

Preser VENICE

Preserving the Material Culture of Venice

An Interactive Qualifying Project Report
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I. Abstract

This project was conducted under the auspices of UNESCO for the purpose of promoting the preservation and restoration of Venetian material culture. Consisting of over 7,000 individual pieces compiled by WPI project teams over the past 20 years, this collection constitutes the most complete and comprehensive catalog of Venetian material culture to date. By centralizing the catalog on the Venipedia.org site through the creation of over 3,000 wiki pages, our group was able to make data readily available to the public. In addition, we expanded the database by 127 decorative keystones and added over 50 traditional Venetian watercraft to the catalog. As a means of further publicizing the catalog, we created an augmented reality mobile application capable of providing users with information pertaining to individual pieces of public art while in the streets of Venice. Finally, we established a priority and cost analysis system, to be used in conjunction with crowdsourcing, in order raise awareness and collect donations for the restoration of these pieces.

II. Executive Summary

Material culture consists of any artifact that tells something about the traditions, beliefs, or values of a society. Encompassing a wide range of objects, material culture can be further divided into two main categories: monumental culture and vernacular culture. Monumental culture generally consists of large, visually striking items; in Venice, this includes sites such as the Doge's Palace and St. Mark's Basilica. Conversely, vernacular culture consists of hand-crafted artifacts made by artisans, craftsmen, and the general populace. Though these works are typically less remarkable to the general public, they remain invariably important to the heritage and culture of the community in which they exist.



Figure 1: A monument and two gondolas, all examples of Venetian material culture

Located throughout Venice is a wide and varied collection of vernacular art which



Figure 2: Map of all pieces of public art in Venice, without the island's borders

includes such items as coats of arms sculptures, small statues, and decorative wellheads. Another form of vernacular culture in Venice is antique boats, which are dwindling in number despite the rich maritime history of the city. All of these artifacts constitute a major component of the city's vernacular culture and some date back as far as 1,000 years. As Figure 2 indicates, the collection is so widespread across the city that, were the

outline of Venice to be removed, the shape of the island would still be discernable based on the distribution of public art. Unfortunately, many of these items are in a state of disrepair. Without proper care and maintenance these pieces will continue to degrade until they are lost forever. The preservation of these works would be greatly facilitated with an accurate and complete record of Venetian vernacular artifacts.

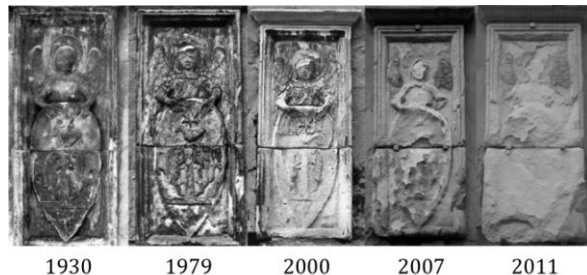


Figure 3: Timeline of a Deteriorated Coat of Arms Sculpture in Cannaregio

A catalog of 6,864 individual pieces of public art has been created thanks to twenty years of project work by Worcester Polytechnic Institute students who have collaborated with such organizations as Earthwatch, Archeoclub Italia, and the United Nations Educational, Scientific, and Cultural Organization (UNESCO). This collection constitutes the most complete and comprehensive catalog of material culture in Venice. Previously, however, this data was loosely organized and stored in standalone, offline databases making it difficult to access. As a means of making this information public and easy to read and review, our team organized all of the data into a standard format before importing it to Venipedia.org¹, the online wiki site dedicated to the city of Venice. A total of 3,068 Venipedia pages were created, with the primary focus on the decorative sculpture of the city; each of these pages includes such information as the subject matter, location, and the dimensions of each artifact.

Though this catalog of public art already includes thousands of pieces, it is not complete. Yet to be fully documented are the decorative keystones in the city,



Figure 5: A decorative keystone over a doorway

ornamental stones that reside at the apex of archways. Previously, the keystones throughout the district of Cannaregio, as well as those on each of the public bridges in the city, had been recorded by a WPI student project team. We sought to expand on this work by cataloging each keystone in Castello. This study resulted in the addition of 127 keystones to the digital catalog and

established a framework to be used by future teams in documenting the rest of the keystones across the city.

Equally important to the city's culture are antique boats, another component of material culture in Venice. Though these antique boats once constituted the only means of travel throughout the canals, the introduction of motorboats within the last fifty years has caused the

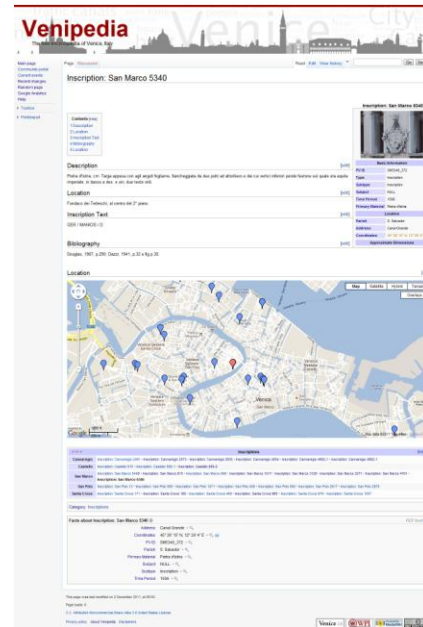


Figure 4: An inscription page created from import

¹ "Venipedia," Published at <http://www.venipedia.org/>.

use of these boats decrease significantly. The motorboats are detrimental to the physical infrastructure of the city by emitting pollution and creating wakes, and have also driven antique boats to the brink of extinction.

Arzanà is an organization located in Venice that is dedicated to the conservation of these antique wooden boats. Working with volunteers from that organization, our team documented their fifty-six boats and added all relevant information to Venipedia as part of the overarching catalog of material culture in the city.

In order to raise awareness for the restoration of these collections, our team developed an augmented reality mobile application, which uses the GPS coordinates of each piece of public art to overlay icons on a smartphone's camera that will direct users to the location of the piece. Once users are facing the object, they can click on a link to the corresponding Venipedia page where they may receive full information about the piece. If a piece is in need of restoration, the user may also be prompted to press the "Donate" button to contribute to the restoration of that piece.

Our wiki catalog of Venetian material culture, together with the mobile application, will be the two main tools of PreserVenice,² a non-profit organization conceived in 2007³ with the aim of raising awareness about the deterioration of material culture and collecting funds for its restoration. To begin the restoration effort, our team developed a prioritization and cost analysis system which can be applied to the entire collection of decorative sculpture in the city. These analyses identified the high priority items and were able to identify their cost of restoration with adequate accuracy. These tools can then be used to prioritize the sequence of restorations to be targeted by future fundraising campaigns.



Figure 6: A screen capture of the mobile application

² PreserVenice. "Homepage," Published at <http://www.preservenice.org/>.

³ Amanda Kent et al., "PreserVenice: Preserving Venetian Public Art" (Worcester: Worcester Polytechnic Institute).

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IV. Authorship

Jonathan Fitzgibbon wrote the introduction, the background sections pertaining to preservation and restoration of public art and antique boats, the methodology and results sections regarding importing the public art catalog to Venipedia, the methodology section regarding collaboration with UNESCO, and edited the final paper.

Christopher Kazanovicz wrote the background sections pertaining to public art in Venice, the methodology and results sections regarding the prioritization and cost analyses, the results section regarding the mobile application, and edited the final paper.

Nicholas Lima wrote the background sections pertaining to the means of cataloging public art, the methodology and results sections regarding antique boats, the methodology section regarding the mobile application, and edited the final paper.

Courtney Rosales wrote the background sections pertaining to the antique boats of Venice, the methodology and results sections regarding keystones, and edited the final paper.

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1. Introduction

Much of our life is determined by the past. Our heritage tells us where our ancestors came from and allows us to learn from them as we grow. One of the best ways of preserving heritage is through the material culture of a society, which consists of artifacts that serve as physical representations of how the community has changed through time. These artifacts may include anything from decorative works of art that depict the folklore and important historic events of a culture to functional effects that a people may have used in their day to day lives. Unfortunately, this is not always an easy task. Public works of material culture are almost invariably faced with ever-changing weather conditions as well as exposure to the general public that ultimately cause the works to wear down over time.

Declared a World Heritage Site by UNESCO in 1987, Venice was one of the first cities as a whole to be inscribed. As such, it is not surprising to note that Venice is a city rich in cultural history and thus rife with artifacts that depict how the city evolved over many years. Each World Heritage Site requires a Master Plan detailing its preservation strategy, and Venice is no exception. The Master Plan for the preservation of this city and its cultural heritage seeks to include all of its magnificent artwork, from the largest and most prominent down to the smallest piece. Due to the immense scale of artifacts located in Venice, the database of art included in the Master Plan would need to encompass thousands of pieces of art.

Arguably the biggest issue facing the conservation and preservation efforts of the artwork of Venice is the question of ownership of these pieces. These works of art, while public in nature, are typically located on the exterior walls of privately owned buildings. Consequently, no real claim of ownership is ever fully established. Though Italian law indicates that the government is in fact responsible for these public works,⁴ it is rarely the case that they act on this. As a result, the public art of Venice is falling into a state of deterioration. Smaller works of art in Venice, though less glamorous in the eyes of many, are equally as important to preserving the culture of the city that has existed for over one thousand years.

⁴ IInd International Congress of Architects and Technicians of Historic Monuments, *International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964)*. (Venice, Italy: 1964).

In an attempt to advance the efforts of the preservation of public art in Venice, Worcester Polytechnic Institute⁵ students have worked to catalog all of these pieces of art at the Venice Project Center⁶ since the time that the center was first opened over two decades ago. In 2007, student teams began working on the PreserVenice⁷ initiative, an organization which hopes to serve as a comprehensive collection of all pieces of vernacular culture in Venice. In addition, the PreserVenice site will update the public on the history, location, and condition of each individual piece. It will then serve as a means of gathering funding to support the preservation process of these timeless works of art. This database will also be useful for UNESCO as they continue to develop and improve the Master Plan for Venice. Past WPI project teams have worked diligently to validate the catalog of Venetian public art so that it may be digitized and presented to the public through an easily accessible online format.

Our project sought to further the efforts of PreserVenice. We validated the portions of the public art catalog that had not been audited in years, and then completely digitized the public art database, making it readily accessible to the general public. Concurrent with this, we also worked to compile and digitize the catalog of traditional boats. By unifying the public art catalog and hosting it on the Venipedia site, we hope to educate the public and raise awareness on the loss of Venetian public art.

⁵ WPI. "Worcester Polytechnic Institute," Published online at <http://www.wpi.edu/>.

⁶ Venice2.0. "Venice 2.0 Homepage," Published online at <http://www.venice2point0.org/>.

⁷ "PreserVenice," <http://www.preservenice.org/>.

2. Material Culture

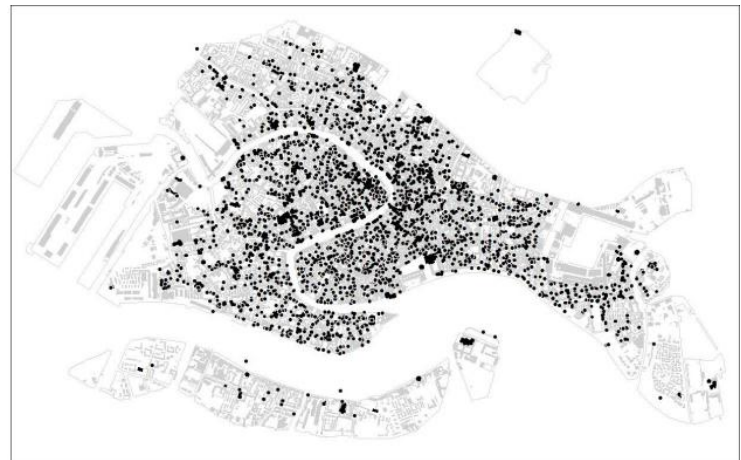
Strictly defined, material culture refers to the totality of physical remains of a past society, through which archaeologists seek to reconstruct the actual living culture of that society.⁸ As a more general definition, material culture refers to any artifact that provides information on how a culture lived, worked, or interacted with other cultures. The preservation and understanding of this material culture is critical to the understanding of a society as a whole. Material culture may consist of decorative artifacts like works of art, or it may refer to more practical items, including, especially in the case of Venetian society, traditional boats.

2.1. Public Art

Public art is any artistic or decorative artifact that can be viewed from a public area, and is non-structural in nature. Generally, public art can be categorized into two subgroups: decorative and functional art. Decorative pieces serve a mainly aesthetic purpose, while functional pieces are usually structural in nature. Examples of decorative public art catalogued in Venice over the past 20 years

include:

- [Coats of arms](#)
- [Circular reliefs](#)
- [Confraternity symbols](#)
- [Crosses](#)
- [Fragments](#)
- [Inscriptions](#)
- [Reliefs](#)
- [Sculptures](#)
- [Street altars](#)



Examples of functional pieces include: Figure 7: Map showing locations of 6,864 pieces of public art in Venice

- [Bells](#)

⁸ Venipedia. "Material Culture," Published online at http://en.wikipedia.org/wiki/Material_culture.

- [Church floors](#)
- [Decorative keystones](#)
- [Flagstaff pedestals](#)
- [Fountains](#)
- [Lunette](#)
- [Monuments](#)
- [Portals](#)
- [Wellheads](#)

Because Venetian public art covers such a wide scope of different artistic pieces it may be further broken down into two primary sub-categories: monumental culture and vernacular culture.

2.1.1. Monumental Culture



Figure 8: View of St. Mark's Bell Tower and Basilica

Monumental culture typically consists of larger pieces of architecture such as churches, palaces, tombs, and monuments.⁹ Because these larger pieces of architecture are generally more elaborate and prominent, they draw more attention than vernacular pieces. This is especially true in Venice where sites such as St. Mark's Basilica, the Doge's Palace, and the Bridge of Sighs draw 50,000 tourists each day.¹⁰ The high volume of tourists drawn by these monumental sites generates vast amounts of income. Because of this, these sites receive the bulk of the funding provided by the city for restoration and preservation, leaving less money available for the restoration of vernacular culture.

