists in order to gather important results concerning the users' expectations and actual use of the *mesh-t* service. However, it is our will that, as in any up-to-date technological solution, the project will be forever ongoing and try to adjust to whatever challenges or trends may come along.

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