

# Challenges and Opportunities for the Digital Enhancement of Religious Cultural Heritage:

A Proposal for the Arca di San Domenico in Bologna

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## *1. Introduction*

The enhancement of religious cultural heritage is a complex issue and deserves specific attention. Several aspects hinder an appropriate understanding of this category of assets. First of all, because of the secularization of society, the iconography and the function of religious objects have come to seem incomprehensible to most people. Museums usually attempt to remedy this lack through mediation devices, although they often neglect the original religious function, focusing only on art-historical aspects. In contrast, inside the church, silence prevails, and the problem is often overlooked. Albeit artworks are in dialogue with their original location, their meanings generally remain elusive. Finally, even though the church itself has been enhanced, the risk of excessive musealization may loom.

How can digital tools come to our aid? In this article, by taking into consideration matters of mediation and enhancement of religious cultural heritage, I will illustrate a Web site prototype, *LArca di San Domenico Digital*, that I developed for the enhancement of Saint Dominic Shrine in the Basilica of San Domenico in Bologna. The Arca, preserved in its original context, still fulfils its function as a place of devotion, and it requires effective mediation because of its complex history and iconography. If used properly, the digital may become an adequate tool in guaranteeing a transmission of the art-historical contents without have an impact on the spiritual dimension. The aim is to provide enhancement by avoiding excessive musealization of the chapel.<sup>1</sup>

<sup>1</sup> The topic and prototype discussed in this article were the subject of my final thesis for a master's degree in Arts, Museology, and Curatorship, which I completed at the Alma Mater

## 2. *The Enhancement of Religious Cultural Heritage*

Religious cultural heritage constitutes roughly 70 percent of Italy's heritage (CEI 2019, 9) with more than 85,000 churches recognized as cultural assets (Feliciani 2008, 255). For this reason, in Italian cultural heritage legislation, scrutiny has been accorded to this peculiar category defined as "cultural assets of religious interest."<sup>2</sup> This umbrella term identifies all those cultural assets representing a direct expression of the religious culture of a community, even though its legal ownership may be private, public, or ecclesiastical (Sessa 2005, 50). In fact, religious interest is not determined by the property, but by the nature and history of the object.

These artworks present an intrinsic dualism as they have both a laic and religious value: They have a spiritual function, but at the same time also present important art-historical testimony. Consequently, institutions must guarantee a cultural fruition for lay citizens as well as allow faithful to use them as part of their religious practice or to ensure that the religious significance of the artifact remains unimpaired (Camassa 2013, 8–10).

### 2.1 Problems of Fruition

As regards mediation and fruition, it is not an easy task when dealing with religious cultural heritage. First of all, the progressive secularization of society has transformed the language of religious objects into something indecipherable to most people, who experience a kind of "semantic black-out." This expression was used by art historian Antonio Paolucci to describe the condition of most visitors in museums, who hardly know what Pentecost is and struggle to identify it in a sixteenth-century painting (Paolucci 1996). Generally, audiences fail in codifying subjects and symbols or reading the episodes narrated within a cycle. That universe of meanings that was once part of common culture has now become a sort of "dead language" unintelligible to most people, apart from those who are directly involved in the life of the Church (Capurro 2013, 42).

In matters of communication, it is important to solve this blackout, preserving the intrinsic dualism of this heritage. Specifically, on one

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<sup>2</sup> The expression "cultural assets of religious interest" stands for the Italian definition *beni culturali di interesse religioso*. This distinction was identified for the first time in 1984, in the agreement amending the Concordat concluded in 1929 between the Italian State and the Catholic Church. The definition refers to all cultural heritage related to any religious denomination. In this article, I will consider the specific case of Christian cultural heritage.

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hand, it is mandatory not to disregard the religious nature of the object in question: In museums, artworks are deprived of their spiritual context and often “Christian art is subsumed into a narrative of the history of style, with little regard to its subject matter and initial function” (Clifton 2007, 107), offering merely incomplete storytelling. On the other hand, many religious objects, especially in churches, are admired only from an esthetic point of view and, in many cases, go unnoticed because the general audience is not aware of their importance due to the lack of a lighting system and effective mediation apparatuses. “Squaring the circle” in both directions is not easy.

