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Augmented Reality and Storytelling in Cities: An Application to Lisbon Street Art

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***Abstract*—**Cities are spaces of memory with several zones (parts of cities) with their own history and cultural events. Today, cities are also marked by a form of intangible cultural heritage like street art, which creates a visual culture based on the process of reflection about the city and the world. To link these realities and create a personal user interaction with this cultural heritage it is important to capture the story and aesthetics, and find alternatives to immerse the user in these spaces of memory. To that end, this article presents a project which combines Augmented Reality technologies and concepts of Transmedia Storytelling applied to Lisbon City, using Street Art artifacts as markers in a framework of digital media-art.

***Keywords*—**Cultural heritage, urban art, street art, augmented reality, transmedia storytelling, digital media-art, socio-museology.

I. Introduction

CITIES are spaces of memory with several zones (parts of cities) with some form of relation with this history or cultural events. These cities are used today by street artists, known as writers, to create forms of conceptual artifacts in order to share with people their perception of the world and the city. Street Art, Urban Art and Graffiti are forms of art that use public spaces, such as a city, as working environment [1], [2]. Some cities, like Lisbon/Portugal, are today marked by these artists, who create a visual culture, as an alive and dynamic exhibition in public spaces. Although these artifacts are ephemeral (remain shortly in the walls), they are a form of art that marks city culture and aesthetics, creating a unique identity.

The concept of cultural identity is also used in Sociomuseology [3] applied to museums and heritage, where it combines archeology, sociology and museology focusing on the need to strengthen the cultural identity and memory of places. In the case of a city, street art creates this memory not only by the artifacts, but also by the culture of social intervention associated with its creation. However, to get a sense of this reality, it is necessary to create a custom form of interaction and immersion (not just a simple walk through the places), which allows to capture the essence of these places in digital formats. For this purpose, it is necessary to combine information, entertainment and interaction to create user engagement.

This research attempts to answer a question related to the role of narrative and digital interaction in cultural and natural heritage, using transmedia storytelling concept [4], [5] and augmented reality technology, considering this case a city with street art as intangible cultural heritage. This investigation is based on a research question about the usage of user digital narrative and interaction with cultural and natural heritage, using the concept of Transmedia Storytelling "Fan Fiction" [4], [5]. In this article, we apply this research using the concepts of Transmedia Storytelling, Augmented Reality technology and forms of digital media-art, as techniques for this purpose, applied to the Street Art in Lisbon, Portugal. This article is part of a series of publications, which began with the publication of the article "I-Place (Augmented Reality and Transmedia in Museums and Cultural Heritage)" in Artech2015 [6] and the practical application to a Garden and Natural Heritage in Digital Heritage 2015 [7].

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II. Augmented Reality (AR)

AR allows juxtaposing multimedia content (e.g. 3D models, animation, video, audio, and websites) on a real image captured by a video camera in real-time [8], [9]. Its operation depends on an object that can be recognized to trigger an action, usually for multimedia content interaction and visualization. AR is positioned between the real world and the virtual world [10]. The difference between augmented reality and virtual reality is that in AR, the computer adds information about the image while maintaining the real view of the surroundings captured, while in virtual reality the user is immersed in a world that simulates the real. Currently, mobile computing devices have decreased in size, increased in computational and graphical power, and decreased in price, allowing its wide use for AR in terms of access and interactivity [11]. These devices can be complemented by the use of GPS (Global Positioning System) to align real image, its geographical position and juxtaposed 3D object outdoors, or infrared or WPS (Wi-Fi Based Positioning System) indoors [11]-[13].

AR can be seen as a form mediation using interaction and customization that supports forms of narratives where the user himself can be the narrative creator, creating a form of user engagement.

III. Transmedia Storytelling

The world today is dominated by the use of Internet communications and mobile devices access to multimedia content, which allows ubiquity, interaction, immersion and randomness (in the sense of customization) as never before possible [5]. However, it is necessary to frame and relate these contents based on the same narrative arc but allowing additional collaborative and user-creator narrative employing

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the Transmedia Storytelling concept. Henry Jenkins [4] defines "Transmedia Storytelling" as the art of creating a universe and a process of dispersion of history/fiction in multiple channels, guided by a goal of creating a unique entertainment experience, but coordinated so that each part can contribute to history. Henry Jenkins also refers to the concept of "Fan Fiction" as the possibility of users to adapt and create their own content, such as stories within the narrative arc of the main story [4]. This focus on the narrative and user collaboration, from a channel or a character, is a fundamental aspect to create the dynamics of interactivity and history personalization. Its applicability gains a new dimension when combined with AR, to create personalization, interactivity and virtualization as a means of exploitation of digital narratives, and as part of the enjoyment of an artifact, such as street art in a city context.

