

Article Title: A Communities Engagement Tool for Assessing the Resilience and Deterioration of Cultural Heritage Sites



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Nikolaos Touser (Resume)



Nikolaos Touser holds a diploma degree in Electrical and Computer Engineering from the National Technical University of Athens (NTUA) and his specialization is Informatics. He is also a PhD candidate in the same school. From 2014 to 2017 he has been working for the In Silico Oncology and In Silico Medicine research group, National Technical University of Athens, where he has been involved in FP7 research projects. Since September 2017 he has been working for the I-SENSE group. His main interests include among others the design and development of Model and In Silico Trial Repositories, Android applications, embedded systems and web applications.





CHALLENGES ADDRESSED AND BACKGROUND

- Climate change and geo-hazards (e.g., landslides and earthquakes) may have a negative impact on historic areas hosting Cultural Heritage (CH) sites and monuments.
- This, in turn yields significant adverse impacts on economies, politics and societies.
- The deterioration of CH sites is one of the biggest challenges that needs to be addressed through structural responses, preventive measures, restoration strategies and resilience and **deterioration assessment**.



THE COMMUNITIES' ENGAGEMENT ICT TOOL (I)

- In order to assess the resilience and deterioration of the historic areas, a community-based participatory environment has been proposed through this paper.
- It is a web tool that has been developed, entitled “Communities’ Engagement ICT Tool” which aims at engaging cultural heritage aware communities through a web platform.
- It is a specialized software and advanced application that encourages citizens to give direct feedback to the relevant cultural authorities in order to assist them in assessing the deterioration of the cultural heritage sites.



THE COMMUNITIES' ENGAGEMENT ICT TOOL (II)

- The Tool serves as a collaborative environment that can be used directly by the citizens so as to submit stories (or else reports) concerning CH sites deterioration and business interruptions.
- It focuses on the engagement of local communities and business owners in reporting significant problems posed in CH sites or businesses that are caused by extreme events associated with the impacts of climate change and natural hazards.
- Rather than being a standalone tool, it is integrated with the PLUGGY (Pluggable Social Platform for Heritage Awareness and Participation), which is a social network platform for heritage that enables citizens across Europe to enrich the European cultural heritage landscape.



RELATED WORK

- Plenty of research has been conducted on damage assessment of cultural heritage sites.
- Well defined methodologies, methods and tools have been proposed for recording both the inventory of sites and monuments and also the damage, threats and causes. Even, crowdsourcing techniques have been used.
- However, the aim of this paper was through integration efforts to get damage assessment content not from the wider public (which could lead to poor crowdsourcing results), but from the users of a cultural heritage aware community, and more specifically from PLUGGY platform.



FUNCTIONAL REQUIREMENTS OF THE ENGAGEMENT TOOL (1-3)

Functional Requirement No.	Functional Requirement Description
FR1	The Engagement Tool must provide a user friendly interface so as for citizen to be able to store or update info relevant to monument deterioration or business damages
FR2	The Engagement Tool must provide a user friendly interface so as for logged in users to be able to view citizen and business owners stories (or else reports)
FR3	The Engagement Tool must be integrated with the authorization services of a platform specialized in cultural heritage, so as to be able to attract its users with their same credentials



FUNCTIONAL REQUIREMENTS OF THE ENGAGEMENT TOOL (4-6)

