PLUGGY: A Pluggable Social Platform for Cultural Heritage Awareness and Participation

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Abstract. One of the preconditions for genuine sustainability is a heritage that is present anywhere and anytime in everyday life. We present PLUGGY, a Pluggable Social Platform for Heritage Awareness and Participation. PLUGGY will address the need of society to be actively involved in cultural heritage activities, not only as an observer but also as a creator and a major influencing factor. With PLUGGY, we aim to bridge this gap by providing the tools needed to allow users to share their local knowledge and everyday experience with others, together with the contribution of cultural institutions. Users will be able to build extensive networks around a common area of interest, connecting the past, the present and the future. It will be powered by its users and puts people's values, aspirations and needs first. Users of PLUGGY will be the providers of information about cultural heritage in the everyday and ordinary, real life. Through its social platform and by using its innovative curation tools, designed to solely focus on a niche area in social media, citizens will be able to act as skilled storytellers by creating fascinating personalised stories and share them through social networking with friends, associates and professionals. In this paper, we describe a structured formative and summative evaluative approach of PLUGGY's core concepts and the results will be used to inform and improve its design.

Keywords: Cultural Heritage, Crowd sourced, Content, Digital Cultural Heritage, Faro Convention.

1 Short description

1.1 A new Paradigm in Cultural Heritage

PLUGGY has been inspired and built around the Convention on the Value of Cultural Heritage for Society (Faro Convention, 2005) and expresses its notions and principles in most of its developments. The Faro Convention, born out of the desire of the Committee of Ministers of the Council of Europe to create a framework that would show what kind of economic, social and cultural possibilities and resources cultural heritage can offer, argues that a heritage that is everywhere, and relevant to everyday life, is likely to be one of the preconditions for genuine sustainability. This is certainly the case at the social and cultural levels, but also at the economic and environmental ones [1]. The convention itself stresses the importance of heritage communities, deemed as social groups who value specific aspects of cultural heritage which they wish to sustain and transmit to future generations within the framework of public action [2]. The Faro Convention outlines a framework for considering the role of citizens in the definition, decision-making and management processes related to the cultural environment in which communities operate and evolve. Citizen participation has become an ethical obligation and a political necessity. It revitalises society, strengthens democracy and creates governance that can renew the conditions for living together, encouraging wellbeing and a better quality of life. Thus, a new heritage paradigm is becoming visible. In the traditional view, material things were privileged, and values were based on supposedly intrinsic properties or represented a national history. This was a paradigm that encouraged the reduction of heritage to tourism and consumption. In contrast, the emerging new paradigm puts the production of heritage in the foreground, and aims to encompass greater democratic participative action, with greater concern for the local and the everyday. It uses the concept of landscape that is promoted by the European Landscape Convention (which is increasingly popular in academia and policy) as a global frame for heritage, recognising that heritage assets and objects offer fundamental social and economic values and benefits far beyond those traditionally recognised [3].

1.2 Overview of PLUGGY

Currently, limited ICT tools exist to provide better support to citizens in their everyday activities in shaping cultural heritage and being shaped by it. There are important initiatives to build applications and repositories for heritage dissemination which compile collections from museums, libraries and other institutions through virtualization (e.g., Europeana, Google Cultural Institute). However, these have been top-down driven by institutions and have so far not succeeded at involving citizens in the creation of heritage communities around them. In contrast, current social platforms have demonstrated their potential to build networks through the individual and distributed contributions of users. However, their possibilities have not been fully exploited with regards to cultural heritage promotion and integration in people's everyday life. PLUGGY aims to bridge this gap by providing the necessary tools to

allow users to share their local knowledge and everyday experience with others together with the contribution of cultural institutions such as museums. This joint effort builds extensive networks around a common interest in connecting the past, the present and the future. This is in accordance to Flinn [3], who emphasized the importance of diversity within our national histories and archives, and that we all, professional and non- professionals, need to find a way of ensuring that community histories and archives are preserved.

The objectives in this project are to: (1) design, develop and implement a heritage-centric social platform; (2) design an architecture of the social platform to allow the easy integration of applications; the scalability of the platform and the support of specialised devices (e.g., AR/VR/trackers etc.); (3) design, develop and implement the integration of the PLUGGY Social Platform with online digital collections and other social media; (4) design, develop and implement the curatorial tool for creating stories with meaningful narratives resulting in Virtual Exhibitions around specific topics; (5) design, develop and implement four different applications, utilizing the social platform and the curatorial tool, in order to showcase the potential of the platform and to be used to kick-start applications for the post-project life of the platform; and finally (6) evaluate the impact of PLUGGY and the pluggable applications in a variety of case studies.