2.1.2. Vernacular Culture

In contrast to monumental culture, vernacular culture generally consists of smaller artifacts created by skilled artisans and craftsmen. These pieces usually serve a functional

⁹ Alyssa Ascare et al., "PreserVenice: Preserving Venetian Material Culture" (Worcester: Worcester Polytechnic Institute, 2011).

¹⁰ Richard Owen, *Venice in peril as tourists flood in and locals get out*

purpose, and often give us the best insight into a culture because they were used by the average citizen. However, because so many of these pieces exist, the importance of an individual artifact is often overlooked. The lack of awareness about these vernacular pieces is reflected in the funding for their preservation, which is virtually non-existent. Due to the large scope of vernacular culture within Venice, project teams over the past twenty years have limited their documentation of vernacular culture to public art artifacts, with over 7,000 individual pieces having been catalogued in that time.¹¹

2.2. Restoration and Preservation of Public Art

Works of public art are exposed to a number of dangers each day. One of the most prevalent and damaging of these is the ever-changing weather conditions. As a result, they are under constant threat of erosion and decay. Pieces of art located nearest the canals also risk damage when the canals flood. In addition to these natural conditions, the art of Venice also faces a great danger from its own people. Over time, some pieces of public art in Venice have been lost or stolen, while others have fallen victim to vandalism and normal wear and tear as the public admired them.



Figure 9: High Relief Sculpture of an Angel

Venetian sculpture comes in many forms and variations; many different materials have also been used to craft them. Despite these differences, all of these works of public art affected by perpetual exposure to the elements. Major efforts to try to combat this include the Venice Charter of 1964,¹² passed by the International Council on Monuments and Sites, and the declaration of Venice as a World Heritage Site in 1987 by UNESCO. Both of these initiatives aimed to bring the duties of allotting funding for and actually restoring the works of art to private organizations. The Venice Charter even went so far as to explicitly state that it would apply “not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time.” Yet despite this work, the thousands of pieces of art on display throughout Venice are continuing to degrade beyond recognition. Proper restoration techniques do exist for sculptures of all different types of materials. Should a proper

¹¹ Ascare et al, “PreserVenice: Preserving Venetian Material Culture.”

¹² IInd International Congress of Architects and Technicians of Historic Monuments, *International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964)*.(Venice, Italy: 1964).

source of funding or a dedicated group arise to take on this immense project, then it would be entirely possible for the preservation of Venetian public art to be carried out successfully.

2.2.1 Istrian Stone



Figure 10: Istrian stone columns supporting the Doge's Palace

The most commonly used type of stone in Venetian architecture is Istrian stone. Derived from the Istrian peninsula, a region in the northernmost part of the Adriatic Sea that is shared by Italy, Croatia, and Slovenia, this type of rock shares many similarities with marble stone. Istrian stone is a type of limestone that has been used for centuries in Venice because of its durability and low water absorption. These characteristics make it an ideal building block for the city, and as such it is often used as the layer between the foundation and the brick walls of Venetian buildings. Its appearance, an initially off-white color that fades over time to a pale gray, also lends itself well to decorative stonework commonly seen in sculptures.

Istrian stone is used most frequently for practical and aesthetic purposes in Venice, with alternative, slightly less popular choices generally consisting of variations of marble. Though marble is also considered to be very visually appealing, it has a less dense microstructure that results to more absorption of water and ultimately more frequent cracking and staining.¹³

2.2.2. Deterioration of Stone

The predominant factors that lead to the decay of stone include environmental and chemical factors as well as physical causes. Vandalism, especially graffiti, has afflicted many works, and others see pieces of their stone sculpting chipped or worn away as the public touches them. Water, which rapidly increases the erosion process of rock, plays a major role in this. Water damage stems from rainfall that occurs each year and also from “acqua alta,” the phenomenon where excessively high tides in the Adriatic Sea cause flooding of the Venetian

¹³ Michael Bender et al., “The Forgotten Art of Venice: Promoting the Conservation and Awareness of External Sculpture,” 21. (Worcester: Worcester Polytechnic Institute, 2000).

Canals. Water damage occurs over time as flowing water slowly wears down the surface over which it runs. Further damage can occur when water that contains impurities evaporates from the surface of, or within rocks, leaving behind salts and other substances that leave a deposit on the stone or cause the outer surface to come off.¹⁴

In addition to the threat posed by water, airborne pollution is also a prevalent cause of stone corrosion in Venice. Following World War II, a spike in industry increased the levels of sulfur dioxide in the air, a compound that has the potential to cause acid rain. Though a law passed during the 1970s looked to choose alternative sources of fuel that would not emit sulfur-containing compounds, other sources such as increased motor boat use still contributed heavily to air and water pollution in the city.¹⁵ Figure 5 (pictured right) of a keystone sculpture in an archway, is a perfect example of a sculpture suffering from years of corrosive and weathering effects without being administered the proper care.



Figure 11: Keystone showing years of deteriorating effects

Not only a result of weathering affects, living organisms also contribute to the deterioration of stone. The most visible example of the effect of living organisms is that of birds, whose droppings contain traces of phosphoric and nitric compounds that break down rocks over time. Microscopic organisms, including algae and bacteria, secrete acids that initiate chemical reactions and ultimately break down rocks further. These chemical reactions often discolor a sculpture, though this is not always viewed as detrimental; the term “patination” refers to any discoloration of stone or other substance that is seen as beneficial to the material.

2.2.3. Public Art Restoration Efforts

One of the biggest obstacles to overcome in the restoration and preservation of stone sculptures lies in proactively preventing water damage before it occurs. Free-standing pieces of

¹⁴ Selwitz, Charles, and Eric Doehne. 2002. The evaluation of crystallization modifiers for controlling salt damage to limestone. *Journal of Cultural Heritage* 3 (3) (9): 205-16.

¹⁵ Maravelaki-Kalaitzaki, P., and G. Biscontin. 1999. Origin, characteristics and morphology of weathering crusts on istria stone in venice. *Atmospheric Environment* 33 (11) (5/1): 1699-709.

art, those that are not integrated into any larger structures, may be treated with sealant that will prevent water from seeping in through cracks; however, works that are attached to other structures do not share this same luxury. Applying sealant to only part of an attached piece would allow water to enter but not exit. This is an issue not only for water entering and leaving deposits inside the stone, but also during the winter when the water may freeze and further damage the stone.

Should a piece of the stone sculpture splinter or break off, there are several possible methods of repair. If the piece is small enough, simple adhesives may be used. Larger pieces, and those ill-suited by adhesives, may be reattached by using a metal rod to hold the pieces in place and then plastering them together. This method can be hazardous to the piece though, as the restorer must ensure that inserting the rod into the two pieces will not cause irreparable surface damage to either of them, and must also ensure that the metal used in the rod is not one that will easily deteriorate through rusting or corrosion.

In dealing with the microorganism and substance buildups on the surface of the sculptures, simple washes may be done. Depending on the type of stone and nature of the deposit layer, the wash may contain only water or it may require soap as long as the soap does not contain any chemicals that will damage the stone. Further action may be taken to spray or rub on certain solutions that protect the piece from elemental damage and prevent surface deposits from accumulating.

2.3. Antique Boats

Apart from the many years of public art documentation and cataloguing in Venice, WPI students have also conducted research in the area of Venetian nautical history and antique boats, traditional wooden boats that are a minimum of fifty years old. The city of Venice is constructed on 125 different islands, which are connected by 182 different canals and 409 bridges.¹⁶ The evolution of Venetian culture and heritage has been greatly influenced by the water and boats have been an integral part of Venetian life since the fifth century.

¹⁶ *Sailing Between the Channels*. Nautica On Line.< <http://www.nautica.it/charter/venezia.htm>>

Shipbuilding became essential to Venetian life and dates back as early as the city itself.¹⁷ Each boat was handcrafted by *squerarióli*, who were among the finest and most talented craftsmen in the world.¹⁸ These artisans were able to create each boat in the same manner: not



Figure 12: A Modern Gondola

with blueprints or instructions, but instead with knowledge handed down over many years.¹⁹ The *squerarióli* crafted these boats in shipyards called *squeri*. These shipyards developed all over the city with some dedicated to the construction and repair of small boats and others dedicated to the production of larger boats with greater transporting capacity.²⁰ Although the art of boat-making is passed down from generation to generation, few *squerarióli* remain who are dedicated to the craft²¹. As a result, there are very few *squeri* left in the city. The number of dedicated craftsmen continues to decline as people become more and more dependent upon motorized boats.²²

Venetian boats were hand-crafted and designed based on their specific function, making life on the canal much more efficient. Each boat was designed with two common traits that were dictated by the canal structure²³. Due to the shallow lagoon water surrounding Venice and the muddy banks that limit each side, the boats were designed with flat bottoms and

with blueprints or instructions, but instead with knowledge handed down over many years.¹⁹ The *squerarióli* crafted these boats in shipyards called *squeri*. These shipyards developed all over the city with some dedicated to the construction and repair of small boats and others dedicated to the production of larger boats with greater transporting capacity.²⁰ Although the art of boat-making is passed down from generation to generation, few *squerarióli* remain who are dedicated to the craft²¹. As a result, there are very few *squeri* left in the city. The number of dedicated craftsmen continues to decline as people become more and more dependent upon motorized boats.²²



Figure 13: The gates of the *Arsenale*, the largest of the *squeri*.

¹⁷ Ibid.

¹⁸ "The Gondola, Its History and Useness." SitoUfficiale Della Gondola Veneziana. Web. 14 Sept. 2011. <<http://www.gondolavenezia.it/history.asp?Capitolo=9>>.

¹⁹ Ascare et al, "PreserVenice: Preserving Venetian Material Culture," 49.

²⁰ Ibid

²¹ "The Gondola, Its History and Useness." SitoUfficiale Della Gondola Veneziana. Web. 14 Sept. 2011. <<http://www.gondolavenezia.it/history.asp?Capitolo=9>>.

²² Ibid

²³ Bryan Bigda et al., "MuseoArzana: Preserving the Traditional Boats of Venice," 21. (Worcester: Worcester Polytechnic Institute, 2007).

shallow draft hulls.²⁴ These features were an obvious choice given the characteristics of the canals and they limited structural damage as the boats were dragged in and out of the water.²⁵

2.3.1. Types of Antique Boats

Antique Venetian boats can be divided into three main categories based on their function: fishing and hunting, cargo transportation, and human transportation.²⁶ Each category contains boats of similar size, shape, and intended use. The types of boats we cataloged are listed below and organized by category. To learn more about each type of boat please visit the Venipedia page dedicated to antique boats.²⁷

Fishing and Hunting Boats:

- [Topo](#)
- [Sanpiero](#)
- [S'ciopon](#)

Large Cargo Transport Boats:

- [Caorlina](#)
- [Peata or Piatta](#)

Human Transport Boats:

- [Sandolo](#)
- [Mascareta](#)
- [Puparin](#)
- [Gondola](#)

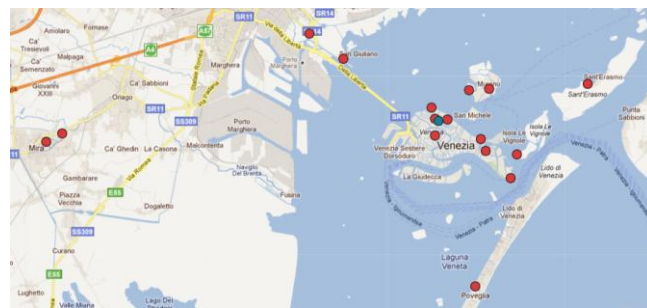


Figure 14: Map showing storage locations of traditional boats in the Arzana collection

²⁴ Witty, Anne. "Beyond the Gondola" *WoodenBoat*. Pg. 50.

²⁵ Bigda et al., "MuseoArzana: Preserving the Traditional Boats of Venice," 7.

²⁶ Bigda et al., "MuseoArzana: Preserving the Traditional Boats of Venice," 21.

²⁷ Venipedia. "Antique Boats," Published online at http://venipedia.org/index.php?title=Antique_boats/.

2.3.2 Preservation of Antique Boats

The antique boats that were once such a large part of the Venetian lifestyle are rapidly being phased out of use. As modern society progressed and motorized vehicles became the norm, motor boats made their way into the Venetian waterways, and eventually became the primary method of travel within the city. Where once there had been tens of thousands of these antique boats in the canals, a small fraction of that number now remains.²⁸ This decline is reflected in the number of *traghetti*, or ferries, located throughout the city. In 1687, there were forty-three active *traghetti* stations, but by 2004 that number had dwindled down to eight.²⁹ Figure 13 shows a map of the active *traghetti* in 1687 (left) and the remaining active *traghetti* in 2004 (right).³⁰



Figure 15: Active *traghetti* 1687(left) and 2004(right)

This example of the closed *traghetti* shows the impact of modernized transportation and the threat it poses to traditional watercraft. This ultimately proves that there is a need to develop some way of documenting and preserving them before it's too late.

2.3.3. Endangerment of Antique Boats

As motorboats become more and more prominent in Venice, the city is seeing less and less of a need for the use of antique boats. Gondolas, the most easily recognizable of the traditional boats, are today seen largely as a tourist attraction and are hardly recognized as a viable means of preserving the cultural heritage of the city. The waves that are produced in the wakes of the city's many motorboats do far more erosive damage than the more docile gondolas had ever done. Motorboats also emit an excessive amount of pollution into both the air and the lagoon that had previously been absent.

²⁸ 'Without gondolas, what is venice?' we might find out --- the beautiful wooden boats typified city of canals; just three squeri remain. 1987; 1987. *Wall Street Journal*1987; 1987.

²⁹ Bigda et al., "MuseoArzana: Preserving the Traditional Boats of Venice," 55.