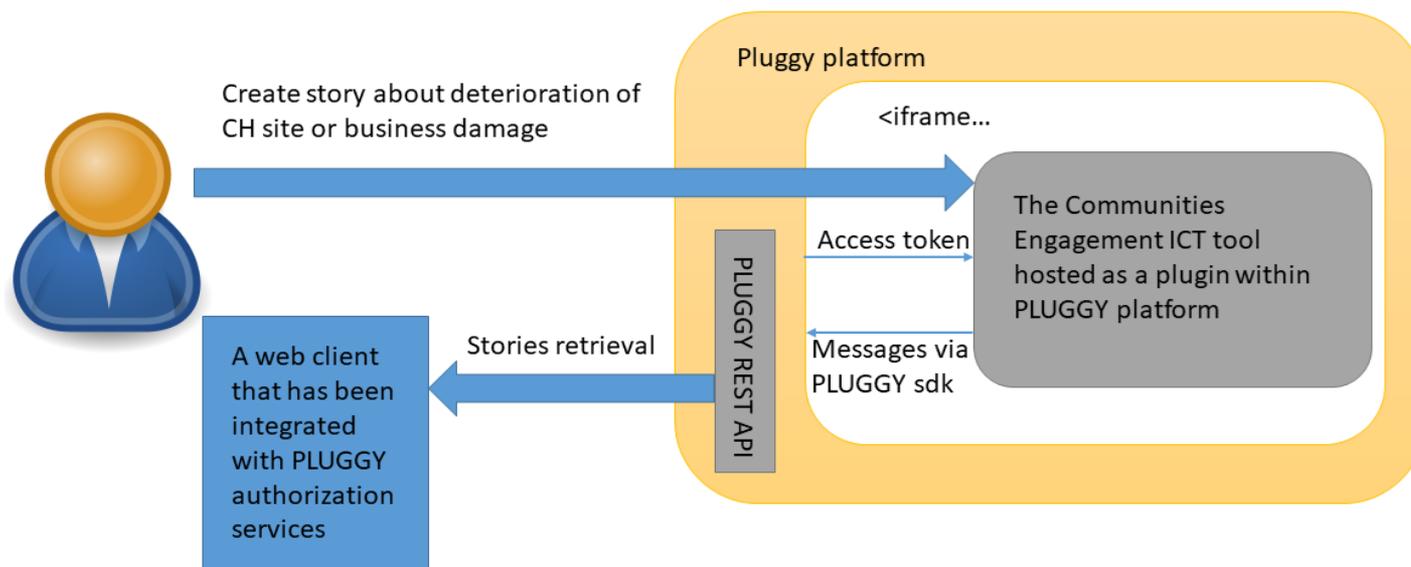
Functional Requirement No.	Functional Requirement Description
FR4	The Tool must store the content generated by the users (i.e., business and citizen stories) in the database of the aforementioned social platform. This would enhance the integration.
FR5	The information relevant to monument deterioration should include at least the following: description of the damage, location of the monument, photos and tags.
FR6	The content relevant to business damages should include information useful to local authorities (e.g. business damage description, relevant tags, location, business risk, etc.)



INTEGRATION OF THE COMMUNITIES' ENGAGEMENT TOOL WITH PLUGGY PLATFORM

The reasons for integrating the Tool with PLUGGY platform are the following:

- Take advantage of the visitors already engaged in PLUGGY (which are CH aware users)
- Be able to retrieve content from PLUGGY platform (monuments info, tags, etc. by making use of its APIs)
- All the content from the Engagement Tool (monuments deterioration ,business losses, etc.) can be viewed both from the Engagement Tool and from PLUGGY.



Integration of the Engagement Tool within PLUGGY platform



THE ENGAGEMENT TOOL MAKES USE OF THE FLEXIBLE PLUGGY DATABASE AND AUTHORIZATION SERVICES

- The Engagement Tool makes use of PLUGGY REST services so as to store the content generated by users to the PLUGGY flexible data model.
- Concerning the security, the OAuth 2.0 protocol is being used for token management (the resource server is the PLUGGY platform and the third-party client is the Engagement Tool)
- Concerning the semantic integration, the Tool makes use of the following PLUGGY entities:
 - **Asset:** The asset in the context of the Engagement Tool plays the role of the media file with an identified owner, a title, a description and a set of tags. The asset mostly corresponds to image files and metadata
 - **Exhibition:** Each citizen story and each business owner story corresponds to an exhibition. The title of an exhibition for a citizen story could be the following: "Notable landmark in Wiltshire has deteriorated. An exhibition may contain many exhibition points
 - **Exhibition Point:** The exhibition point contains more detailed info concerning a story (e.g., for business stories, the business damage description, business risk description and customers lost percentage are included in this entity.)