2   Partnership

The PLUGGY consortium spans across 5 different countries: Greece, Spain, Italy, UK, and Slovakia. The universities included (UMA, TUK, ICL) and the research institute (ICCS) specialise in social platforms, authoring tools, Virtual and Augmented Reality, knowledge management, semantics and 3D audio. The SMEs (XTS, VIA, CLIO) have extended knowledge and experience in gamification, game development, user engagement and exploitation of these technologies, while CLIO has also experience in cultural heritage stories curation. The museums (PIOP, ESM) receive about 210,000 visitors per annum, palcing them in an ideal to position to disseminate PLUGGY and to engage their visitors in the Social Platform.

3   Open challenges

3.1   The Role of Communities

According to Giaccardi et al. [4], contemporary heritage studies teach us that values are not attached just to artefacts, buildings or sites, nor are they frozen in time. Instead, they are the results of ongoing interactions in the lived world of ordinary people. Giaccardi et al. emphasizes that heritage is something we socially construct in the context of our own lives as a way of meaningfully interacting with our past and shaping our vision of the future. Fortunately, digital and social technologies are facilitating distributed forms of curatorial practice, which can be harnessed to democratize history [6]. Although, we still need to understand better whether and how ubiquitous and

communication technologies like social media shape and sustain a shared sense of identity and belonging for current and future generations [4], there are examples of previous work in cultural heritage where social media plays a central role, e.g. in distributed curation and personalisation (further discussed below).

3.2   Personalization in Cultural Encounters

Social media can also play a role in the personalisation of information technologies. People are often overloaded with an increasing amount and variety of cultural items making it difficult to identify what is interesting. Therefore, there is a need to personalise visits to cultural objects, to visitors' knowledge and connections, to ensure interactions are effective. For example, ArtLinks was developed to provide a guidance system based on a public display in museum exhibits that allowed visitors to create and use tags to help guide other visitors [7]. ArtLinks aimed at encouraging social interactions and enhancing experiences by supporting visualisation of people, words and their connections related to an exhibition. Similarly, MobiTag [8] is an electronic guide that supports semantic, social, and spatial navigation in museums by allowing visitors to create and vote for tags. Furthermore, Han et al. [9] developed a mobile application called Lost State College (LSC) and showed that users utilised social features as a way of learning local history and interacting with others, co-creating digital traces and rich layers of local history information. Users shared information using social features, which allowed different types of connection to the local history. Personalisation, derived through interactions between visitors of cultural environments, has also been supported using data from popular available social media sources such as Twitter, Instagram, Wikipedia and Flickr. For example, McGookin and Brewster designed PULSE [10] to allow users to gain a vibe (i.e., an intrinsic understanding of the people, places and activities around their current location) using Twitter data. As users moved, PULSE downloaded public messages (tweets) generated by any user in the current location. Then, PULSE would select the closest tweet and insert it in a virtual 3D auditory environment: users heard tweets as whispered conversations. Bellens et al. [11] explored how social media data can be employed to study tourism on European Cultural Routes and showed its potential for investigating a complex touristic object such as a cultural route. They combined text related to photos on Instagram with Wikipedia for geographical places. This allowed them to identify the most popular stops and localities related to the cultural route. Bujari et al. [1] proposed PhotoTrip, an interactive tool able autonomously to recommend cultural heritage locations along travel itineraries even if those locations were not mainstream. PhotoTrip identified points of interest by gathering pictures and related information from Flickr and Wikipedia and then providing the user with suggestions and recommendations.

Related work has demonstrated how digital cultural heritage transforms the way of experiencing or learning community heritage through social media. The communities are being increasingly involved through distributed curation, where technologies mediate and allow them to contribute to our histories, and personalisation, i.e., where communities' online activities are used to aid in decision-making. Current social platforms have demonstrated their potential to build networks through the individual

and distributed contributions of users. To our knowledge, however, their possibilities have not been fully exploited with regards to cultural heritage promotion and integration in people's everyday life.