³⁰ Bigda et al., "MuseoArzana: Preserving the Traditional Boats of Venice," 59.

The citizens of the city, as well as the thousands of tourists who visit Venice every day, seem unaware, or perhaps ignorant to this problem. “Venice represents the clearest result of all dangers facing Italy’s treasures: environmental degradation . . . massive bureaucracy, the impact of tourism, and, on the part of the citizens themselves, a weird combination of cynicism, impotence, and an almost sublime lack of awareness of the irony of their own actions”³¹ writes Erla Zwingle in *National Geographic*, reflecting these sentiments. Thus, fewer and fewer of the traditional-styled boats are produced each year and those that already exist have mostly been neglected to a state of much-needed repair.

2.3.4. Preservation Efforts for Antique Boats

Fortunately, there exists an organization, known as *Arzanà*,³² that has an overt interest in the preservation of Venetian maritime heritage. Established in 1992, Arzanà is a non-profit organization that works to acquire antique boats of Venice, as well as any other tools or instruments related to these boats, and restore them to full working condition.

Currently, the Arzanà collection is comprised of roughly fifty individual boats that have been collected or donated over the years. Since the restoration of these boats is an expensive, time-consuming process for which there is little city funding, the process of returning these boats to working order is slow. In the meantime, all of the boats that have been collected are stored in the various shipyards owned by Arzanà throughout the city. One such storage facility is a museum located in the Calle delle Pignatti in Cannaregio. The museum itself is situated in the location of a former shipyard, which used to produce these same antique boats from the fifteenth century until roughly 1920.³³



Figure 16: Exterior view of Arzanà

³¹ Zwingle, Erla. “Italy’s Endangered Art”. *National Geographic* 196, no. 2 (1999): 107.

³² Arzana. “Per Lo Studio E La Conservazione Delle Imbarcazioni Veneziane.” Published online at <http://www.Arzanà.org/>.

³³ Ibid

2.4. Means of Cataloging Public Art

The first step toward the preservation of Venetian public art is to compile a complete and accurate listing of each individual work in the city. One individual, by the name of Alberto Rizzi³⁴, worked toward this goal in the 1970s and early 1980s under the commission of UNESCO. In 1987, Rizzi published Scultura Esterna a Venezia³⁵, a comprehensive listing of each piece of erratic sculpture in Venice. This collection was of the first true catalog of public art in Venice.

The book categorizes each piece of art with “a unique identifying number, the street or campo name where the piece is located, its exact or approximate age, the material it was made from, a short description of the subject matter, a conservation status determined by Rizzi at the time of publication, and a bibliography.”³⁶

With Rizzi’s efforts serving as a basis for future projects, groups of the Venice Project Center have been working for many years to visit both the sites that Rizzi covered and those that he did not. Over the past 20 years project teams have managed to compile a catalog of approximately 7,000 pieces of Venetian public art that details their location, condition, material, age, as well as a current picture. The contents of this extensive catalog range from wellheads (an item originally catalogued by Rizzi in the book Vere Da Pozzo Di Venezia³⁷) to Venetian bells.

In recent years project teams³⁸ have worked to add traditional Venetian watercraft to this extensive catalog. Working with Arzanà and their collection, these project teams have documented each individual boat, noting the condition and location of each one, while also taking a current photograph of each catalogued piece.



Figure 17: Scultura Esterna a Venezia by Alberto Rizzi

³⁴ Venipedia “Alberto Rizzi,” Published online at http://venipedia.org/index.php?title=Alberto_Rizzi. [Cited December 12, 2011]

³⁵ Rizzi, Alberto. *Scultura Esterna a Venezia*

³⁶ “Alberto Rizzi.” http://venipedia.org/index.php?title=Alberto_Rizzi.

³⁷ Rizzi, Alberto. *Vere Da Pozzo Di Venezia*

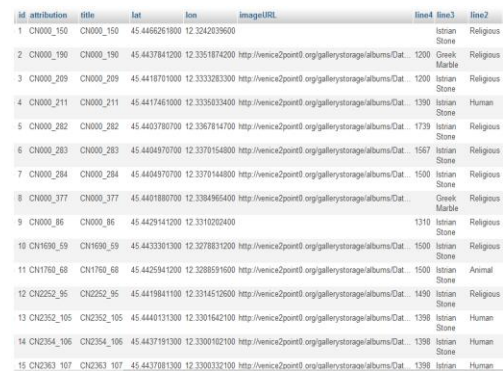
³⁸ Catalano, Brian and others. *Preserving the Nautical Traditions and Maritime Heritage of Venice, Italy*. 2005

2.4.1. Digital Information Storage

When teams from the Venice Project Center began working on the catalog for public art, all of the data was stored locally on various disks and drives. However, this method was inefficient as the data was very scattered and unorganized, and there was generally only one accessible copy. As need for the files to be more easily accessible arose, alternative means for storage were explored. The solution implemented was to relocate all of the accumulated data onto an online server maintained by Bluehost.³⁹

Bluehost is a web-hosting platform that provides its users with a variety of services, including web domain hosting and online database storage. This allows all of the data to be accessed from anywhere with an internet connection and the proper access permissions.

The catalog of public art data is hosted online in a MySQL (Structured Query Language) database. This type of database allows other programs to access the data inside and copy it to another location easily. The database also has the ability to name different categories of data. This allows many different entries of the same type to have the same categories, such as height, width, location, and name. This facilitates organization and allows for clearer understanding of the database.



id	attribution	title	lat	lon	imageURL	line4	line3	line2
1	CN000_150	CN000_150	45.4466261900	12.3242039600				Isitian Stone
2	CN000_190	CN000_190	45.4437841200	12.3351874200	http://venice2point0.org/gallerystorage/albums/Cat...	1200	Gravk Marble	Religious
3	CN000_209	CN000_209	45.4418701000	12.3333283300	http://venice2point0.org/gallerystorage/albums/Cat...	1200	Isitian Stone	Religious
4	CN000_211	CN000_211	45.4417461000	12.3335633400	http://venice2point0.org/gallerystorage/albums/Cat...	1390	Isitian Stone	Human
5	CN000_282	CN000_282	45.4403780700	12.3367814700	http://venice2point0.org/gallerystorage/albums/Cat...	1739	Isitian Stone	Religious
6	CN000_283	CN000_283	45.4404970700	12.3379154800	http://venice2point0.org/gallerystorage/albums/Cat...	1567	Isitian Stone	Religious
7	CN000_284	CN000_284	45.4404970700	12.3370144800	http://venice2point0.org/gallerystorage/albums/Cat...	1500	Isitian Stone	Religious
8	CN000_377	CN000_377	45.4401880700	12.3384965400	http://venice2point0.org/gallerystorage/albums/Cat...		Gravk Marble	Religious
9	CN000_86	CN000_86	45.4429141200	12.3310202400		1310	Isitian Stone	Religious
10	CN1690_59	CN1690_59	45.4433381300	12.3278831200	http://venice2point0.org/gallerystorage/albums/Cat...	1500	Isitian Stone	Religious
11	CN1760_68	CN1760_68	45.4425941200	12.3288591600	http://venice2point0.org/gallerystorage/albums/Cat...	1500	Isitian Stone	Animal
12	CN2252_95	CN2252_95	45.4419841100	12.3314510900	http://venice2point0.org/gallerystorage/albums/Cat...	1490	Isitian Stone	Religious
13	CN2352_105	CN2352_105	45.4440131300	12.3301642100	http://venice2point0.org/gallerystorage/albums/Cat...	1399	Isitian Stone	Human
14	CN2354_106	CN2354_106	45.4437191300	12.3300102100	http://venice2point0.org/gallerystorage/albums/Cat...	1399	Isitian Stone	Human
15	CN2363_107	CN2363_107	45.4437081300	12.3300332100	http://venice2point0.org/gallerystorage/albums/Cat...	1399	Isitian Stone	Human

Figure 18: Bluehost database of public art

Hosting the data in an online server is convenient for project teams. However, this method does not allow for the public to view the catalogs. The Bluehost data requires login credentials to access which, for the purpose of keeping the records secure, will not be provided in this report. However, the information in this database is provided through online services, such as the website PreserVenice⁴⁰.

PreserVenice was created in 2007 by a group of Worcester Polytechnic Institute students working on their Interactive Qualifying Project⁴¹. The website was created in order to raise awareness about the state of the many decaying artifacts in Venice, Italy. The pieces cataloged include coats of arms, confraternity symbols, crosses, decorations, fragments, inscriptions,

³⁹ Bluehost. "Homepage," Published online at <http://www.bluehost.com/>.

⁴⁰ "PreserVenice," <http://www.preservenice.org/>.

⁴¹ Kent et al., "PreserVenice: Preserving Venetian Public Art."

patere, reliefs, sculptures, street altars, wells, portals, flagstaff pedestals, and lunette⁴². Each category of art has its own section on the site, which allows visitors to view more information about specific pieces, as well as see a map which shows the GPS location of each piece of that particular type of art. The maps get their data from the Bluehost database, and the locations are displayed by a Google map, which is embedded into the webpage. Each map works in conjunction with PreserVenice to display a picture and detailed location information about each specific piece.

Visitors to the site are also afforded the opportunity of getting involved by submitting their own report about a piece of art that may be in danger. Under the “Get Involved!” dropdown, visitors can select “Submit Report,” which brings up a form giving detailed information about the current state of the piece, including the exact location, any damage on the piece, and whether or not the piece is missing⁴³. This type of crowdsourcing is particularly useful for PreserVenice, which does not have the means to check and recheck the current state of each of the pieces. Giving the public a way to assist

PreserVenice in its ultimate goal is a useful way of utilizing the internet as a way to improve the catalog.

An equally important webtool for the documentation of public art in the city is Venipedia. Venipedia was designed by the Venice Project Center to be a host of information dedicated to the city of Venice, Italy. The site currently includes over 4,000 articles⁴⁴, with more being added every year. In 2010, the

PreserVenice project team began to add the catalog of public art to Venipedia, which laid the groundwork for future groups to complete the import of public art data online. However the site is not maintained exclusively by WPI project teams. Venipedia is a wiki, which functions as an online encyclopedia. This means that outside users can register and edit the information. This type of collaboration allows anybody with information to contribute about a particular subject can add their knowledge to the site.



Figure 19: An example of a cross sculpture page

⁴² “PreserVenice,” <http://www.preservenice.org/>.

⁴³ See the appendix for a copy of the form.

⁴⁴ “Venipedia,” <http://www.venipedia.org/>.

Ultimately, Venipedia aims to be the best resource for information on the public art catalog of Venice. Presently, wiki pages exist for general information about each type of art, as well as specialized pages for each individual piece around the city. The general art pages provide overviews of each different category, explaining their significance and relevance in Venetian society. The individual pages contain information about the size, location, condition, and any other pertinent information for that particular artifact. Each of these pages also includes a picture and an interactive map showing the location of the given piece and all other artifacts in the city of the same type.⁴⁵

Presenting the catalog in an online format allows for the works of art to be reviewed and studied much more easily. As opposed to the previous catalog formats that included paper copies and localized computer files of all the data, Venipedia and the digital catalog make it effortless to read and share the wealth of information available on public art in Venice.

2.4.2. Crowdsourcing

In order to keep the preservation effort alive, organizations such as PreserVenice require funding. The pieces of art that are decaying require restoration from master artisans, whose work requires payment. In order for the catalogs to be updated regularly and the pieces in need of repair to be maintained, a sustainable means of crowdsourcing must be employed.

Crowdsourcing is defined as “The practice whereby an organization enlists a variety of freelancers, paid or unpaid, to work on a specific task or problem.”⁴⁶ By delegating tasks to a large number of people, by way of a mobile application or website, organizations can receive feedback and information from a large number of people. This can help organizations such as PreserVenice that require a large number of people in order to collect relevant data or funding.

PreserVenice is an organization that stands to benefit greatly from crowdsourcing. As it presently stands, it is difficult for small student project teams to gather data on each piece of the catalog of nearly 7,000 pieces. This is where crowdsourcing becomes useful. Using the PreserVenice website, visitors can fill out an online form that details a change in a piece of public art. This allows anyone who notices a difference in a piece of art to submit the changes to

⁴⁵ Venipedia. “Cross: Cannaregio 1544, CN 1544 51,” Published online at [http://venipedia.org/index.php?title=Cross: Cannaregio 1544, CN1544 51/](http://venipedia.org/index.php?title=Cross:_Cannaregio_1544,_CN1544_51/).

⁴⁶ Word Reference. “Crowdsourcing Definition,” Published online at <http://www.wordreference.com/definition/crowdsourcing/>.

PreserVenice. The website can then be updated with the new information, saving the project groups from having to revisit each piece every year.

Another significant use for crowdsourcing is Venipedia. As a user-edited wiki about Venice, Venipedia is a crowdsourcing outlet by definition. A user-edited wiki allows anyone to create and edit pages after creating a user account. People who live and work in Venice are more knowledgeable about it than groups of project teams who are only there for two months, so it is critical that they add their knowledge to the site. One downside to crowdsourcing, however, is spam pages. If any user can add pages, it follows that users can add spam pages. This is a particular problem for Venipedia. With no real website moderation, there are a large number of spam pages that have cropped up on the site in recent years. However, beginning this year, students of the Venice Project Center are looking to control the amount of spam that has been added to the wiki, as well as prevent spam from being added in the future.

In dealing with the catalog of public art where each piece has a unique location, an



Figure 20: The Layar Logo

augmented reality application is the most effective means of crowdsourcing. Layar⁴⁷ is an application for smartphones that uses “augmented reality.” By accessing the camera and GPS location of the user, Layar “can recognize real world objects and display digital (augmented reality) experiences on top of them. These types of overlays in the program are called layers.”⁴⁸

A previous WPI project team developed a layer for use in Venice that would allow the user to see nearby pieces of public art⁴⁹. The layer would receive its information from PreserVenice and display markers on the phone screen that would represent the location of nearby pieces of public art. However, the layer is incomplete, and requires additional work in order to function.