In the next subsections, I will focus on the enhancement of religious cultural heritage within its original context. It is commonly assumed that museums are the ideal place to learn about art history. Yet as Tomaso Montanari argues, churches theoretically may be the privileged training ground for the study of art history because, unlike museums, churches are also contexts (Montanari 2021, 105). Therefore, the question to raise is how we can provide effective valorization of these assets without altering the spirituality of the space for which they were designed. Nowadays, due to massive tourist fruition, churches are often treated as if they were museum buildings, with fees for access and huge flows of visitors (Capurro 2013, 56). Moreover, the sacrality may be altered by the intrusive presence of mediation devices, which affect the spiritual dimension by transforming the church space into a museum gallery, covered with labels.

### 2.2 Digital Transformation and Religious Cultural Heritage

In this article, I decided to inquire into the potential of digital tools to provide an adequate enhancement, balancing the needs of conservation, mediation, and worship of religious cultural assets. Before proceeding with the description of the prototype, some reflections are required, in which I will analyze similar projects in the field.

The impact of digital technologies in sacred contexts is relevant, because they facilitate the enhancement of religious heritage in a manner that is both non-invasive and multisensorial. An interesting example is the experimental project undertaken by the University of Naples Federico II for the church of San Vincenzo Ferreri in Naples, seldom accessible to the public. This initiative leverages advanced technologies to provide the public with a comprehensive visualization of the building’s architectural evolution and decorative history. The project offers two distinct solutions: The first one is exclusively tailored to on-site visits and offers a multisensorial experience using sounds, animations, and projection mapping. The second one is also accessible remotely or when the church is closed and allows users to walk

virtually through the church's interior by means of augmented reality (AR) (Lo Pilato et al. 2023, 969-975). These digital technologies facilitate access to this heritage, seldom open to the public, while respecting the integrity and environmental specifics of the site.

Moreover, virtual reality can be an interesting tool to attract new audiences to visit religious places: According to a recent survey supported by Kyung Hee University, virtual reality (VR) can be particularly useful in evoking the atmosphere of religious ceremonies and “increase people's immersion in the spiritual experience they feel, which will further increase their motivation to visit actual cultural heritage” (Hwang et al. 2023, 10). The experiment was applied to the city of Jerusalem, and it compared VR to Web-based experiences. According to the survey, Web content does not offer an immersive dimension capable of evoking a spiritual experience for remote audiences, although such content may remain educationally valuable (Hwang et al. 2023, 16).

Despite the effectiveness of virtual reality, it has limitations related to obsolescence and cost (Allal-Chérif 2022, 8). Consequently, Web-based solutions are generally more resource-efficient and manageable in church spaces where surveillance is not always guaranteed, such as the Basilica di San Domenico. In matters of Web-based contents, an interesting example is the digital enhancement project of the Cathedral of Tarragona in Spain. Currently, visitors can enrich their on-site experience by selecting between two digital options: They can pay for an audio guide available on tablets with tracks covering the most relevant artworks, or they can read the corresponding script available for free on the official Web site (Cathedral of Tarragona, n.d.) by scanning a QR code featured on a small label at each point of interest (Hathcock 2023, 42). This latter Web-based solution allows visitors to access information freely on their smartphones. Finally, labels placed in the cathedral minimally impact the spiritual context, avoiding excessive musealization. *L'Arca di San Domenico Digital* project, described in the following sections, draws inspiration from this case study.

### 3. *A Proposal for the Arca di San Domenico*

The Arca di San Domenico is conserved in the chapel of the saint in the Basilica di San Domenico in Bologna, and it constitutes an interesting case study both for its art-historical value and for its religious significance. On one hand, the Arca embodies a precious testimony of the development of Gothic and Renaissance sculpture in Bologna over three centuries. Artists who are undisputed points of reference contributed to its construction:

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Nicola Pisano and his workshop for the thirteenth-century sarcophagus, Niccolò dell'Arca and Michelangelo Buonarroti for the fifteenth-century crowning of the sarcophagus, and Alfonso Lombardi for the sixteenth-century predella. The work is therefore a visual summary of the evolution of sculpture, and it has become one of the most attractive monuments in the city for both scholars and tourists. On the other hand, the Arca is above all an important pilgrimage destination because it houses the relics of Dominic of Guzmán, founder of the Order of Preachers, who died in Bologna in 1221. As recorded in the *Libellus* of Jordan of Saxony, in the period following Dominic's death, a great popular devotion arose because of several miracles attributed to the saint. Today, the shrine still attracts a great number of worshippers from all over the world (D'Amato 1988, 2:85), as witnessed by the recent Jubilee of 2021 for the eighth centenary of the death of the saint.

