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The 'Synthesis' Virtual Museum – an open virtual exhibition creation tool

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Extended Abstract

The continuous development of web services and computer infrastructures complemented by the increasing availability of game development software engines, contribute to an on-going expansion in the release of serious games (SG) in diverse areas, ranging from entertainment, cultural heritage (CH), education, artificial intelligence (AI), sociology, military to health systems [1]. In this sense SGs can be thought of as bridging culture and education with gaming. By utilizing contemporary visualization and simulation technologies SGs are able to enhance the user experience in realistic environments with enhanced interaction [2]. This form of stimulation is considered to be one of the basic factors for the successful user activation, being the force that promotes focusing in the activity process and encourages users to continue. Stimulation may be considered as a targeted mechanism to achieve the desired results, and is greatly supported by using SGs [3]. The notion of virtual museums and exhibitions has been introduced as a means to overcome the limitations of the physical space and to provide a vivid experience to remote visitors [4]. An overview of virtual museum technologies is presented in [5].

Numerous works utilize various technologies to support cultural heritage purposes, such as historical teaching and learning, or to enhance museum visits. In [6], a management system of 3D digital models and a dynamic virtual exhibition showroom was introduced as a dynamic web-based virtual museum framework. In addition, in [7] a more realistic framework for digital museums has been presented with the creation of a non-realistic digital replica of a museum that presents its educational activities and not its exhibits, aiming at producing more actual museum visits. In [8] interactive SGs for the promotion of a prehistoric heritage site of the Gargas caves were presented. In [9] a state-of-the-art review was presented for the existing theories, methods and technologies utilised by SGs as cultural heritage promotion tools, showing several case studies representing those technologies. Taking a step further, works like [10] focus on a generalization of the task-based learning theory with great advantages of smartphone support. In addition, the researchers in [11] proposed a new approach in navigating within complex cultural scenes by exploiting content-based descriptions. Scaling down to the smaller scale, the researchers in [12] propose a content-based navigation framework for a virtual museum, based on metadata that describe the exhibits, thus providing semantic-similarity-based navigation. In a recent work [13] a multi-user virtual exhibitions framework has been proposed that adapts to the visitors' preferences. In [14] an SG is proposed based on a cultural heritage scenario, and tries to enhance knowledge of cultural heritage by spreading a mystery in the ancient world.

Differentiating from previous works, we present a novel content-dynamic web-based SG system primarily focused on creating virtual exhibitions (the 'Synthesis' virtual museum), which relies and exploits the rich content of both internal and external web cultural resources to empower users to generate their own exhibitions through the usage of cross-platform gaming technologies. The 'Synthesis' virtual museum is not like any other virtual museum in that it is not the stakeholder of the exhibits; it is just the host virtual environment. It is built upon the Open Linked Data concept, thus supporting the creation of virtual exhibitions for

cultural and educational purposes by maintaining purely persistent URIs and URLs. The 'Synthesis' virtual museum offers:

- VR-like, non-immersive 3D visualization, navigation and interaction
- Cross-platform functionality
- Purely user-driven dynamic exhibitions
- Interconnection with external resources based on data interoperability

Fig. 1 presents an overview of the functionalities supported by the system. The current implementation of 'Synthesis' Virtual Museum supports exhibitions in the form of 2D images mapped onto flat surfaces, like painting frames. Both exhibition visits and exhibition administration are provided through the same, unified, Graphical User Interface (GUI), thus making administration much easier and more intuitively coupled with the end-user experience.

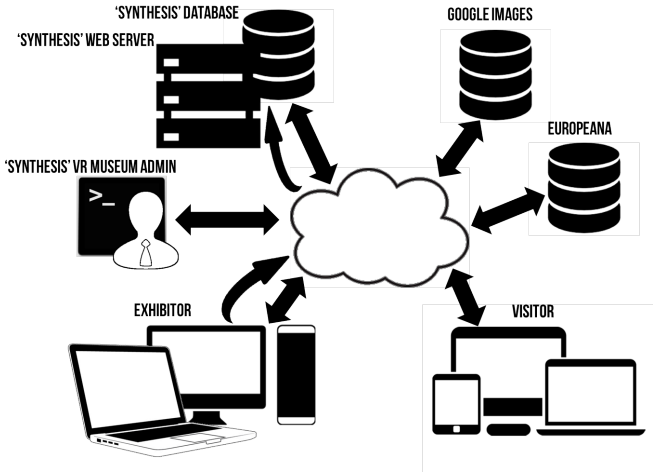

Fig. 1. Abstract functionality diagram of the system

The system requires that all users be registered. Each registered user is able to either browse and visit exhibitions, or become an exhibitor and administrator of his/her exhibitions. All exhibitions are viewable by all registered users. Currently, as shown in Fig. 1, the main image data resources are Google Images, Europeana and the 'Synthesis' database (developed for project 'Synthesis'[1] that funded this work). Exhibition management by the users (creation and editing of exhibitions) is screened by a system super-administration (SA) responsible for activating exhibitions after a typical content verification. The exchange of data between the core of the system and the external web-based resources is being done using JSON[2]. The overall graph of requests and data exchange is illustrated in Fig. 1. The virtual building hosting the exhibitions was inspired by the building of "The B & M Theocharakis Foundation for the Fine Arts and Music", Athens, Greece. Fig. 2 shows screenshots of the exterior and the interior of the virtual museum.

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[1] *'Synthesis' project homepage at* http://synthesis.ceti.gr
[2] http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-404.pdf *and* http://www.json.org

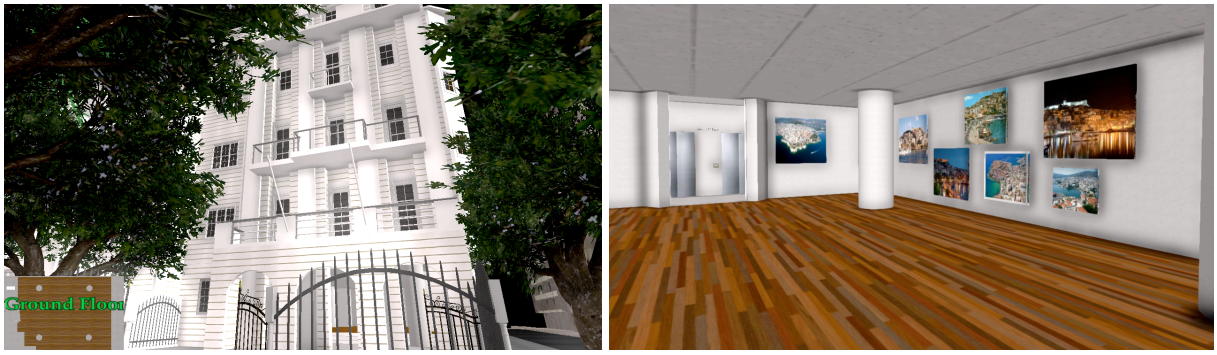

Fig. 2. Screenshot of the virtual building's exterior and of an exhibition in the ground floor

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