Through integration with PreserVenice and Venipedia, Layar could potentially provide users with an interactive and informative tour of Venice. The application would access PreserVenice and display preservation data for the piece. The application could also lead the user on a tour of nearby pieces of art. If desired, the user could also access Venipedia and see the historical data about the piece.

⁴⁷ Layar. “Layar homepage,” Published online at <http://www.layar.com/>.

⁴⁸ Ibid.

⁴⁹ Ascare et al, “PreserVenice: Preserving Venetian Material Culture.”

2.4.3. Crowdfunding

A similar concept to crowdsourcing, crowdfunding is built around the idea of benefiting from the participation of multiple individuals. However, the concept of crowdfunding involves using the “crowd” to raise money. Crowdfunding has grown in significance with the rise of the internet, as the internet makes it easy to donate from a computer or mobile device with only a credit card number. Organizations such as the American Red Cross have taken advantage of these types of crowdsourcing to aid disaster victims.⁵⁰

Crowdfunding is becoming increasingly useful as a tool for small businesses and organizations that have little funding. PreserVenice is a perfect example of an organization that could benefit greatly from crowdfunding. As a small, mostly student-maintained organization, PreserVenice lacks the funding required to achieve the end goal of restoring the public art of Venice. However, by putting a donate button on the site, PreserVenice allows interested parties to give money to their cause. In addition to PreserVenice, the mobile application that is being developed (which will integrate with Venipedia and PreserVenice) will allow people to donate from their mobile phones as well. The primary purpose of the application will be to raise awareness about the current state of public art. Residents of Venice and tourists alike will contribute to the project as they learn more about the worsening condition of the Venetian collections of art. Given that student project teams only spend a short amount of time in Venice working to maintain the catalog, crowdsourcing and crowdfunding become that much more important in keeping PreserVenice alive.

⁵⁰ “Japan Earthquake: Donating Relief Funds - ABC News.” *ABCNews.com: Daily News, Breaking News and Video Broadcasts - ABC News*. Web. 01 Oct. 2011. <<http://abcnews.go.com/International/japan-earthquake-donating-relief-funds/story?id=13122660>>.

3. Methodology

The purpose of this project was to promote and raise awareness about the deterioration of material culture in Venice, while preserving and maintaining the history and heritage of the city.

The established goals for this project included:

1. Assess and validate a section of the existing catalog of public art in Venice
2. Work with Arzanà to create a more complete catalog of antique boats
3. Transfer the current catalog of public art to Venipedia, the Venice wiki site
4. Create a prioritization chart ranking all erratic sculpture and decorative keystones cataloged based on need for restoration
5. Develop a viable means of crowdsourcing as a means of maintaining the catalog of public art

We accomplished these goals by first and foremost revisiting the previously compiled catalog of material culture. In doing so, we identified several gaps in the data, pieces that had been omitted from previous years of work. The first was the collection of decorative keystones present in archways all across the city; these works had not been visited and examined in over a decade, so our team began compiling data on them and laid the groundwork for future project teams to further our efforts. Similarly, though teams had previously worked to study the Arzanà collection of antique boats, none of this data was ever formally documented, so our team worked with the organization to do so. Once this was completed, the new data was merged with the older information, which was then imported to Venipedia where it would serve as a unified and easily accessible catalog for the public to view. In addition to the Venipedia catalog, we worked with our sponsor, UNESCO, and a consultant for the municipality of Venice to create a Geographic Information System (GIS) map that contains the GPS location of each piece of cataloged public art; once completed, this map will be made available to organizations within the city responsible for the preservation of these pieces. Finally, with all of the data assembled, a prioritization analysis was run on the catalog of art to compare each piece and determine which were in most urgent need of restoration.

3.1. Building the Keystone Catalog

Without periodic catalog maintenance, the accuracy of the collected data for the public art of Venice will decrease. Given the vast amount of public art throughout the city, it is an immensely difficult task to constantly monitor each individual piece. As a result, some collections within the public art catalog have not been revisited within the past decade. This means that factual errors exist within various data sets that must be corrected if the catalog is to remain accurate.

The 2010 PreserVenice team⁵¹ advised that the decorative keystone collection, which has not been examined since 1995, be given the highest priority. In 1995 a WPI team in collaboration with Earthwatch, a non-profit organization committed to conserving the diversity and integrity of life on earth to meet the needs of current and future generations, documented the keystones throughout the district of Cannaregio as well as the public bridges across the city. It was our goal to further the efforts started by the team; as such we developed a strategy for auditing the keystone collection. Due to the difficulty of accessing the collection and the time constraints of our time in Venice, we focused only on the sestiere⁵² of Castello. The first step in studying the keystone collection was to generate a field form to document all relevant data pertaining to the collection, including the dimensions, location, and condition of a piece. The field form our team developed was based on the work of the student project team that examined the keystone collection of Cannaregio in 1995. A copy of the field form can be seen in Appendix C.



Figure 21: Keystone Map Icon

After establishing our means of data collection, the team then developed a method to catalog each individual piece. Since the previously collected keystone data was limited, we were advised to search address by address throughout the district. In order to accomplish this task in a timely manner we divided into two separate teams, with one team starting at the lowest numerical address and the other starting at the highest. From there each team worked in numerical order (or reverse numerical order) to locate each keystone. Once located, information for an individual piece was marked on the field form, a picture was taken, and its location was marked on a map. This process was repeated until each address and bridge within Castello had been visited.

⁵¹ Ascare et al, “PreserVenice: Preserving Venetian Material Culture.”

⁵² The word ‘sestiere’ roughly translates to ‘district’ in English. It is the term used to describe the six major districts in Venice: Cannaregio, Castello, Dorsoduro, San Marco, San Polo, and Santa Croce.

Keystones that were discovered on churches were excluded, as were those that were considered to be minimally or not at all decorative. The finalized data was then compiled into an excel spreadsheet and standardized to be imported into Venipedia.

A Google Map of the catalogued pieces was also created to display the location and other pertinent information. The interface on Google Maps allows each item to be labeled with a “place mark,” often displayed as a pushpin or other icon on a map. A KML (Keyhole Markup Language) file was generated and uploaded to Google maps. See Appendix H: Basics of Google KML for a brief overview of KML files.

Using the same KML file generated for the Google Map, a Geographic Information System (GIS) cloud layer was created for the keystone collection and added to the pre-existing public art GIS map. GISCloud allows users to represent statistics in maps over layers, which is useful for displaying large quantities of data in a fixed location.⁵³ The program works particularly well for the public art database because each type of art has its own layer, allowing the user to filter through each individual collection on the same map.

Using our method, future project teams will be able to complete the validation of the decorative keystone collection for the entirety of Venice.

3.2. Compiling Data for Antique Boats

In addition to the validation of the keystone catalog, our group worked to develop a catalog for the antique boats of Venice and import it to the Venipedia site. As a foundation for the catalog, we worked in conjunction with Arzanà to document and publish a portion of their collection of over fifty boats. In doing so, we visited a part of the Arzanà collection, located at Forte Marghera in Mestre. There, multiple photographs of each boat were taken and any available information about the boat was recorded.

After the completion of field work at Forte Marghera, our team compiled our data with that of previous project teams, before importing it all into Venipedia. Individual wiki pages for each type of antique boat



Figure 22: A Sanpiero photographed at Forte Marghera

⁵³ GIS cloud. “GIS cloud homepage,” Published online at <http://www.giscloud.com/>.

(*sandolo, mascareta, topo*, etc.) were created containing information relevant to the function of that particular type. These were then linked to pages generated for each individual boat cataloged, which include information gathered in the field. Because the information relevant to the Arzanà collection is orally communicated, most of the information about the individual antique boats was obtained through interviews with members of the organization. This extracted information was crucial in developing the wiki pages and login credentials have been given to members of Arzanà so that they may continue to add and update information relevant to their work.

3.3. Transferring the Current Catalog of Public Art to Venipedia

Although Venipedia is a significant source of knowledge on Venetian culture, at the start of this project the site contained a fraction of the catalog of Venetian public art compiled by the Venice Project Center over the past twenty years. As one of the most comprehensive catalogs on Venetian material culture in existence, it was important that the data was added to Venipedia to further its credibility as the most comprehensive source of information on the city.

In order to achieve this goal, our team took a number of measures to ensure that all information imported was done correctly and in an organized fashion.

3.3.1. Organizing Previous Data

The first step in moving the catalog to Venipedia was to organize the data collected by past project teams. The 2009 PreserVenice project group worked carefully to normalize these data sets in Microsoft Access, ensuring that all entries into the database contained the same information and that a uniform set of criteria was established for adding new works. The following year, the 2010 project group was responsible for transferring this data from the locally hosted files to the SQL databases on the Bluehost server so that the information could be accessed and edited by multiple users in different locations simultaneously. Accessing this information, our group compared all of the different data tables in the server and validated the entries across each table (as well as against the local Microsoft Access databases) to ensure the accuracy and completeness of the data. Once completed, we downloaded the relevant tables from

the server in the Comma-Separated Values (CSV) file format. These tables were then edited and manipulated to the point where they were ready to be imported into Venipedia.

3.3.2. Importing Data to Venipedia

In order to import large quantities of data into Venipedia under the same format, we needed to make use of template pages. The template page for each different type of art was made to hold a very similar format, differing solely with the varying fields that contained information only relevant to that particular type of art. Each template page included an infobox that contained a concise summary of the most important information about the piece of art; a section for body text that included more expanded facts about work, such as the text of an inscription that it might

Street Altars	
Cannaregio	000-1 • 000-2 • 000-3 • 000-4 • 000-5 • 000-6 • 000-7 • 000-8 • 1249 • 1896 • 2385 • 2927 • 3144 • 326 • 3599 • 363 • 4090 • 4113 • 4176 • 4321 • 4500 • 4925 • 5910 • 6028 • 618 • 6270
Castello	000-1 • 1125 • 2169 • 2182 • 2841 • 3412 • 3558 • 3701 • 4199 • 4719 • 4897 • 5137 • 5160 • 5169 • 5500 • 5614 • 5851 • 6070 • 6121 • 6282 • 6690
Dorsoduro	000-1 • 102 • 1306 • 1745 • 178 • 1880 • 2222 • 2615 • 2620 • 2784 • 3467 • 3805 • 560
San Marco	000-1 • 000-2 • 000-3 • 000-4 • 000-5 • 104 • 1455 • 2717 • 3135 • 3203 • 3226 • 3415 • 3560 • 3568 • 3607 • 4609 • 4854 • 4864 • 5412 • 5534 • 786 • 790
San Polo	000-1 • 000-2 • 1099-1 • 1099-2 • 1256 • 1296 • 1324 • 2212 • 2272 • 2978 • 3063 • 3074 • 364 • 464
Santa Croce	1165 • 134 • 1505 • 1599 • 2116 • 2174 • 224 • 2281 • 2346 • 290 • 32 • 647 • 742

Figure 23: A navbox for all street altars in Venice

contain; and a map and navbox for the category of art that the piece was listed

under, directing users to each other piece in that category. Navboxes on Venipedia served to provide links to all pages on the wiki under the same category together. In the case of the public art collection, each individual piece under one category was linked to in the same navbox, which was sorted by sestiere of location. Similarly, using Venipedia’s map extension, an interactive Google Map was embedded onto each page. These maps, generated from the geographic coordinates of each individual piece of art in that category, indicated the location of each piece while highlighting the location of the piece being viewed. For more information about creating template pages on Venipedia, refer to Appendix E.

The next step toward transferring the public art catalogs into Venipedia was to import the pictures for each piece of art. Due to the large number of pictures, this task was completed through use of a Secure Shell (SSH) protocol. The entire collection of public art images was already located in the photo gallery on Venice 2.0.⁵⁴ These files were then copied and moved to an accessible location using an SSH File Transfer Protocol (SFTP) program. This type of program is generally used for file management and can be used to transfer files from one host location to another over a secure network. From there, an SSH client was used; by logging into

⁵⁴ “Venice 2.0,” <http://www.venice2point0.org/>.

the same host server that the image files were placed in and running the proper PHP script, all of the files could be seamlessly imported to Venipedia in a very short period of time. More information on this method may be obtained in Appendix D.

Once the template pages had been created and the pictures were imported, the remainder of the public art data was ready to be imported. The 2010 PreserVenice project team experimented with the wiki extension DataTransfer, which allows Venipedia to automatically import information from a CSV spreadsheet file directly into an article. They were able to successfully import the entire collection of data on cross and relief sculptures into Venipedia with this technique. Our group similarly made use of this extension to correctly generate pages on the wiki from our data.

To properly format the CSV files and ensure that the entries were put in the proper place online, the header in each column needed to carry the correct format. The first column was invariably used as the title column, listing the title of each page that would be created from the spreadsheet; thus, the first entry in that column was labeled ‘Title.’ Each subsequent column contained the information that would be displayed on the page, and it must have matched a field in the previously created template page. The label for each of these remaining columns in the spreadsheet was ‘Template:*Name_of_Template*[*Name_of_Data_Field*].’ Venipedia was then able to recognize and properly import the data into the correct template page and location within the template. Each row of the CSV spreadsheet generated its own page on Venipedia, and consequently each individual entry of the public art catalog of Venice could be viewed. A more detailed explanation of this process is given in Appendix F.

Some additional information was also added to a lesser number of pages, where necessary. The Venice Project Center was in possession of a number of photographs that Alberto Rizzi had taken when he was cataloging the city’s art for *Scultura Esterna a Venezia*⁵⁵ but that he ultimately omitted from the book. These pictures were added to their respective pages at the bottom of the infobox, thereby providing a comparison of the pieces as to how their conditions have changed over the course of roughly two decades.

As the conditions of some pieces of art have worsened over the years, other pieces have disappeared entirely. After referencing the database, a unique category was created on Venipedia to list all of the pieces of art across each type known to be missing. By visiting this category page

⁵⁵ Rizzi, Alberto. *Scultura Esterna a Venezia*

or viewing to corresponding map, users will be able to see which pieces have vanished and from which location they once existed.