Throughout the centuries, the Arca was embellished by the community, and it has a long construction history marked by multiple commissions and different translations. It is an outstanding example of the intrinsic dualism that characterizes religious cultural heritage because its conception was based on both religious and secular patronage. In 1267, Nicola Pisano completed the embellishment of the sarcophagus, commissioned by the Dominican community (Moskowitz 1994, 5-25). In 1469, Niccolò dell'Arca signed a contract with the Senate of Bologna (Ciammitti, 2022) to take on the project of a covering for the sarcophagus, two angels holding candlesticks, a predella, and sculptures of the patron saints of the city. Therefore, these works mark "a transition from the exclusively Dominican stewardship of the tomb, or area, of San Domenico to a predominantly civic one" (Klebanoff 1999, 412), transforming the shrine from purely an object of worship into a landmark of the city.

### 3.1 Analysis of Current Materials

The community of Saint Dominic has been involved in providing mediation of the iconography of the Arca. Between the end of the nineteenth and the beginning of the twentieth century, there was a shift from brochures produced on the occasion of pilgrimages (Guonassi, 1899) to guides produced in collaboration with municipal institutions in charge of promoting tourism (Alfonsi, 1921, 1927, 1934, 1935) (Venturino, 1950).<sup>3</sup> In addition, in the second half of the twentieth century, the chapel where

<sup>3</sup> I conducted bibliographic and archival research at the Biblioteca dell'Archiginnasio, the

the shrine is located was also equipped with traditional museum apparatuses such as labels and brochures aimed at facilitating the understanding of the subjects related to the monument.

At present, a range of traditional mediation devices such as booklets, brochures, and labels is available at the entrance to learn more about the history of the Arca. However, the main focus is the religious narration with sparse emphasis on art-historical storytelling. The construction and iconography of the Arca are not detailed and there is no possibility of deepening specific topics. The materials are focused mainly on the biography of Saint Dominic, and they sometimes include prayers for worshippers and pilgrims.

Regarding digital promotion of the Arca di San Domenico, a few informative pages appear on the official Web sites and channels of the Dominican community. The available content focuses mainly on devotional information rather than enhancing the Arca to attract new visitors. The main Web site lacks references to the shrine or the Basilica's history, giving information mainly about community activities and religious services (Convento Patriarcale San Domenico Bologna 2017). The 2021 Jubilee Web site offers a timeline on Saint Dominic's life and details of the Mascarella Table relics but omits specific content about the Arca and its history (Giubileo degli 800 anni di San Domenico, n.d.). Similarly, the "Centro San Domenico" cultural association's Web site features two videos about the Arca's history in its archive, but once again, the focus is religious (Centro San Domenico, n.d.). In the same vein, we also find the application *Guida alla Basilica di San Domenico*, available on Google Play Store for a fee and launched for the 2021 Jubilee, advertised at the entrance of the church.

Therefore, a solution is required that enhances the artwork while still addressing the needs of lay visitors and resolving the semantic gap identified by Paolucci. To achieve these objectives with traditional devices, several information labels should be placed in the Chapel of Saint Dominic, creating a route tailored to various levels of audience interest. However, this could lead to the excessive musealization of the sacred space, undermining its devotional function, especially since the Arca is still in use and situated in its original spiritual context. The digital project presented in this paper seeks to solve this challenge.

Biblioteca Universitaria di Bologna, and the Biblioteca del Convento Patriarcale di San Domenico to inquire into the past and current enhancement of the Arca.

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### 4. *LArca di San Domenico Digital: Main Objectives and Web Project Plan*

The Web site prototype *LArca di San Domenico Digital*<sup>4</sup> was implemented to achieve two main goals in a unique digital channel: providing both an online enhancement of the artwork and a tool to support the on-site visit.

Regarding the first objective, there is currently no digital tool that systematically collects all the information related to the history of the Arca di San Domenico. Therefore, *LArca di San Domenico Digital* aims to fulfil this role by combining informational content with digitized resources that document the shrine's history from an art-historical perspective, such as documentary sources and photographs. In this prototype phase, items already available in the SIGECWeb system<sup>5</sup> were mainly reused within the Digital Library section, but the tool could be further enriched with resources from other institutions or digitized materials stored in the Archivio Storico Domenicano. Specifically, the Web site offers the following exploration modes, which are presented on the homepage and always accessible from the main menu's navigation bar.

