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## TOWARDS ONLINE 3D ARCHIVE OF HISTORICAL SITE: THE TURIN 1911 WORLD'S FAIR

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### Abstract:

Digital technologies as online virtual experiences are more and more emerging and widespread as dissemination tool of culture and education, recreating the past of historical sites and enabling the 'unreal' visualization of no more visible configuration. The present paper illustrates the topic, aims and first analysis related to the first year of research, in the context of the 'Turin 1911' international project. The recreation of a virtual world dedicated to the first World's Fair held in Italy in 1911 is based on digital technologies exploited by Geomatics; the development of an up-to-date online platform containing original textual and graphical documentation aims to support the diffusion of a human-drive technoculture. Firstly the Turin 1911 project mission and vision, related researches and already achieved results are reported. Secondly, the core of the paper explores the preliminary investigations about historical research and geodatabase development related to the Turin 1911 project, finally interesting perspectives are considered.

**Keywords:** geodatabase, WebGIS, cultural heritage, technoculture, international exhibitions, long-term preservation

## 1. Introduction

Nowadays, digital technologies and web communication play a crucial role, especially in time of emergency like pandemic during while institutions suffer from closing or restrictions and people are confined at home. Especially in this situation, digital tools are more and more available to everyone and can be an intuitive communication tool by facilitating and stimulating curiosity and knowledge. In this framework, the world culture embodies a primary element, related explicitly to heritage as material and immaterial proof of this common culture belonging to all humankind. Recently the development of digital solution to create online archive of historical sites is becoming a fundamental task to provide data access to experts and public (Münster et al., 2020). Large scale initiatives to collect big data related to the past like Time Machine project (Time Machine Organisation, 2021) encounter different expertise and train a new generation of experts in Cultural Heritage and Digital Humanities (Münster et al., 2019). Today the Time Machine Organization (TMO) - founded in the 2019-2020 as fruitful result of the Time Machine project – constitutes a milestone for the entire Europe. In fact, the European Parliament's Committee on Culture and Education (CULT) has recognized the Time Machine Project relevance for the application of Artificial Intelligence and Information Technologies in the framework of culture and education (CULT, 2020). The use of advanced digital technologies unites

documentation stored and preserved in archives, libraries and also museums, custodians of a fragmented history of places. In this way, digital solutions applied to documentation and sites give meaning to a global past aiming to recreate the cultural and economic history of Europe. Given the above, promising techniques and methods in the Geomatics field applied to cultural heritage can support the widespread communication of the culture and good practise, as tested in the case of the 'Turin 1911' project.

## 2. 'Turin 1911' project

'Turin 1911' is a joint research project led by University of California San Diego (UCSD) and Politecnico di Torino where the encounter between ancient and digital worlds constitutes the core of a multidisciplinary and international investigation devoted to the Turin 1911 World's Fair on Industry and Labour. The Fair has been held in occasion of the 50<sup>th</sup> anniversary of the Italian Unity in the fabulous stage of the Valentino Park in Turin, the first Italian capital city. The leading idea of the digital project (Della Coletta, 2012) is to support a technoculture developed in a human direction fostering users' imagination and critical thinking. The immersive digital world of the 1911 Fair will constitute reality in a second degree that means the virtual reconstruction of an imaginary construction, in fact, the Exposition was itself a representation of the real world. In this context creativity technologies constitute a source of

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freedom, pushing the actual fairgoer to reflect about potentiality of emerging digital world from one side, and allowing to explore not real world exploiting multimedia as tool of leisure, but also with critical interpretation on the other side. In detail, the project aims to explore the recreated 3D virtual world of the 1911 Fair as tool of knowledge and visualization of both the actual and the no more surviving places, mixing the real and the not real world. The integration between traditional research methods and digital innovations facilitates and implements processes related to past events as: long-term preservation of original and fragile documentation, integration with newest studies and discoveries, comparison and query between heterogeneous elements and concepts.

### 2.1. Previous researches and results

'Turin 1911: The World's Fair in Italy' is the first digital project solely dedicated to this International Exposition; an entire webpage (see University of California, 2018) aims to collect, organize, disseminate and study primary and secondary sources in a systematic way exploiting digital technologies. In the last decades, different researches focused on various topics about the Turin 1911 Fair; a selection of the main studies is here reported. First of all, the Italy's role in the World's Fair Exhibitions as a phenomenon emerging during the XIX and XX centuries is discussed in Della Coletta (2006); in particular, the relevance of the Turin 1911 Fair itself is affirmed considering it the first international fair in Italy and the last before the First World War; then the role of Turin in creating the sense of national identity in an international context is deepened examining overturning the scholars' point of view about Italy's role in the political, social and economic world context. Secondly, for the 100<sup>th</sup> anniversary of the Turin 1911 Fair two books have been published (Bassignana, 2011; Balocco, 2011) providing a general overview of a complex phenomenon; traces of which are only represented by postcards, black and white photos, few drawings and videos, guide books, newspapers, journals and narratives. In fact, about 100 temporary structures were built for this gorgeous moment lasting only 7 months but requiring years of planning. Recently, the interdisciplinary team of UCSD and Politecnico di Torino has considered different topics related to the integration between history and Geomatics as the challenging survey and modelling of the few remaining structures in the Valentino Park (Chiabrande, Sammartano, Spanò, & Spreafico, 2019), and the 3D digital modelling and visualization of the no more existing pavilions starting from a combination of original drawing and photos.