3.4. Updating the Mobile Application

Last year, a smartphone application was developed to spread more awareness about the public art of Venice. Using an existing application called Layar, students were able to show the user the location of public art through the use of “augmented reality” technology, which dynamically superimposes icons on the smartphone camera image based on the GPS location of each piece of art.

There were four main goals for the development of this application:⁵⁶

- Provide the user with the location of the pieces Venetian public art
- Provide basic information about the piece at hand
- Have the ability to donate to the restoration of the piece through PreserVenice
- Contact the PreserVenice team with feedback.



Figure 24: The previous Layar interface

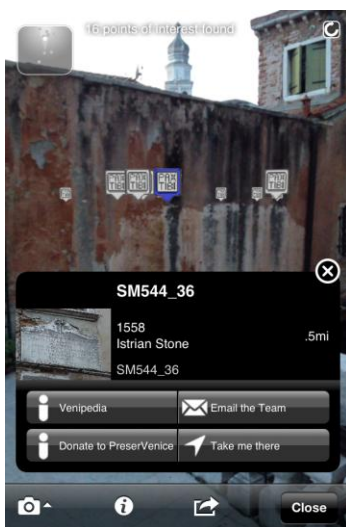


Figure 25: The current Layar interface

While the application fulfilled these four goals, in certain places the application fell short. The application did provide basic information about the piece, but there was no way to access the Venipedia page for the specific piece that was being referenced. In addition, users were not able to donate to PreserVenice.

In order to address these two concerns, modifications were made to the information accessed by Layar. The database was altered so that the buttons displayed when viewing a piece would link to the specific Venipedia page for that piece. As of the completion of this project, this functionality is only enabled for the Inscriptions layer. Donation functionality was enabled by adding another button,

⁵⁶ Ascare et al, “PreserVenice: Preserving Venetian Material Culture.”

labeled “Donate to PreserVenice,” that would bring users to the Donations page of the organization’s website. There, the user is able to donate to the cause.

In addition to these changes, the icons that represent the pieces of art were updated. Previously, the pieces were represented by small, dark circles on the screen; they have been switched to the PreserVenice icons that are used to represent the different types of public art.

3.5. Priority Analysis

With the public art catalog fully integrated into the Venipedia wiki site, the next area of focus for our group was to develop a means for the preservation and restoration of individual pieces. To work toward this goal, it was necessary to establish a prioritization system detailing which pieces are most in need of attention. Past IQP project teams had created prioritization charts for individual types of art, but it was not until 2007 when one system was established for every type of piece. Using their work as a basis for our own, we sought to improve upon their priority system for decorative sculpture, and to extend it to functional pieces as well.

In designing their system, the 2007 group based their work off of a 1993 paper written by Professor Fabio Carrera entitled “A Computerized Catalog of Outdoor Art in Venice with Automatic Estimation of Restoration Costs.”⁵⁷ Published in the proceedings of that year’s International RILEM/UNESCO Congress, the paper laid out his thoughts on the subject to which he has dedicated much of his time in Venice. This paper, in addition to another paper published in 1997 entitled “What cultural heritage do we preserve and why?”⁵⁸ served as the backbone for their system.

Our reason for adapting the 2007 team’s system was that it allowed for each type of public art to be compared on the same scale. The system itself acts as a great equalizer, allowing all pieces to receive the same treatment from future evaluators. It is also very basic, relying on a zero-to-four scale to rate pieces in five separate categories. But it is the simplicity and directness of this system that allows for its effectiveness.

As with the 2007 team had done, we incorporated several large “meta-attributes” detailing with the main areas of interest for a particular piece. These “meta-attributes” of state of

⁵⁷ Fabio Carrera, “Computerized Catalog of Outdoor Art in Venice with Restoration Costs” in *Conservation of Stone and Other Materials*, ed. M.-J. Thiel, 831.

⁵⁸ Fabio Carrera, “What cultural heritage do we preserve and why?” (PhD diss., Massachusetts Institute for Technology, 1997).

conservation, vulnerability, social and historical importance, artistic value, uniqueness and emergency criteria are broken down further into subcategories, or “attributes”, in the sections below. Attributes marked with an asterisk represent a significant change made to the 2007 system.

3.5.1. State of Conservation

This category exists as an evaluation of the “condition” an individual piece is in. It exists strictly as a determination of physical condition, and disregards artistic value and other factors.

The attributes for this category are:

- Surface condition, defined as “corrosion, deposits, and discoloration.” 4 is severe and threatening; 3 is problems that would be threatening if worsened; 2 is minor; 1 is some evidence; 0 is no evidence.
- Damage coverage, defined as “percentage of object covered by damage.” 4 is 100%; 3 is 75%; 2 is 50%; 1 is 25%; and 0 is 0%. The ratings should be rounded up (a 15% would receive a 1) so that only those pieces in pristine condition receive a 0.
- Structural integrity, defined as “missing pieces or compromised structural integrity*⁵⁹.” 4 is severe and pronounced; 3 is potentially severe if the condition worsens; 2 is moderate; 1 is minor; and 0 is no evidence.
- Readability, defined as “legibility of the design and/or inscription.” 4 is 100% illegible; 3 is 75% illegible; 2 is 50% illegible; 1 is 25% illegible; and 0 is 0% illegible. As with “damage coverage,” raters are encouraged to round up, ensuring only pristine pieces receive a 0.
- Cracking. 4 is structural cracking; 3 is deep surface cracks that may become structural; 2 is average surface cracks; 1 is minor surface cracks and/or scratches; 0 is no cracking.

3.5.2. Vulnerability

This category determines an object’s susceptibility to external threats generally consisting of damage caused by environmental and human factors. The attributes for this category are:

- Risk of theft. 4 is small, easily detached, close to the ground or window*⁶⁰; 3 is any two of those criteria; 2 is any one; 1 is low risk of theft; and 0 is reserved for objects whose structural function would make them immediately noticeable if stolen (wellheads, mascaroni, etc.)*⁶¹.

⁵⁹ The phrase “compromised structural integrity” was added to the definition to accommodate structural and functional pieces

⁶⁰ The phrase “surrounded by scaffolding” was removed due to the frequency and unpredictability of construction work and our inability to frequently visit each piece

⁶¹ This definition was altered to account for structural and functional pieces

- Exposure and accessibility to vandalism. 4 is at ground level, in a public area, with some “prestige” associated with vandalizing the object; 3 is any two of those criteria; 2 is any one; 1 is low risk of vandalism; 0 is completely inaccessible.
- Exposure to the elements. 4 is exposure to strong wind, direct sun, rain/drainage, and ocean spray; 3 is any three of those elements; 2 is any two; 1 is any one; and 0 is no exposure to the elements.
- Material used in construction. 4 is wood and/or metal; 3 is terracotta and/or stucco; 2 is non-Greek marbles and/or non-Istrian stone; 1 is Greek marble; 0 is Istrian stone. This rating is determined solely on whether the material is present, no matter the quantity.

3.5.3. Social and Historical Importance

This category puts the piece in social and historical context. Ratings for this subject require some specific knowledge on the piece. While basic knowledge is sufficient for rating, more in-depth background research will result in a more accurate rating. It is also worth noting here that pieces of high social and historical context are often *less* in need of restoration, as they frequently have caretakers and interested parties tending to them. The attributes for this category are:

- Popularity/folklore, defined as “use and recognition” by a local population, whether past or present.” 4 is high; 3 is above-average; 2 is somewhat; 1 is rare; 0 is never.
- Visibility or location, defined as “visibility to passers-by and volume of pedestrian and vehicular traffic.” 4 is high; 3 is above-average; 2 is moderate; 1 is low; 0 is almost never seen by traffic.
- Historical association, defined as “importance to local (Venetian) history.” 4 is high; 3 is above-average; 2 is somewhat; 1 is slight; 0 is not at all significant to the story of the place where it is found.
- Informational content, defined as the “amount of biographical information, text, or examples of styles and techniques important to the history of art and architecture contained in the object.” 4 is full of such information; 3 has an above-average amount; 2 has some; 1 has little; 0 has no information contained in it.

3.5.4. Artistic Value and Uniqueness

This category relates an object’s importance as a piece of art in an urban landscape. The attributes for this category are:

- Artistic importance, defined as “fame of the sculptor or artist.” 4 is a famous artist; 2 is an artist who can be identified; 0 is an unidentified artist. Not enough categories exist to warrant the entire zero-to-four scale.
- Monumentality, defined as “sheer size and influence on the surrounding landscape.” 4 is very significant; 3 is above-average; 2 is somewhat; 1 is minor; 0 is no influence.

- Crowdedness, defined as “percent coverage of carved figures, human or otherwise.” 4 has 100% coverage; 3 has 75%; 2 has 50%; 1 has 25%; 0 has no figures (text or geometric decorations only).
- Figurativeness, defined as the “type of figure depicted.” 4 is human features that are elaborate and life-like; 3 is animal features; 2 is plant figures; 1 is geometric figures; 0 is text only.

3.5.5. Emergency Criteria

This category indicates whether an object is in dire need of intervention to prevent damage or loss. Damage can be attributed to a number of sources ranging from natural elements to human contact. Pieces being dissolved by acid rain or bacterial secretions are given priority over those that have had an individual piece broken off, a one-time occurrence unlikely to happen again. The attributes for this category are:

- Risk to public safety. 4 poses an extreme and immediate risk; 3 is heightened risk; 2 is a moderate risk; 1 is low-risk; 0 is no risk.
- Danger of loss of the object (excluding theft). 4 is in extreme danger of being lost; 3 is in significant danger; 2 is moderate danger; 1 is in little danger; 0 is in no danger. Loss may occur when an object is located in an area making it more susceptible to damage (construction zones, behind shutters, near pipes, etc.) Theft is addressed in the “vulnerability” section above.

In short, the basis for our system is very similar to that produced by the 2007 project team. Apart from a few small adjustments made to the attributes, our system remains simple and intuitive as a means of rating objects quickly and efficiently. The 25% accuracy of the zero-to-four system may be subject to the criticism that it cannot detect minor deterioration, but if used to compare an object now with the same object ten years later, any change worth noting will manifest itself in the system. The assumption that each individual catalog will be updated every ten years remains an optimistic assumption until a viable means of crowdsourcing is developed.

As with any system, raw attributes based on data are not adequate. Because the rating of these pieces is inherently as subjective task, certain components of the priority system can be deemed more important than others. In seeking to determine their weightings, the 2007 team and Professor Carrera interviewed three prominent figures in the Venetian art community: a historian, a restorer, and an architect. After obtaining their weightings for each “meta-attribute,” the project team used that data to determine their own weightings which can be seen in the table below.

	Historian	Restorer	Architect	2007 IQP	Our Team
State of Conservation	1.14	-1.54	28.81	3	12
Vulnerability	1.77	0.95	13.53	6	4
Historical Importance	-3.49	-11.10	5.77	6	2
Social Importance	-2.55	-4.22	-2.14	-3	-2
Artistic Value	14.45	12.89	9.35	13	8
Uniqueness	8.83	14.61	7.59	8	6
Emergency	8.46	4.62	-5.28	4	2

However, because the 2007 project team only included decorative sculpture in their priority analysis system, their weightings subsequently favor decorative pieces. With the long term goal of the PreserVenice initiative being the preservation and restoration of all types of public art, our team sought to integrate functional sculpture into the priority system as well. As such we adjusted the weightings for the system, the results of which can be seen in the table. Since the most important factor for a functional piece is whether it is structurally sound, these weightings place a higher emphasis on the “meta-attributes” that determine the physical condition of an individual piece. This ensures that any functional piece whose structural integrity is compromised receives priority over a functional piece with a more minor problem. For further information and refinements, see the case study in the Results and Analysis section.

3.6. Cost Analysis

After establishing a prioritization ranking each individual piece, the next logical step in working toward the preservation of these pieces was to develop a cost analysis for their restoration. In doing so we again borrowed from the work of Professor Carrera, who also included a cost analysis system in his 1993 paper.⁶² Due to time constraints and because the cost analysis was centered on his prioritization system (on which our priority system is based) our version of a cost analysis system is primarily an updated version of the work of Professor Carrera. Much like our prioritization system, the cost analysis can be separated into a series of “meta-attributes.” For this system, the proposed meta-attributes include conservation,

⁶² Fabio Carrera, “Computerized Catalog of Outdoor Art in Venice with Restoration Costs” in *Conservation of Stone and Other Materials*, ed. M.-J. Thiel, 831.

conservation number, and restoration costs. These meta-attributes are broken down further in the sections below.

3.6.1. Conservation

This category is used to determine the physical condition of a piece. Because there are multiple factors that affect the condition of an individual piece, it was important to rank these conditions based on severity. Since most of the physical factors that can affect a piece can be grouped under three categories (grime, corrosion, and structural problems), the ranking system consists of only those three categories. The weighting used for each of these categories is listed below.

- Grime: 15%
- Corrosion: 35%
- Structural Problems (cracks, missing pieces, etc.): 50%

Since our prioritization system was limited to the “worst” term for a particular piece, the same principle was applied here.

3.6.2. Conservation Number

This category is used to quantify the need for restoration of a particular piece. In our system, a conservation number (CN) is assigned to each piece indicating the importance of restoration based on condition. The conservation number is determined through use of the formulas listed below.

- $CN = [(m + s)w_s + cw_c + gw_g + iw_i]$ for $m > 2$ and $s > 2$
- $CN = sw_s + cw_c + gw_g + iw_i$ for $m \leq 2$ or $s \leq 2$

Where m = missing pieces (0-4); s = cracks (0-4); c = corrosion (0-4); g = grime (0-4); i = 1 if iron hook is present (0 if not); $w_s = 5$; $w_c = 3.5$; $w_g = 1.5$; $w_i = 30$.

3.6.3. Restoration Costs

This category was used to determine the overall cost of restoration. This is done through use of a formula incorporating the restoration estimate (RE), scaffolding cost (SC), actual restoration cost (RC), architect fee (AF), and taxes (TX). The formula used is listed below.