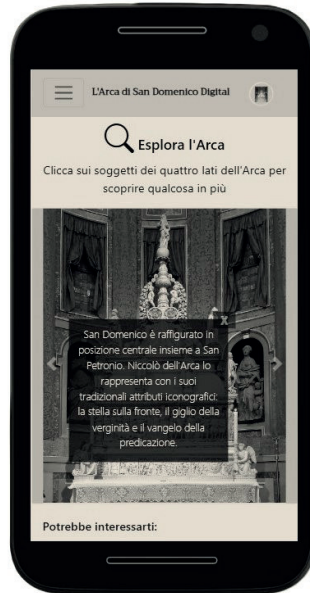
- *Homepage*: It shows a presentation of the project, exploration tools (Linea del Tempo, Esplora l'Arca, Digital Library, Approfondimenti) and insights, a brief description of the Arca, a short biography of St. Dominic, geolocation references, and a link to the Dominican community Web site.
- *Linea del Tempo*: A timeline to explore the whole history of the monument's construction.
- *Esplora l'Arca*: An interactive image to discover the iconography. Users can "browse" the Arca by clicking on subjects or episodes and read the information on the pop-ups (Figure 1).
- *Digital Library*: It gathers heterogeneous items documenting the Arca from an art-historical point of view. These can be single sections of the shrine, photographs, and written sources.<sup>6</sup> All the sources can be filtered

<sup>4</sup> Please note that not all resources are active but only the following pages: Home, Esplora (Linea del Tempo, Esplora l'Arca), Digital Library (San Petronio, Legenda Aurea, Fotografie dei particolari eseguite in occasione del trasporto della salma di S. Domenico nel rifugio (Cimasa), Michelangelo Buonarroti).

<sup>5</sup> The General Catalogue Information System (SIGECWeb) is a Web-based platform of the Central Institute for Catalogue and Documentation (ICCD) of the Italian Ministry of Culture (MiC) that manages the entire flow of cataloguing from data entry to online enhancement.

<sup>6</sup> The first typology is constituted by individual parts of the sections of the shrine according to the cataloguing carried out by the Soprintendenza Archeologia, Belle arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara. The

Figure 1



Mock-up of the page “Esplora l’Arca,” as visualized on mobile device.

by material support and re-arranged by alphabetical and chronological order and selected according to authors, centuries, and sections.<sup>7</sup> Each item page presents a picture with a short description and a metadata table. There is also the possibility of contextual navigation to explore related items and external sources. Finally, users can access the artist’s or author’s page to have more information on the authorities. The digital library is a scientific instrument that may seem redundant to the general audience, yet it is an important tool for preserving the documenta-

photographs, taken by Studio A. Villani & figli during the work in 1943 to build anti-aircraft protections, document the dismantling of the Arca and provide a comprehensive view of various subjects, including the recent translation of Saint Dominic’s body. These photographs are included in the Digital Library to support the storytelling of the events surrounding the Arca. Also, the textual sources like the *Legenda Aurea* by Jacopo da Varazze and the *Legenda Sancti Dominici*, first compiled by Petrus Ferrandi Hispanicus and then revised by Humbert of Romans, are crucial for the iconography and history of the Arca’s construction.  
<sup>7</sup> Some of filtering options are reduced in the mobile version of the Web site.



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tion about the Arca and can be available to researchers and art-history students.

- *Approfondisci*: Three thematic insights progressing from popular storytelling about theft of relics (*Le reliquie tra venerazione e furti*), to the more specialized one on the 1943 photographic documentation (*I servizi fotografici di A. Villani & figli del 1943*), and the iconographic interpretation entitled *Una cosmografia sacra di Bologna*.

In relation to the second objective, *LArca di San Domenico Digital* was implemented to be an aid for the in-person visit. Therefore, the Web site interface has been customized differently for desktop consultation and for mobile viewing, in both cases in terms of responsiveness and in selection of contents. The idea is that people connected remotely might use a desktop and would like to have a broader overview of the Arca because they cannot look at it directly. In contrast, people during the on-site visit might employ a more synthetic description without accessing as much content, such as videos, because it would require too much time and would disturb worshippers.

Regarding on-site consultation, the approach adopted is the BYOD – Bring Your Own Device – method, widely used in the museum context. It allows people to get access to different services, dedicated contents in the museum Web site or apps specially designed for the visit. This approach is particularly convenient because it makes use of a digital device, the smartphone, which people already use daily (Devine 2015) and have at their disposal at the moment of the visit.