4   Tools

PLUGGY architecture is depicted on Figure 1. The main idea is to provide a Content Management Services system available via a well-defined REST API to all possible user tools. In our case example user tools will be the Green boxes in the figure:

- Social Platform
- Curatorial Tools
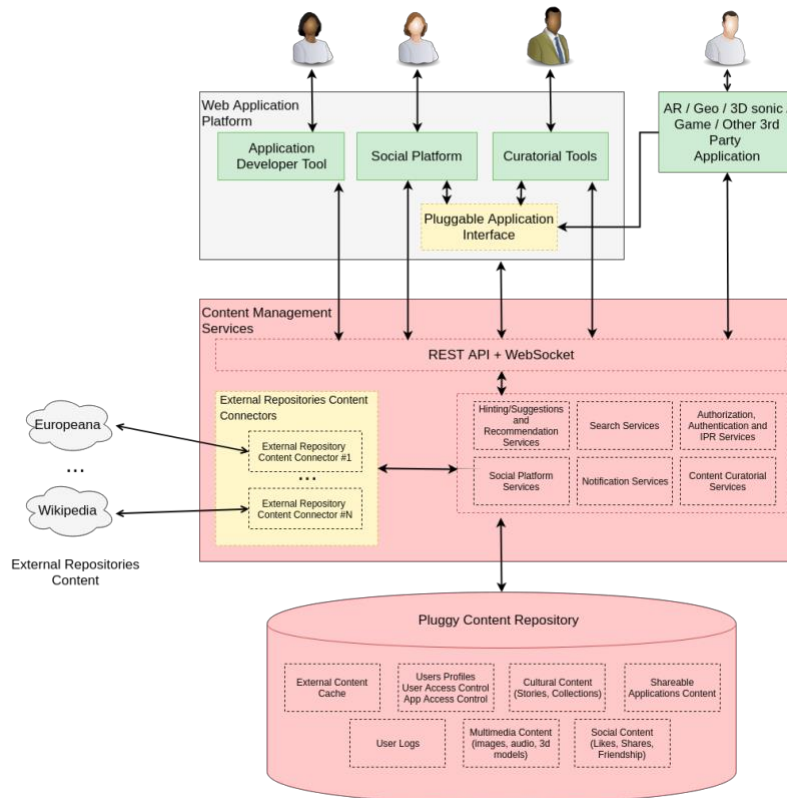- Applications (AR, Geo, 3D)
- Games

Figure 1: PLUGGY Logical Architecture

All these user tools will be able to use any of REST API interfaces. That for example means, that even if the Curatorial Tools are the main tool to create new stories, Games or other Applications can also publish their stories.

The Web Application Platform is a modular platform that allows usage of common functionality, like logging and security, for the Social Platform, Curatorial Tool and Application Developer Tool.

The green boxed user tools will be described mainly in their corresponding deliverables. However, the red boxes need to be clarified here. Let's call these red boxes the "Core PLUGGY Components". From the Figure 1it is obvious that there are two main modules namely:

- Content Management Services
- PLUGGY Content Repository

Content Management Services will contain all needed software components to process, store and serve information to the external user tools via the REST API. These components are:

- External Repository Content Connectors
- Hinting/Suggestions and Recommendation Services
- Search Services
- Authorization,
- Authentication and IPR Services
- Social Platform Services
- Notification Services
- Content Services

All of these components access the PLUGGY Content Repositories for all possible information described later in the Information View section of this deliverable. Basic functions of all different components is described in the following text

Yellow boxes present two basic principles of extensibility of PLUGGY platform:

- Pluggable Application Interface - allow users to explore and create content of different types, that core PLUGGY application does not support
- External Repositories Content Connectors - allow users to reuse content from existing external content repositories

4.1 PLUGGY components

In the following table, we list all the components currently developed.

Table 7: Web Application Platform

Component name:	Web Application Platform
Description:	The Web Application Platform will: Provide common modular platform for Social platform, Curatorial Tool and Application Developer Tools Provide security middleware Provide web components shareable between different modules Provide common PLUGGY layouts

	Allow modules to use Pluggable Applications Interface
Dependencies:	Content Management Services
Technologies:	Angular5, HTML5, CSS, TypeScript

Table 8: Social Platform component

Component name:	Social Platform
Description:	The Social Platform will: Allow users to access to the PLUGGY content Provide a visual representation of the virtual assets Allow users to introduce media content Allow users to access Virtual Exhibitions Allow users to search in PLUGGY overall content Allow users to create social networks and communities Allow to link with other social platforms Support content exchange with the content management services
Dependencies:	Content Management Services
Technologies:	Angular 5, HTML 5, CSS, JavaScript, Typescript, 3D content viewer based on Unity3D and webgl.