- $RE = SC + RC + AF + TX$
- AF is fixed at the equivalent of one day of work (~\$887) for the analysis and documentation of the restoration needed.

- $SC = [(SB \times SH)C_s]w_c + C_t$
 - Where SH = needed height; SB = fixed base perimeter (roughly 5.2 m); C_s = cost per square meter of scaffolding; $w_c = 2.5$ if piece is on a canal, 1 otherwise; C_t = transportation of scaffolding (~\$345)
- $RC = (RC_b + RL + RC_s + RC_c + RC_g + IH) \times UC$
 - $RC_b = (Aw_e)MR + RP$
 - Where RC_b = basic cost; A = surface area of piece; MR = going rate of restoration per square meter for the material that the artifact is made of; w_e = expansion factor: 4.5 for statue, 2.5 for relief, otherwise 1; RP = fixed preparation cost to account for two half days needed to set up the restoration and to clean it up afterwards
 - $RL = (n/2)MH$ added if inscribed letters need to be restored
 - Where RL = cost to repair letters; $MH = 1$ man hour (~\$30); n = number of letters to be repaired
 - $RC_s = SR + MF$ for $m > 2$ and $s > 2$
 - Where RC_s = extraordinary costs; SR = structural repair (add ~\$172 for every 0.5 rating above 2 in the missing pieces or cracks categories, whichever is greater); MF = flat fee for a stone mason (~\$345)
 - $RC_c = \{0.2[(c-2)/0.5]\}RC_b$ for $c > 2$
 - Basic cost RC_b is increased by 1/5 for each 0.5 rating above 2 [Corrosion]
 - $RC_g = \{0.2[(g-2)/0.5]\}RC_b$ for $g > 2$
 - Basic cost RC_b is increased by 1/5 for each 0.5 rating above 2 [Grime]
 - $IH = 4(MH)i$
 - Additional 4 man hours (1 MH = ~\$30) added to account for removal of iron hooks, if present ($i = 1$)
 - $UC = 0.1(RC_b + RL + RC_s + RC_c + RC_g + IH)$
 - 10% “unforeseen cost” factor built into the estimate to cover unexpected costs

The restoration costs above represent a conversion of the estimates produced by Professor Carrera in 1993 to modern day inflation rates. For further information and insight, see the case study in the results and analysis section.

4. Results & Analysis

After completing our field work, it was important to compare the information that we gathered to past knowledge. Our field work resulted in the addition of 127 keystones, 56 boats, and the creation of 3,068 Venipedia pages. We worked to publicize this information through a mobile application and through our collaborations with UNESCO.

4.1. Catalog of Keystones in Castello

As a result of our team's examination of keystones, a total of 127 pieces were cataloged in Castello. There were twenty-three pieces that were not photographed because they were only accessible by boat. We analyzed the distribution of pieces on different types of arches and found that forty-two of the decorative keystones were found on doors, forty-one on windows, thirty-five on bridges, eight on arches over walkways, and one was only accessible by boat and could not be recorded. We also analyzed the subject matter depicted on each piece resulting in eighty-three of the keystones depicting human heads, thirty-one with coats of arms, ten with lion heads, one with a chalice, and the remaining two with infants.

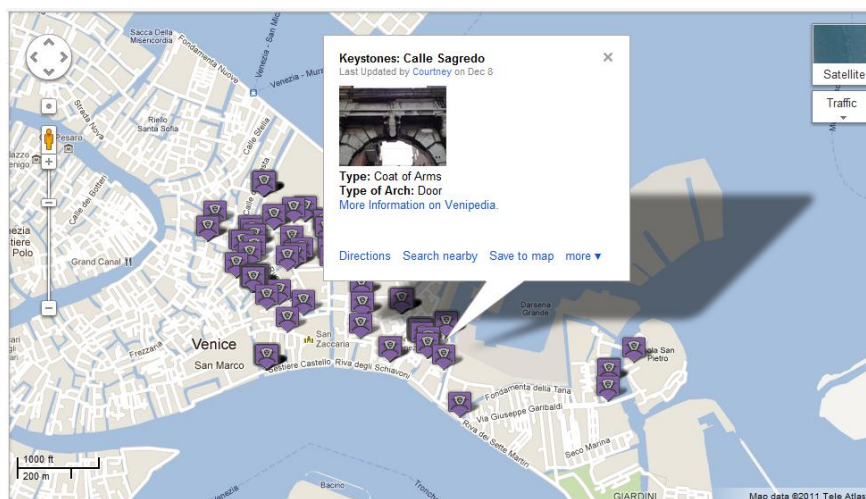


Figure 26: Google map displaying all keystones in Castello

exists at each point that details information about the piece including the subject matter, type of arch it's located on, street name of location, and an image, if one exists. The dialogue box also

To display the location and some important information about the keystones of Castello, a map was created using Google Maps⁶³. The map serves as an interactive display of the GPS location of each individual keystone cataloged. A dialogue box

⁶³ Google Maps. "Google Maps," Published online at <http://maps.google.com/>.

links the user to Venipedia where more information can be found regarding that specific piece of art and its current condition.

After our examination, we were able to add the total number of pieces we cataloged to the previously collected data from 1995 resulting in a total of 413 decorative keystones in Venice. This number is still incomplete because it only includes counts from addresses in Cannaregio and Castello as well as the public bridges across the city.

We were also able to compare the data we collected with the previously collected data in 1995. This data consisted of fourteen bridges cataloged in Castello; ours, on the other hand, counted twenty-four bridges. In comparing our data to this previous work, it was determined that there were thirteen bridges in common, while the preceding team had found a keystone on one bridge that we did not. This bridge was Ponte Rielo, located on 168 Calle Rielo. Our study of Castello did examine this area as well, so this discrepancy was likely to have been caused by an error in the data or the keystone being moved or replaced. The remaining keystones that we did find in common with the previous team were deemed to be in similar condition as they were fifteen years ago, which was to be expected as these structural pieces necessitate maintenance for the bridge to remain in proper working order.

4.2. Catalog of Antique Boats

The history for all of the boats in the Arzanà collection is retained by the members of Arzanà. However, because much of this history is maintained orally, little formal documentation exists concerning the history of their collection. We acquired this information through interviews with members of Arzanà; in particular their president, Giorgio Supplej, and the conservator of the museum collection, Giovanni Caniato. A total of fifty-six boats were cataloged from the Arzanà collection and added to Venipedia. The addition of these boats provides a framework for future teams to work with Arzanà to update the entire catalog of Arzanà's antique boats. By documenting the wealth of information regarding the antique boats in the Arzanà collection, our team has contributed much to the preservation of the maritime heritage of Venice. As with the public art collection of the city, these boats represent a once major facet of Venetian life that is rapidly losing its place.

4.3. Making the Catalog Public

At the completion of the data import from Bluehost to Venipedia, a total of 3,068 wiki pages were created for individual pieces of art. This is an enormous step in the effort to preserve vernacular art in Venice as, for the first time ever, the entire collection of decorative sculpture as well as much of the functional artifacts are available in a digital format for the public to browse and examine. Locations are provided for each piece, both by address and by GPS coordinates, allowing users the find any piece in the city with relative ease.

Similarly, a set of Resource Description Framework (RDF) tags were added to a number of properties on each page that allowed for more interactive searching by the user. RDF tags provide a means of semantically querying similar sets of data across many pages from multiple categories. In the case of public art, the tags were added to such classes of data as the subject, street of location, primary material, and time period of origin. Through the RDF search feature, a user may be able to see every piece of art across each category that shares a same value in one of these fields. For example, if the user is interested in looking at a list of all pieces of art that are located in the parish Santa Maria Formosa, they would simply need to do property search or navigate to it from a page with that value.

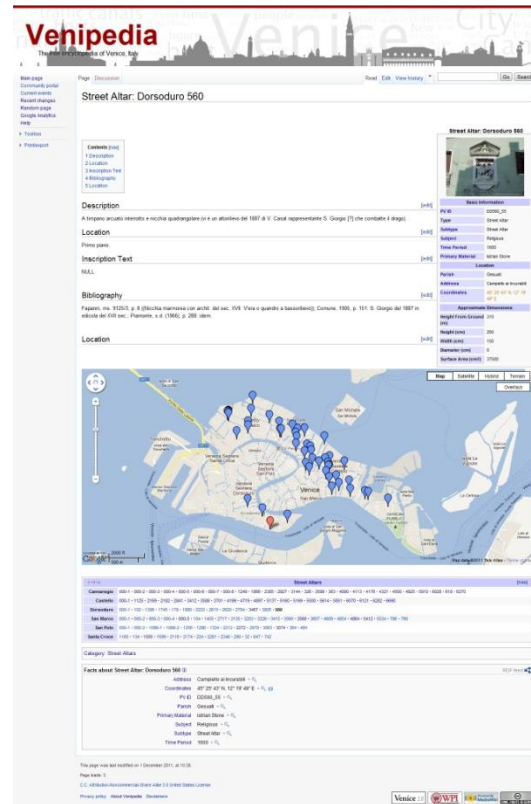


Figure 27: Imported street altar page

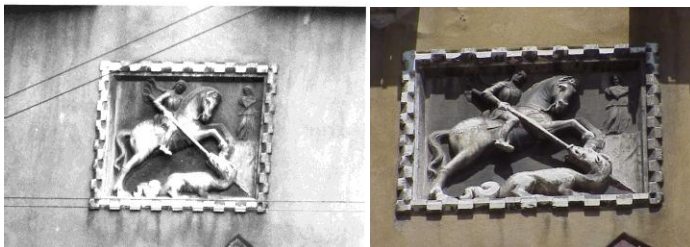


Figure 28: A photo taken by Rizzi of a relief in San Marco; (Right) A photo of the same sculpture taken years later by a student of the Venice Project Center

Rizzi. While working under the commission of UNESCO to catalog all of the decorative sculpture in Venice, Rizzi took many more photographs than he ended up using in his book. Our

Several other features were added to a lesser number of pages as well to expand upon the knowledgebase that Venipedia is to provide about Venetian public art. The first of these is a set of unpublished photos by Alberto

team used these unpublished pictures to provide additional insight into the deterioration of public art. The pictures taken by Rizzi date back to the late 1970s and early 1980s, while the pictures that make up the current Venice Project Center catalog are much more recent, having been taken closer to the year 2000. With close to two decades passing in between the photographing of these same pieces, deterioration is often very apparent. These photos provides insight into how these pieces have aged in that time and may be useful in establishing a link to what is causing this deterioration. They are also useful in that they help to illustrate which pieces may be deteriorating more rapidly, and thus which pieces may in fact be in greater need of restoration.

4.3.1. Missing Artifacts

While all pieces of vernacular culture degrade over time, some pieces have gone missing altogether. Previously, an effort had been made⁶⁴ to list and validate all pieces thought to have gone missing since Alberto Rizzi published *Scultura Esterna a Venezia*. Using this list as a basis, a special category page was made on Venipedia entitled ‘Missing Pieces.’ This grouping was

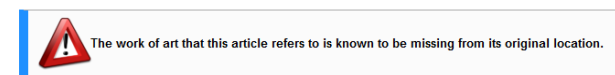


Figure 29: Maintenance tag for missing pieces of art

made up all of these missing pieces, and from it a map was generated using the locations these pieces were previously known to hold. Pieces can often be lost during a renovation of a building’s exterior when they are removed and never replaced, or they may also simply be stolen from their locations. A total of thirty three pieces of public art are known to be missing across the city.

Several tools were implemented to alert Venipedia users to the fact that a given piece is missing. The first of these was the ‘Missing Pieces’ category page⁶⁵ which provides a list of all pieces that have determined to be missing. To provide users with

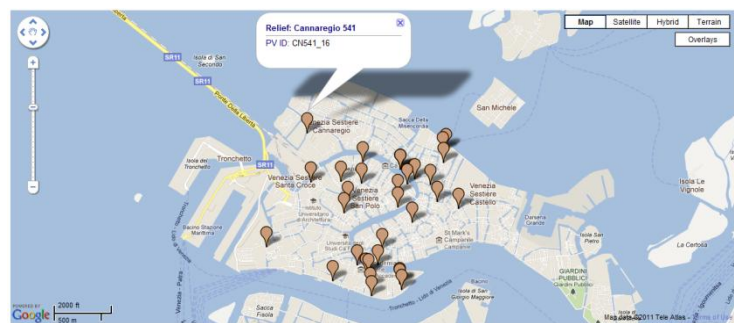


Figure 30: Map of all known missing pieces of public art in Venice

immediate and visible notice that a piece is missing while browsing through the catalog, a maintenance tag template was created to indicate that “The work of art that this article refers to is

⁶⁴ Kent et al., “PreserVenice: Preserving Venetian Public Art.”

⁶⁵ http://venipedia.org/index.php?title=Category:Missing_Pieces

known to be missing from its original location.” These tags were inserted at the top of the page for each piece of art that has been documented as missing, with the intention of being the first item noticed by visitors to the page.

Though these works are presently known to be missing, their original locations are still known. As such, a map was created on Venipedia using the coordinates of these locations. Users of Venipedia now have the ability to see exactly where pieces have gone missing from, and property owners throughout the city will be given definitive indication that pieces of art essential to the preservation of Venetian culture have gone missing from their property.

4.4. Prioritization System

As a test of our priority analysis system, we applied it to the catalog of decorative sculpture, originally catalogued by Alberto Rizzi, which has been maintained by IQP teams past and present. In addition to these 2930 objects, we also added in the 127 decorative keystones that we catalogued in Castello. This addition of functional sculpture allowed us to test whether the changes we made to the system were effective. For comparison to the results gathered by the 2007 team, we limited our prioritizing fields to the same twelve that they used in their system.