I consider the BYOD approach particularly suitable for the fruition of cultural assets of religious interest. It makes it feasible to provide an adequate mediation of content with different degrees of insights, but without invading the physical space of the chapel with material supports. The audience can access on-site storytelling by simply scanning a QR-code displayed on a simple label.

The sacredness of the space is upheld as the mobile version of the Web site has no video or audio content. Consequently, lay visitors will not disturb worshippers. This approach contrasts with museum strategies that prioritize oral transmission as more effective and less demanding than written communication (Antinucci 2014, 134-140) and with some recent studies that show how virtual immersive reality can be particularly useful to enhance the spiritual atmosphere of the religious places (Allal-Chérif, 2022). However, the context of the Basilica of San Domenico necessitates

different considerations. Although providing headphones could allow visitors to access audio and video content, the basilica's open-access nature and lack of surveillance staff pose a challenge for managing such facilities. Therefore, the choice was to employ more traditional Web-based contents and let visitors be physically immersed in the multisensory experience of the original sacred space.

#### 4.1 One Tool for Multiple Visitor Journeys

In relation to the user's journey, the idea is to support what Catherine Devine, former strategist leader of Libraries and Museums Business at Microsoft, has called "the visitor's journey." It is about accompanying visitors before, during, and after their visit to the museum. In our case, it is about leading them to the Arca preserved in the Basilica di San Domenico: "[T]he visitor's experience starts before they arrive, exists during their visit and extends after they leave" (Devine 2015).

The construction of the visitor journey map<sup>8</sup> (Figure 2) is based on three key moments of interaction with the digital tool: before, during, and after the visit. Furthermore, three possible user categories were envisioned: the general audience, art enthusiasts, and specialists such as researchers and art history students. For each of these categories, it was identified a main goal and a specific route, considering the hypothetical preferred touch-points and access devices.

#### 4.2 Categories of Metadata

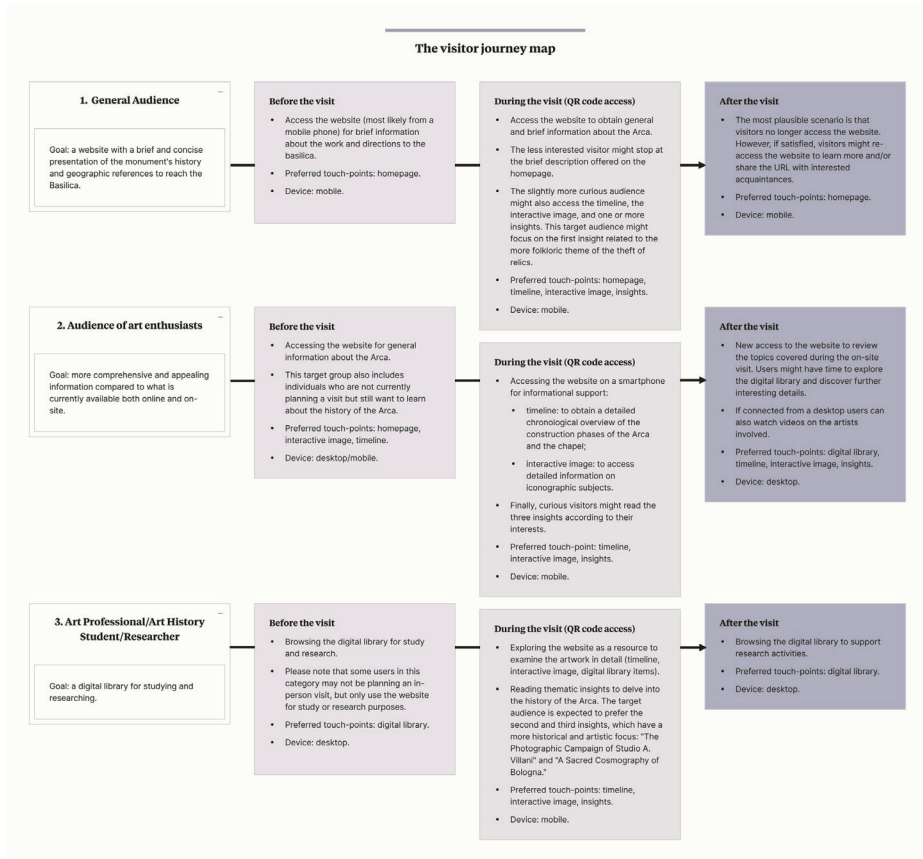
To pursue the principle of interoperability and long-term preservation, users can access metadata on the Web site interface as well in XML files for each resource of the Digital Library. In each page, there is a table with several descriptive categories. The audience can retrieve information on title, author, date, type of item, size, material, subject, identifier code, supplying institution, current position, legal status, tags with categories, and other related items or contents. These categories are derived by the ones on *Europeana*, which mainly re-use the Dublin Core Metadata Initiative schema.<sup>9</sup> Furthermore, there is a certain accuracy in matters of