IV. Graffiti, Street and Urban Art

Street and urban creativity includes forms of expression ranging from performing arts to diverse visual forms of self-expression [1]. Street art, urban art and graffiti are ephemeral art forms that use public spaces, like a cityscape, as a working environment. Graffiti is generally related to a style of writing or drawings, street art consists of pictures, characters and forms that seek communication with a larger public (including online), and urban art is a form of street art that includes also legal work [2].

The artist (known as writer) uses several materials (e.g. spray, stencils) and supports (e.g. walls, trees, urban furniture) to design phrases, symbols, characters, images and other representation of concepts of protest, irony, humor, subversion or just gratuitous acts of beauty. The street intervention can be done in an abandonment zone, commercial zone or residential zone. Normally it is ephemeral (they are cleaned after some time or replaced by other artifacts), but it creates a visual culture in the city that becomes a form of exhibition room.

V. Related Work

We have been working with Aurasma Studio and WordPress technology to create a combination of Blog complemented by AR applied to Caloust Gulbenkian Foundation Garden [7].

AR and Transmedia Storytelling have been used also in heritage related to cities, like in the case of the London Street Museum (UK), Rewind Cities (Lisbon), Architip (Greece) and Sintra/Portugal Talking Heritage project. In the world of Street Art, AR has been used in Mobile APP like Stiku, Real Graffiti, and Street Tag. Some writers, like INSA or BLU, have worked with digital artists to create some animations based on their artifacts. These trends inspired the design of intervention in the Street Art Lisbon project where we have an ongoing creative process of research. The first phase now completed is based on common AR application Aurasma Studio and WordPress Blog using the concept of a media-art artifact called "I-Place" [6].

VI. iStreetArtLisbon Project

Lisbon is one of the best cities in the world to see Street Art. This fact is the result of a dynamic subversive intervention of Street Artists, combined by the role of the Town Hall that created a specific department named GAU (Urban Art Department) that coordinates several interventions in the city. As part of this effort of GAU, the publisher Zest Books launched in 2014 the book Street Art Lisbon, in Fig. 1, composed by a map and images of 197 Street Art artifacts.



Fig. 1 iStreetArtLisbon Book

Based on this book, we created the iStreetArtLisbon artifact based on our I-Place concept [6], presented in diagram in Fig. 2, to create a vision of Lisbon memory communicated through Street Art, based on the following:

- Definition of a narrative about how the city "needs" to communicate all its memories with people and for that purpose uses the street art artifacts as a dialogue portal. This portal is the graffiti work created by the writers in specific locations, because they "understand" the city and because of that they open gates in specific areas using its artifacts;
- Study of the city considering the zones related to its history and culture. As a result, we create the ancient central zone, the zone where the Portuguese world discoveries were based, the ancient rural zone that today are part of the city and the modern zone where Portugal organized the World Exhibition in 1992. Each zone has its own memories (history and culture). This zones were defined also in Google Maps together with the location of the artifacts in each zone;
- Mapping of citations (short phrases) of famous literature writers according to each zone. For instance, in the ancient zone the citations are about the old places relation and is relation with life;
- For 23 artifacts, we created a graphic illustration with the artifact image and a citation coming from the artifact with a dialogue balloon;
- We prepared a Blog with WordPress using contents related to Street Art, Lisbon, Routes, Zones and a specific Dialogue page with the 23 posts, one by each artifact;
- We used these 23 artifacts as triggers in the street and in the book, to create aura animations in Aurasma AR APP Studio.

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As a result, we created an integration view of street art Lisbon with a Blog and AR APP, based on the same content, as a dialogue concept between the city and people, as presented in Fig. 2.

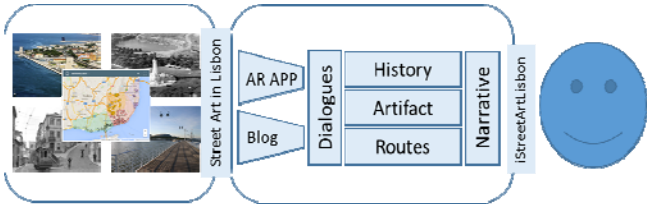


Fig. 2 iStreetArtLisbon Artifact

In the case of the WordPress Blog https://istreetartlisbon.wordpress.com presented in Fig. 3, we integrated also Google Map to show in routes the location of all 197 artifacts, and for each artifact we included content about its classification, author and indication if an AR interaction exists. We detailed also the concept of Street Art, the Lisbon history, the project narrative and the description of best places in the city to see street art (based on the street art artifacts in specific locations).