Social	Physical	Artistic	Historical	Vulnerability	Uniqueness
Family	Condition	Known Artist	Age	Material	Type
Visibility	Dimensions	Figurativeness	Inscription	Metal Present	
	Surface Area				

While these 12 fields are not quite the 20 that we recommend, they still provide enough data for a successful analysis of the collection. An explanation of each field and its sub-categories can be found in Appendix I. After selecting our fields, we assigned a “score” (0-4) to each one based on the data in the catalog. The determination of these scores can also be found in Appendix I. After assigning scores to each of the fields, the weightings were applied to the system and values for the meta-attributes were computed. The meta-attribute weightings were then factored in, producing a unique value for each piece. These values ranged between -0.02 and 2.9, with higher values signifying higher priority. Rounding to three decimal places yielded unique values for the vast majority of the pieces.

Our system was produced in Microsoft Excel, which only allows for a limited degree of automation. A more sophisticated program, or better educated programmers, would allow for

higher degrees of automation and less modifications of the data. Because our system is relatively basic, we were forced to modify some of the data so that it would be compatible with the algorithm. This is most noticeable in the “note” field, where we were forced to limit our notes on the keystone collection to a one-word substitute. As was done with the Rizzi notes, we used the “worst” word for a particular piece (choosing “corrosion” over “illegible”, for example) if both were in the same note. Ideally we would be able to have our system recognize both terms, and thus rank that piece ahead of a piece with only one of those notes.

Despite the simplicity of the system, it does allow for adjustments to the weightings. When opened in Microsoft Excel, the system consists of three spreadsheets: the first contains the database and “score” calculations, the second an adjustable weighting system, and the third contains the results of the priority ranking. The weights can be manually adjusted and the program automatically computes the new results. For our evaluation we used the weights listed in the table below. Because none of the information gathered from the database could be adapted into a “restorability” meta-attribute, we have left it out of our weighting system.

Social -2	Physical 12	Artistic 8	Historical 2	Vulnerability 4	Uniqueness 6
Family 1	Condition 10	Artist Known 2	Age 7	Material 4	N/A
Visibility 3	Dimensions 2	Figurativeness 10	Inscription 5	Metal 14	
	Surface Area 2			Other Risks 2	

After taking the scores, weightings, and attributes into account, the system produced a top five list consisting of CS245, SP269, CS018, CN178, and SP108, from 1 to 5. The top priority piece, CS245 is a degrading and fractured relief, made of tenera, depicting a human figure. Pieces number two and three are both sculptures, the former of a saint and the latter of the Madonna. The fourth piece is a large, intricate relief depicting human figures, and the last piece is another corroded sculpture depicting animals.

The top five list generated by the system is evidence that it is successful in prioritizing data. Based off of simple text and numeric fields, it selected unique pieces, depicting strong human features, which are in danger of corroding beyond repair. When we further analyze the top 100 pieces (found in Appendix J) we see that it also selected pieces that are part of a larger collection. This last characteristic is particularly important when considering the process of restoring these pieces. In fact, when we analyze which keystone is of highest priority, we find that it is listed at 86, with the rest being ranked far outside the top 100. This ranking is in-line with what we would expect to see from functional pieces. Because many of these pieces serve a

structural purpose, they are often better maintained than other examples of public art, and therefore are not as high on the priority list.

When analyzing the rest of the top 100 list, we see they contain similar traits to the top ten. This suggests that our system is consistent in its analysis, and that it works well given the limited data contained within it. With access to more detailed information and a refined system, the results could have been even better.

4.5. Cost Analysis

As a means of testing our system, we produced a cost assessment of the top five pieces most in need of restoration as generated by our priority analysis system (CS245, SP269, CS018, CN178, and SP108). Due to the small scale of our assessment, the cost assessment for each piece was calculated by hand using the formulas provided in the methodology section. A larger test of our system could be generated through Microsoft Excel or a similar statistical analysis program.

The first step in providing a cost assessment for the restoration of the selected pieces was to assign each of them a conservation number. This required the assignment of values for missing pieces, cracks, corrosion, grime, and the presence of an iron hook. After assigning these values the conservation number for each piece was calculated, and the results can be found in the table below.

	CS245	SP269	CS018	CN178	SP108
Missing Pieces	0	1	0	1	0
Cracks	3	2	2	1	1
Corrosion	3	2	2	3	1
Grime	2	3	2	4	4
Iron Hook	0	1	1	0	0
Conservation Number	28.5	51.5	50	21.5	18.5

It is worth noting that the priority of restoration order indicated by the conservation number differs from the order generated by our priority analysis. This difference occurs because the attributes considered by the cost analysis system differ from those considered by the priority analysis. While our priority system provides information on which group of pieces to restore, our cost analysis determines in which order we should restore them.

After generating a conservation number for each piece, we then proceeded to develop restoration estimate for each artifact. As outlined in our methodology, the restoration estimate is the sum of the architect fee, scaffolding cost, and any taxes imposed on the restoration of the piece. Because the taxation cost associated with any restoration relies heavily on variable factors, it has been left out of our estimation. The cost calculations (in Euro), as well as the restoration estimate, for each piece can be seen in the table below.

	CS245	SP269	CS018	CN178	SP108
Architect Fee	671	671	671	671	671
Scaffolding Cost	419.60	495	469	469	391
Restoration Cost	3266.70	3063.20	3141.74	3018.10	2987.3
Restoration Estimate	4357.30	4229.20	4281.74	4158.10	3949.30

The similar values for the restoration estimates of each piece suggests that our system works; assigning pieces of similar priority with similar restoration costs. It is also worth noting that this analysis was conducted on the top five pieces most in need of restoration, and therefore most likely constitutes some of the more expensive restoration works. Because the estimate of each piece was calculated independently, an architect fee and scaffolding cost had to be determined for each, slightly inflating the costs. Ideally multiple pieces in the same area would be restored at the same time, reducing the architect fee and cost of scaffolding (which could be moved from one piece to another) for each individual piece. The assumption can also be made that because these pieces were determined to be among those in the worst condition, their cost of restoration is higher than that of the average piece of public art.

Furthermore, this cost assessment can be extended to the rest of the collection of public art to obtain a rough estimate of the total cost of restoration. In order to do this we conducted a cost assessment on the five artifacts located in the middle of our priority list: SC 074, SM 254, CN 285, CS 370, SC 117A. After averaging these costs (€853.26) and multiplying it by the total number of pieces in our catalog (6,864), we obtained an estimate of €5,856,776.64. This value represents a realistic and achievable goal for the restoration of these artifacts and the preservation of Venetian heritage.

4.6. Augmented Reality Application

Our team's creation of a mobile application provides a further means of making the public art catalog available. The Layar framework provides users with a link to Venipedia, allowing for access of the entire catalog from their phone. This allows users to access the information where it is most useful: in the field. The implementation of a mobile application increases both the number of people with access to the application and the availability of the catalog to the public. This second point is particularly important because it allows for maintenance of the catalog by the general public. Future modifications to our application could allow users to update the condition rating and photograph of an individual piece or report it missing in real time. These continuous updates would be crucial in providing information relevant to the prioritization and restoration of these pieces.

Our mobile application also introduces the possibility of crowdfunding as means of generating funding for the restoration of public art. By embedding the application with a link to the PreserVenice donation page, we provide users with the opportunity to donate to a particular piece. The use of a mobile application to generate these micro-donations is particularly effective because it provides the user with the ability to donate when they are most likely to: while looking at the piece. By organizing the donations through PreserVenice, we also provide the user with the opportunity to view other pieces in need of restoration, and thus raising awareness and potentially generating more funding.

5. Recommendations

As a means of ensuring that preservation efforts for Venetian material culture are sustained, our team has developed several recommendations for future project groups to ensure the success of the PreserVenice initiative and, most importantly, to preserve the material culture of Venice. The first of these recommendations involves validation of the catalog of public art. Previous project groups have recommended that each collection be audited at least once every ten years to optimize accuracy versus time constraints. Though the locations of the pieces are not expected to change, the conditions of the pieces will decline as time passes and many also face the risk of going missing; this recommendation should be used as a threshold to update the catalogs of data systematically and ensure the most complete and accurate data is contained within.

Seeing that the collection of keystones across the city has yet to be entirely surveyed, it is recommended that a future group work to fulfill this goal. Our team has developed a methodology to complete this task and has drafted a field form that has proven effective in documentation of the works in Castello. This form should be used by a future group, with any modifications that they see fit to optimize results, to visit each keystone in the remaining sestieri of the city.

It is also suggested that teams visit other islands of the lagoon to document works of art there. Previous efforts have been made to begin cataloging art on these islands, but it has yet to be completed. The surrounding lagoon islands contain considerably less works of public art than Venice proper does, so it would take a lesser amount of time to inspect this entire collection and compile all of the relevant information.

Close contact should be maintained with Arzanà and each of the boats in their collection should be added to Venipedia as well. Having this type of documentation present, along with an array of photographs, will do nothing but help to publicize the organization and their work in restoring these boats that were once such a large part of Venetian society. The preservation of these boats is invariably important to the perpetuation of the city's material culture and heritage. Any additional aid required by the organization, at their discretion, should also be extended.

One of the most important steps in completing the preservation and restoration of these pieces is publicizing the cause. The mobile application that is in development is an excellent way to realize this need. Using the past two years of development as a basis and the mock-ups as a

guide, the application should be expanded on to include more in depth features, including the ability to submit a current photograph of the piece being viewed, a feature that permits updated condition reports to be submitted, a “liking” element that allows users to select their favorite pieces and a subsequent recommendations section based on these choices, and a means of reporting pieces as missing if they are not found at the location given. With this in mind, it is extremely important that the location for each piece of art be entirely accurate so that users will be properly directed to each piece and can take appropriate actions from there. With a properly functioning application that is published for users to download, more people will be exposed to the notion that public art is in need of restoration and will therefore be more likely to get involved with the cause.

Using the previously documented condition reports as well as all future reports that will be generated, it is recommended that project teams begin to incorporate these numbers on either Venipedia or the PreserVenice website. These will allow for the most current prioritization and cost analysis determinations possible and will prove essential in determining starting points for the restoration efforts. The condition reports that our team generated for the keystones we documented may be seen listed in tables on each individual page; future teams should explore this method as well as any others that they may come across to establish the most suitable means for displaying all of this information.

The final recommendation that our team has for future groups is to begin seeking donations and other funds for the purpose of restoring individual pieces of art. Now that the collection is entirely online, it will be easier than ever to share the information with others outside of the Venice Project Center. This information can be used to present to property owners with works of public art on their buildings or to other potential donors. Once PreserVenice does begin to take on donations and work on the restoration of Venetian public art, it is advised that one or more dedicated individuals be utilized more permanently as volunteers to the cause. These workers would ideally have several duties to uphold. First and foremost, they would be in charge of maintaining the website. All submissions through the mobile application and through the PreserVenice website would have to be monitored and validated by this group, and consequently the catalog would need to be kept as current as possible. Finally, they would be charged with handling the incoming donations to the organization and pitching to restorers and architects for restoration jobs to be completed.

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Appendix A: Types of Venetian Public Art

Bells (*campane*)

For thousands of years bells have been used for mass communication in Venice. Whether it be for communicating the time, celebrating weddings, or even announcing executions, bells form an essential component of Venetian material culture⁶⁶. The bell towers of Venice also represent an important part of Venetian history, serving as lookout towers in times of war. While the ringing of the bells is an automated process today, in the past they were rung manually. This lack of human interaction has left the bells of Venice in danger of neglect⁶⁷. Since the formation of the Venice project center, 253 bells have been catalogued by project teams.



Figure 31: Bell

Coats of Arms (*stemmi*)



Figure 32: Coats of Arms

Traditionally used by wealthy families as marks of ownership on a building, coats of arms were often removed or etched off when the ownership of the building changed. Due to this practice, many of these pieces are now either illegible or blank⁶⁸. Existing coats of arms can be divided into three main categories: baroque, renaissance, and gothic. The periods are categorized by their level of detail, with gothic being the most basic, renaissance somewhat intricate, and baroque the most

elaborate⁶⁹.

⁶⁶ Jamie Bezek, et al., “PreserVenice: Preserving Venetian Public Art,” (Worcester: Worcester Polytechnic Institute, 2009).

⁶⁷ Melissa Marion et al., “Preservation of Venetian Bell Towers,” (Worcester: Worcester Polytechnic Institute, 2004).

⁶⁸ Bender et al., “Forgotten Art of Venice: Promoting the Conservation and Awareness of External Sculpture.”

⁶⁹ Ibid.

Church Floors (*pavimenti chiese*)

Church floors are of particular historical interest because they contain many other historical artifacts. While tombstones (also called ledgers) are the most common element found in church floors, artifacts such as plaques and inscriptions can also be located there. Of most interest are the ledgers themselves, which are engraved with information about the deceased. Generally these descriptive ledgers were used for people of special importance to the church or city⁷⁰.



Figure 33: Church Floor



Figure 34: Patere

Circular Reliefs (*patere*)

Considered the oldest forms of Venetian public art; most circular reliefs date between the years 1000 and 1300. The majority of these elements were created from the recycled materials of old columns. Their diameter generally ranges from 20-80 cm and they often feature animal or plant themes. Because a common theme Venetian *patere* is harmony, many of the pieces depict two animals intertwined and eating from the tree of life⁷¹. *Formelle* are a specific type of relief that are more rectangular in shape and comprise roughly 10% of *patere* in Venice⁷². To date over 493 circular reliefs have been catalogued in Venice.

Confraternity Symbols (*simboli*)

Much like coats of arms, confraternity symbols were placed on buildings to indicate ownership. But whereas coats of arms were used by families, confraternity symbols were generally employed by guilds (*scuole*). These guilds were united by a common trade and often times had their own patron saint. In addition to the work done through their trade, these guilds also



Figure 35: Confraternity Symbol

⁷⁰ David Gagnon et al., "Embedded Heritage: A Study of Venetian Church Floors," (Worcester: Worcester Polytechnic Institute, 2005).