## 3. Main

The aforementioned relevance of the Turin 1911 Fair pushes researchers to search, collect and compare old and new discovered documentation held by private and public archives and libraries, mostly spread in Piedmont region. The creation of a dedicated and interactive website, where all data is collected in a unique online tool open to the public, constitutes a promising solution. In this way the Turin Exposition can be explored in a new way boosting the critical analysis for experts, but also showing digital 2D and 3D environments for non-scholars.

### 3.1. Preliminary researches

In the planning of the entire Exposition, an exciting role has been played by one of the three main 'architects' responsible of the general design of the fair, the engineer Stefano Molli (Gli Architetti dell'Esposizione, 1910). He was depicted as a humble man, in fact only few friends were aware of his projects and also other colleagues ignored part of his work (Reycend, 1916). Maybe for this reason the huge collection of technical drawings dedicated to the Turin 1911 World's Fair remained unstudied for about a century, but well preserved by Fondazione Marazza of Borgomanero (Italy), Molli's hometown. The documentation consists of 588 sheets subdivided in folder and subfolder, varying in size from a letter up to 1 or 3 meters for side and drawing scale from 1:2000 up to 1:10 (Fig. 1). A pre-inventory of this important documentation has been created and the drawings are currently under digitization process performed by Politecnico di Torino.

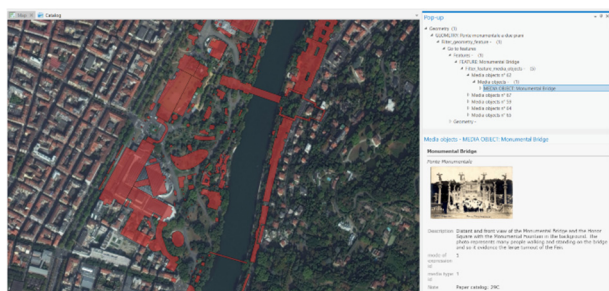


**Figure 1:** Stefano Molli's large format drawing at Fondazione Marazza of Borgomanero.

### 3.2. Geodatabase development

Currently, the website dedicated to the 1911 Fair is based on a database continuously updated by UCSD. The UCSD relational database has an articulated schema consisting of 54 entities and containing information about structures, media object, sources, people and places. This database lacks the geospatial data; therefore tests have been performed to create a geodatabase in GIS environment (ArcGIS Pro) starting from the object-relational database system (PostgreSQL) and the related management tool (PgAdmin). A lot of tests have been performed to solve technical issues related to the development of a non-native geodatabase starting from an already existing relational database. As first attempt a UCSD database backup file has been created in PgAdmin, this provided data constitute the starting point. Then it has been analysed and optimized for the database connection to ArcGIS Pro and then to enable it as a geodatabase. At the moment only structures and media object entities have been considered to connect them to the corresponding geometry in ArcGIS Pro, generated starting from a 1911 general plan of the Fair. Geographic information allows association between spatial content - added by Politecnico di Torino - and textual and graphical information - already contained in the UCSD database. Currently, in ArcGIS Pro starting from the query of a single geometry, as a pavilion, it is possible to retrieve a pop-up containing a selection of information (i.e. the name of the structure, a brief description, the architect and style of the structure) and all the images contained in media objects

such as photos and postcards (Fig. 2) thanks to the recreation of the relationships. A lot of complications have been tackled during the development of the geodatabase starting from the UCSD database (i.e. managements of: pre-existing entities before the geodatabase enabling, relationships between entities not automatically recognized in ArcGIS Pro but existing in the UCSD database, media object in GIS environment), especially due to compatibility issues between PostgreSQL and ArcGIS Pro, and solved adopting manual solutions as registering the entities in the geodatabase and at the moment recreating only the relationships needed. In only one year three version of ArcGIS Pro and two of PostgreSQL have been employed; from one side the updating to the last version of ArcGIS Pro has provided benefits, but also further problems related to compatibility between different versions of both softwares.

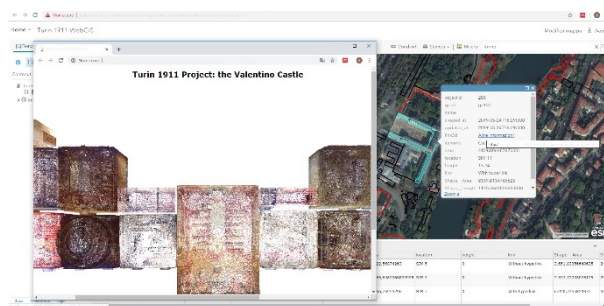


**Figure 2:** Visualization of a configured pop-up in the geodatabase with images related to the selected geometry.

#### 4. Conclusion

Turin 1911 World's Fair represents a complex phenomenon, therefore it can be considered a challenging case study for the creation of ad-hoc WebGIS starting from an already existing relational database missing of spatial content.

As regard archival research, unknown original drawings have been discovered in the Fondazione Marazza, increasing the available documentation of the Turin 1911 World's Fair. This material requires to be inserted in the geodatabase according to cataloguing standards for architectural drawings and providing metadata. Concerning the geodatabase, only a few issues have been solved. The development of a WebGIS dedicated to the Turin 1911 Fair requires further studies, also considering to extend the connection between spatial content and related videos and 3D models for visualization in a medium-term period - as partially tested at this stage of the research (Fig. 3) – and the possibility of exchange and integration between systems, such as GIS and BIM, in a long-term period.



**Figure 3:** Visualization of the connection between 3D model and the selected geometry in the WebGIS test.

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