Fig. 3 Blog iStreetArtLisbon

The main interaction is the dialogue page, presented in Fig. 4 that includes posts for each of 23 artifacts allowing to comments to create the interaction using this kind of blog media features. Each post was classified in a category according to places, to allow filtering.

The second interaction page is “places”, presented in Fig. 5 that includes contents about the places and location of the artifacts using also Google maps.

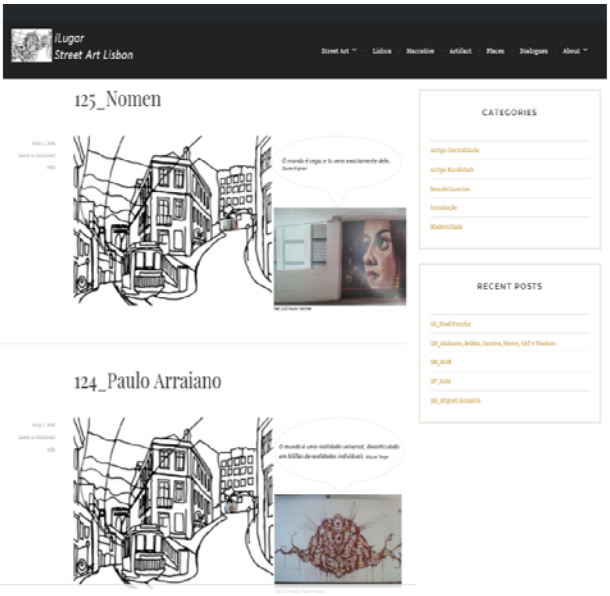


Fig. 4 Blog page dialogues

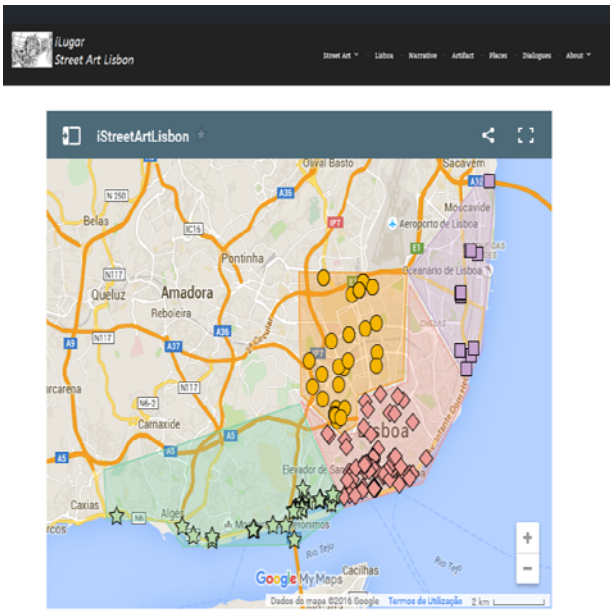


Fig. 5 Blog Page “Places”

Using Aurasma Studio we defined the live graffiti images as triggers and reuse the illustration of each of 23 graffiti in the dialogue posts to become the overlay, creating the appropriate auras to be used in the APP Aurasma under the campaign iStreetArtLisbon. In Fig. 6 we present some results.

Using the same iStreetArtLisbon campaign in Aurama Studio, we defined new triggers for each equivalent image in the book linked to overlay as the ones used in the live images, creating new auras. In Fig. 7 we presented some results.



Fig. 6 Blog of Posts Dialogue



Fig. 7 Blog of Posts Dialogue

VII. Conclusion

This paper addresses the role of AR and Storytelling in a city using street art as point of access to the city memory in its engagement with people. To design the intervention, we considered the concept of digital media-art and arthrography as a way of using technology as a means and as a product [14], which enables us to make a reflection on the artifact and concept in the genesis of it, which helps in the construction of the proposed intervention. We use arthrography because it is a methodology for digital artists, who most of the time are engaged in the (re)-thinking process about the concepts behind the artifact being created. According to [14], practice has shown that the deeper the artist-author can experiment in this process, the higher the propensity holds to achieve better results in terms of aesthetic quality.

The result is a look to a city and his street art as an intangible cultural heritage, using two different channels, a blog and AR APP, based on the same content. To create an engagement with the people, we created project narrative that justify the concept as a city that need to communicate with people using street art and writers (street art artists) as a channel and the I-Place concept as a medium.

The usage of images in a paper (book) and in a public space was possible to be recognized, creating the proper identification as marker to activate the animations. In terms of the Web site, the Blog concepts was a good option because create the concept of "talking with", reason why we create a central page called dialogues with several posts as contents reused also in the AR APP.

Acknowledgment

This work is being carried out in collaboration with the Zestbook publisher that provides us the GPS location of the 197 artifacts in the book.

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