Table 9: Application Developer Tool Component

Component name:	Application Developer Tool
Description:	The Application Developer Tool will: Provide user interface for administrator to manage pluggable applications Provide reporting mechanism for the users of PLUGGY to report issues with pluggable applications Enable developers of applications to register their applications to PLUGGY Provide guidelines and set of examples for application developers
Dependencies:	Web Application Platform Content Management Services
Technologies:	Angular5, HTML5, CSS, TypeScript

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4.2 Interdependencies among PLUGGY components

PLUGGY will build upon available software and libraries in order to speed up development and utilise the open source communities. Some libraries have already been identified as potential components of the PLUGGY software suite, namely the libraries from KnightLab and the software from the EU-funded project 3D Tune-In. In the figure below, one can see the relation between the software already identified and the several components of PLUGGY. The KnightLab libraries and the software of 3DTune-In already come under a specific licence, the Mozilla and GPLv3 licence respectively.

Currently there are three distinct components in PLUGGY: a) the back-end services, b) the Social Platform and Curatorial Tool and c) the mobile apps. These components will communicate with each other using web services. The diagram below describes the interdependencies among these components, where the sense of an arrow from A to B means that A makes use of B. This implies that the social platform and curatorial tool, as well as the apps, should be published under a licence scheme compatible with

the third parties they are using. Therefore, a GPLv3 licence is being considered for these components.

However, as we do not want to impose GPLv3 licence to future apps, the PLUGGY back end should be published under a less restrictive licence, as for instance MIT (see 4.1.3 infra) or Apache (see 4.1.5 infra). In any event, the PLUGGY back end licence must be compatible with the licences attached to software the back end incorporates.
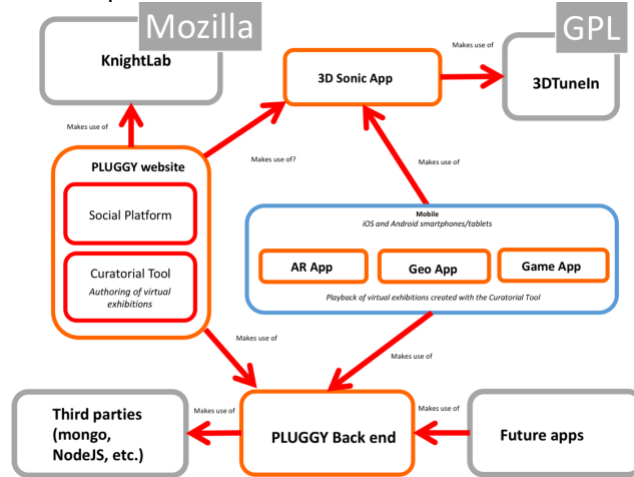

Figure 2: Interdependencies among PLUGGY's components

5   Conclusions

With PLUGGY's social platform, Curatorial Tool and pluggable applications, any sensitised individuals will be able to enrich the cultural heritage of their focal point by uploading materials (i.e. audio, video, images, text, 3D models) and use these in combination with what is already available in the platform to create a more personalised, interactive, and to-the- point story which can then be shared online. PLUGGY, however, will face several challenges: for example, is there room for yet another social platform? And what is the value of having a centralised social platform specifically for cultural heritage over the potential of the various social media services already in use? Moreover, it might be argued that PLUGGY also faces the challenges inherent to the paradigm shift in cultural heritage; institutions and professionals trained to safeguard traditional cultural heritage may have difficulties in applying their skills to safeguard intangible heritage (or any other type of heritage) due to differences in perceptions or truths held in society. On the other hand, it will allow for a diversity of ways to look at history. This will further extend to the issue of trust. What mechanisms should be implemented to gain trust in content and content creators for an effective use of a platform like PLUGGY? Nevertheless, we expect PLUGGY to have significant impacts socially, economically and ecologically. First, it can promote wider understanding of heritage. Second, it can improve innovation capacity and integration of new knowledge as it will mobilise the economic sectors, i.e., tourism and the creative

industries, indirectly promoting local development and entrepreneurship. Finally, it is expected to promote cultural diversity.

6 Aknowledgements

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