THE USER INTERFACE OF THE ENGAGEMENT TOOL FOR CREATING STORIES

There are two kind of stories that the user can store within the Engagement Tool through wizards: citizen stories and business owners stories.

Citizen Story Main Info
Title, description and location

Hyperion Citizen Story title
Lansdown monument has deteriorated over winter

46 / 75

Monument deterioration description
A notable landmark in Wiltshire has deteriorated over the winter

Add some tags related to the monument deterioration
landmark damage monument stone

Start typing to view already used tags derived from Pluggy platform

Images of CH site
Images uploading and their location

Pick a point on the map below so as to provide location of Citizen Hyperion Story

Longitude
-1.9426376609571296

Latitude
51.42301802251953

CLEAR LOCATION

Lower Compton
Cherhill
Stockley
Heddington

Leaflet | © OpenStreetMap contributors, © CartoDB

First step of a citizen story wizard. The user provides the title of the citizen story, a description of the monument damage, relevant tags and the location



THE USER INTERFACE OF THE ENGAGEMENT TOOL FOR THE PRESENTATION OF THE STORIES

In addition to uploading through wizards two kind of stories, the users of the Engagement Tool are also able to view already stored stories. Moreover, editing functionalities are also available through dedicated pages.

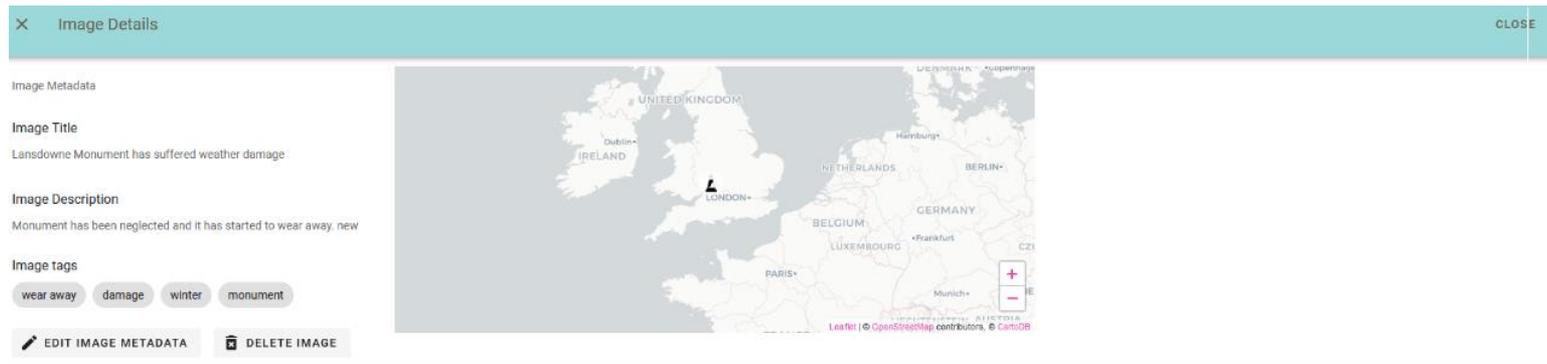


Photo depicting a monument damage along with the relevant metadata(image title description and tags) is being displayed to the user of the Tool



RESPONSIVE DESIGN OF THE ENGAGEMENT TOOL

- The Engagement Tool has been driven by Responsive Web Design – best practices. It adapts the layout to the viewing environment by using fluid, proportion-based grids, flexible images and CSS3 media queries
- This way, the user is able to use the tool and view the content of citizen and business stories from any device independent on its screen size.

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Citizen Story Main Info
Title, description and location

Hyperion Citizen Story title
0 / 75

About Monument damage

Monument damage tags ▾
Start typing to view already used tags derived from Pluggy platform

First step of the citizen story wizard if it was to be viewed in a screen 320 * 510

The Communities Engagement Tool



Thank you