<sup>8</sup> Naturally, the visitor journey map will undergo modifications based on user-experience testing before final release of the tool.

<sup>9</sup> The Dublin Core Metadata Initiative has formalized fifteen elements to describe any kind of digital resources. The first version was created in 1995, but other implementations were inserted over the years.

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Figure 2



The visitor journey map with a description of all the actions at each stage.

classification with references to authority control systems and controlled vocabularies.<sup>10</sup>

On the Digital Library's item pages, XML files containing the corresponding metadata can be downloaded to store machine-readable

<sup>10</sup> Concerning the author, a link to its VIAF – Virtual International Authority File – page is available. The type of object is defined through a semantic network provided by WordNet and the term identifying the material is taken from the Getty Research Institute's Art & Architecture Thesaurus. Geolocation is provided by GeoNames.

documents. Specifically, I selected Dublin Core categories as the basic metadata schema, but I also enriched the metadata description using RDF/XML syntax, with properties and classes from the ArCo ontologies.<sup>11</sup> This approach will facilitate future linkage with other Linked Open Data resources.

### 4.3 Tools of Implementation

Currently, at this prototype stage, only the Web interface was designed to investigate and evaluate the potential use of the different exploration tools for the three target audiences. At a later stage, the online database will also be implemented.

As regards the Web interface, the choice was to imply Web programming languages instead of using a CMS-Content Management System. Since the project has multiple objectives (on-site and remote consultation) and different targets, it was much more convenient to have as flexible wireframe and layout as possible. Two main tools were employed: Sublime Text and Bootstrap. The former is a text editor employed for HTML and CSS code as well as XML markup, while the latter is an open-source framework that provides pre-written code for responsive Web sites. It can be used for both layout and interface components, and it was extensively employed because of its responsive design, which facilitated the customization for mobile consultation. Components such as navbars, carousels, buttons, cards, filters, and pagination were directly taken from Bootstrap and then customized with CSS classes. Furthermore, it was also feasible to add a certain dynamism to the Web site because JavaScript is used in the components.

For the development of the prototype, another essential tool was GitHub, which is an open-source hosting provider for software developers. It offers repository space to store all the material (Macaluso, 9 July 2023), and it enables the publication of the Web site (Macaluso, 4 September 2023).

In terms of interaction tools, the interactive image of the Arca was implemented thanks to Free Online Map Generator. This Web-based program allowed us to entirely map the image with coordinates and to add pop-ups for descriptions. The timeline was produced thanks to Knight Lab's TimelineJS: By filling a simple Google Excel document with captions

<sup>11</sup> ArCo is the Knowledge graph of Italian Cultural Heritage, and it establishes a network of ontologies currently employed in the SIGECWeb system for the LOD visualization.

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and media, it was possible to embed an HTML code in the text editor (Northwestern University Knight Lab, n.d.).

### 5. Conclusion

The application of digital tools for the enhancement of religious cultural heritage in the sacred space opens up possibilities that can provide multiple benefits. It is important not to import the same mediation approach used in museums. It is required to conceive the most suitable strategy calibrating both the needs of worshippers and of lay visitors. Digital technology can provide effective storytelling without an excessive impact on the religious context.

The prototype for the Arca di San Domenico is intended to be a concrete example. The tool addresses the needs of the lay public who wants to delve into the complexity of the history of the Arca and simultaneously grasp its devotional function. If the chapel were turned into a museum gallery and covered with labels, the importance of the context would be lost, and at the same time, pilgrims would be deprived of their place of worship. In contrast, after the implementation of *L'Arca di San Domenico Digital*, visitors will have access to multi-layered storytelling as they silently walk around the shrine, even as prayer space will be guaranteed for devotees. The project is available on GitHub, but it is still at the prototype stage. After a user-testing phase and optimization process, it will be completed and made available to the broader community.

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