⁷¹ Bender et al., "Forgotten Art of Venice: Promoting the Conservation and Awareness of External Sculpture"

⁷² Kent et al., "PreserVenice: Preserving Venetian Public Art."

completed a vast amount of charitable work throughout the city. The six *Scuola Grandi* in Venice are San Giovanni Evangelista, San Rocco, Santa Maria Carita, Santa Maria in Valverde (Misericordia), San Marco, and Santa Maria del Carmelo (Carmini)⁷³. Over 250 confraternity symbols have been catalogued to date.

Crosses (*croci*)



Figure 36: Cross

Crosses are one of the most prevalent examples of Venetian public art. A Christian symbol found around religious sites, crosses can be categorized into three main styles: Maltese, Greek, and Latin. Maltese crosses have arms that are equal in length and taper toward the center. The arms of Maltese crosses are also often indented at the ends. Much like the Maltese style, Greek crosses are also square in shape. What differentiates the two styles is that Greek crosses and generally lack decoration. Latin crosses have longer vertical beams which are intersected at the top by a smaller beam⁷⁴. Since the formation of the Venice project center, 75 crosses have been catalogued by project teams.

Decorative Keystones (*mascaroni*)

A keystone is the last stone placed in the construction of an arch, and supports the majority of the weight. Most decorative keystones in Venice are of human faces or coats of arms and can be commonly seen on bridges, doors, and windows. Coats of arms are the most popular keystones on bridges, while faces are the most popular on doors and windows⁷⁵. Over the past 20 years 127 keystones have been catalogued by IQP project teams.



Figure 37: Keystone

⁷³ Bender et al., "Forgotten Art of Venice: Promoting the Conservation and Awareness of External Sculpture"

⁷⁴ Kent et al., "PreserVenice: Preserving Venetian Public Art."

⁷⁵ Ibid.

Flagstaff Pedestals (*pili portabandiera*)



Figure 38: Flagstaff Pedestal

Often centrally located in city squares, decorated pedestals historically held the flags of various organizations and families. Each pedestal consists of two main structural elements; a body and base. The body, which is mounted on the base, is often decorated or inscribed and holds the flag staff⁷⁶. With 56 catalogued, flagstaff pedestals contain a variety of art ranging from animals to coats of arms.

Fountains (*fontane*)

One of the more functional elements in Venetian vernacular culture, fountains account for nearly 137 million liters (roughly 36 million gallons) of drinkable water dispensed by Venetians each year⁷⁷. These fountains are owned either by public works contractors, or the city of Venice itself.



Figure 39: Fountain

Fragments (*frammenti*)



Figure 40: Fragment

Fragments are any broken pieces of a larger sculpture. Instead of being discarded or destroyed, these fragmented pieces were embedded into the side of a wall or building. There have been 25 fragments catalogued to date⁷⁸.

⁷⁶ Kent et al., "PreserVenice: Preserving Venetian Public Art."

⁷⁷ Ibid.

⁷⁸ Ibid.

Inscriptions (*iscrizioni*)

Inscriptions are engravings done in order to memorialize and event or a person. Most inscriptions are done in Latin or the native Venetian dialect. Project teams have catalogued 30 inscriptions since the formation of the Venetian project center⁷⁹.



Figure 41: Inscription

Lunettes (*lunette*)



Figure 42: Lunetta

A lunette is a decorative arch located above a doorway. The name refers to the semi-circular shape of the sculptures, and is derived from the Italian “*lunetta*” meaning “half-moon.” Renaissance, Byzantine, and Gothic are the most popular styles of lunettes in Venice. The earliest of these lunettes are the Byzantine, dating from the 12th century, which are characterized by their dome shape and religious themes. Gothic lunettes, dating from the 12th to 15th centuries, are characterized by pointed arches and their large elaborate style.

Renaissance lunettes, dating from the 15th and 16th centuries are much more basic in execution than their gothic counterparts⁸⁰. Over 80 lunettes have been catalogued by project teams to date.

Monuments (*monumenti*)

For the purposes of this project, monuments are defined as any large sculpture or structure created in commemoration of an event or person. Due to laws prohibiting the elevation of one individual above another, few monuments were erected during the Venetian Republic. Because of this most monuments in Venice were erected following the fall of the Republic in 1797⁸¹. To date 67 monuments have been catalogued.



Figure 43: Monument

⁷⁹ Jaime Bezek and others. *PreserVenice: Preserving Venetian Public Art*, 2009.

⁸⁰ Kent et al., “PreserVenice: Preserving Venetian Public Art.”

⁸¹ *Ibid.*.

Portals (*portali*)



Figure 44: Portal

Portali are any doorway embellished by sculpture or other decoration. The decoration of *portali* depended on the location of the doorway, and varied between religious and natural themes. It is common for *portali* to include a *lunetta* within it⁸².

Reliefs (*rilievi*)

A relief is any carving with depth from a surface. A relief can be categorized as either low relief (*basso-rilievo*) or high relief (*alto-rilievo*) depending on how far the sculpture protrudes from the surface. Low reliefs feature only a slight protrusion from the background plane, whereas high reliefs have a minimum of half the depth protruding⁸³. Most reliefs depict religious, natural, or historic events. Venetian project teams have catalogued 394 reliefs over the past 20 years.



Figure 45: Relief

Sculptures (*sculture*)



Figure 46: Sculpture

Sculptures are wood, stone, or metal carvings that serve purely aesthetic purposes. Sometimes structurally attached to buildings, statues are the most common type of sculpture. Statues can often be seen adorning the sides and tops of churches and other important buildings. Most of the sculptures in the city depict religious figures, animals, or mythical beasts due to Venetian laws prohibiting the elevation of one individual over another⁸⁴. Since the formation of the Venice project center 173 sculptures have been catalogued.

⁸² Ibid.

⁸³ Antonia Boström, ed., *The Encyclopedia of Sculpture*. (New York: Fitzroy Dearborn, 2004), s.v —Relief Sculpturel.

⁸⁴ Meagan Foley and others. *Preserving Venetian Heritage*, 2008.

Street Altars (*edicole*)

Street altars are broadly defined as any shrine which is not attached to a church. These shrines can be religious in nature or can be used as memorials for a specific person or group of people. Most of these altars were built into a wall or building, and contain a statue or other idyllic figure. Most of these street altars are preserved and maintained by the local residents of Venice⁸⁵.



Figure 47: Street Altar

Wellheads (*vere da pozzi*)



Figure 48: Wellhead

Wellheads are the covers for cisterns that were used to collect rainwater in Venice. Up until the 1800s, these cisterns were the main source of fresh water for Venetians, since the lagoon water was and is undrinkable. The rainwater collected by the cisterns was filtered through sand and stored in clay tanks underground. The wellheads, which were often decorative, prevented any external contamination of the filtered water⁸⁶.

Since the formation of the Venice project center students have catalogued 238 wellheads.

⁸⁵ Bender and others, *Forgotten Art of Venice: Promoting the Conservation and Awareness of External Sculpture*, 2000

⁸⁶ Lewis Blackwell and others. *Preserving Venetian Wellheads*, 2000.

Appendix B: Types of Traditional Boats

Fishing and Hunting Boats



Figure 49: Topo

Name: Topo

Description: The word *topo* commonly translates to “mouse” and this type of boat was generally used for transport and fishing. The *topo* is a coastal and lagoon sailboat that has a flat bottom, a bow stem that curves forward, and is typically fourteen to twenty-four meters long. The most unique feature about the *topo* is the position of its sail; the mast is located about one third of the way along the length of the hull. The Venetian waterways become shallow during

low tides, especially in the smaller canals. The *topo* was built with the ability to lift its deep rudder and lock it in an upward position, thus preventing the rudder hitting the bottom of the canal. There are very few traditional *topi* that exist today and the last few are used more as pleasure boats instead of for their original function. Currently in the canals of Venice, one is more inclined to see *moto-topi*, which are motorized boats that transport goods around Venice.



Figure 50: Sanpiero

Name: Sanpiero

Description: The *Sanpiero* was also a popular fishing boat that is part of the *sandolo* boat family and was popular for its sturdiness, reliability, roominess, and relatively simple maintenance. The name is derived from its

place of origin, San Pietro, in Volta. This boat was sail powered and is typically built with a length of six to seven meters.



Figure 51: S'ciopon

Name: S'ciopon

Description: The S'ciopon, also known as the *sandolo s'ciopo*, has a unique design that represents its name and function well. This boat

was designed for hunting with a *singarda* (large gun) and for fishing with a harpoon. The *S'ciopon* literally means long gun and this is one of the few types of traditional Venetian boats that can be rowed sitting down. The boat is specifically designed to allow one man to navigate the boat while shooting down ducks. The hull was designed so that the *s'ciofonante*, or hunter, could shoot the gun level with the water. The gun was about three meters long and the length of the hull ranged from five to eight meters. However, these boats are no longer used for hunting, they are commonly used by Venetian children to travel short distances and maneuver easily in the canals.

Large Cargo Transport



Name: Caorlina

Description: This lagoon boat was designed for the transport of large amounts of goods around the canal. It is known for being easy to maneuver and fast. The *caorlina* can have six to eight rowers inside, but typically there are only two oarsmen. To accommodate so many rowers, the *caorlina* has a unique design

Figure 52: Caorlina

not seen in many traditional Venetian boats; it is symmetrical along the width and length. Today, the modern versions of the *caorlina* are used for traditional *regate* (boat races), recreation, and show.

Name: Peata (or Piatta)

Description: The *peata* is the largest boat in Venetian history and was used to transport large bulky items through the canal. Typically sixteen meters in length, the



Figure 53: Peata

the *peata* is usually rowed by two oarsmen, but can hold be propelled by up to sixteen oarsmen. The *peata* differs from traditional Venetian boats not only in its size, but also with the way it is moved through the canals. Instead of being rowed with a traditional bladed oar that catches water, the *peata* is propelled forward by the oarsmen pushing off the bottom of the canal with their oars.

Human Transport



Figure 54: Sandolo

Name: Sandolo

Description: The *sandolo* is the most common form of human transportation around Venice, they were usually privately owned vessels, but they could

sometimes be seen as water taxis or fishing vessels. *Sandolo* are common in Venice today but are often seen with motors attached to them. The main features of the *sandolo* include a flat bottom, straight sides that flare outwards, and a long pointed overhanging stem. The hull length ranges from five to nine meters long. There are many local variants, which include: the *sàndolo ciosoto*, *buranelo*, *San Pietro* or *sanpiero*, *puparin*, the *s'ciopon*, and the *mascareta*.



Figure 55: Mascareta

Name: Mascareta

Description: The *mascareta* is a smaller lighter version of the *sandolo*, with its hull being six to eight meters long and weighing one hundred and twenty kilograms, the *mascareta* was quite popular. Because the *mascareta* is lightweight, easy to maneuver, cheap to build and maintain, it was a favorite among boat amateurs and remains one of the more simple Venetian traditional boats. However, when motorized boats

became more popular, this boat fell out of existence and is used mainly for recreation.



Figure 56: Puparin

Name: Puparin (also known as the sandolo puparin)

Description: The *puparin* is a much more elegant style of the *sandolo* and they were difficult to obtain. The *puparin* was one of the quickest and most expensive of traditional Venetian boats and to have ownership of one was an indication of rich

stature. With the exception of the gondola, the *puparin* is the fastest and most agile of the two-oared lagoon vessels. Its most noticeable feature is its asymmetrical hull, like that of the gondola, which ranges from nine to ten meters long.



Figure 57: Gondola

Name: Gondola

Description: Despite the number of traditional boats that once inhabited the canals of Venice, there are very few left and the most commonly seen boat is the *gondola*. The *gondola* has

become the symbol of Venice and is the easily

the most recognizable traditional boat in the waters as it flourishes in the now tourist rich city.

The modern gondola has very specific measurements and specifications. The outer length is 10.85 meters, with an average width of 1.40 meters and a net weight of about 350 kilograms.

Made up of around 280 wooden pieces, the gondola uses a variety of wood in its construction, including oak, fir, walnut, cherry-wood, larch, elm-root, and limetree.

Appendix C: Keystone Field Form

Presence
 N/A=Non-applicable
 Y=yes
 N=No

Type of Arch
 D=Door
 W=Window
 Other=Specify

Overall Condition
 0=Excellent
 1= Pretty Good
 2=Average
 3=Poor
 4=Awful

Importance
 A=Artistic Expressiveness
 P=Popular/Grotesque
 R=Rare
 M=Mould Copy
 S=Size (large)

(Measurements in cm)

Keystone #								
Type (H=Head)								
Type of Arch								
Location								
Street Name								
Sestiere								
Street Number								
Floor (Ground=0)								
Opening from Left								
Map Number								
Group								
Group Code (1st#)								
# of Pieces in Group								
Keystone								
Material (I=Istria)								
Height (cm)								
Width (cm)								
Importance								
Conditions								

Grime (Y/N)								
Spots/Stains (Y/N)								
Major Cracks (Y/N)								
Surface Cracks (Y/N)								
Surface Damage (Y/N)								
Missing Features (Y/N)								
Misaligned (Y/N)								
Obstructions (Y/N)								
Overall Condition (0-4)								
Photos								
Photographer Initials								
Photo #								

Appendix D: Importing Images to Venipedia

Note: Mid-way through the term Venipedia was moved to a new server. This procedure no longer worked on the new server and thus images could not be imported to Venipedia by these means.

In order to import the images into Venipedia, they must first be placed onto the site's server. If the images are already there, steps 1-3 may be skipped.

1. Open an SFTP program and log in to the server using the proper credentials. (For our project, we used the program WinSCP.)
2. Create a new folder somewhere in the directory to store the image files.
3. Transfer the files over to the folder that has been created. [The public art images were already located on the server. They may be found by navigating to `/home8/venicetw/public_html/gallery_storage/albums/Database/`]

Once the files have been moved to the server, they may be imported into Venipedia.

4. Open an SSH emulator and log in using the proper credentials. (For our project, we used the program PuTTY.)
5. Input `cd public_html/venipedia/maintenance` in the command prompt.
6. In the next prompt, enter `php importImages.php /home8/Image/Directory/Location/`
 - a. Categories may be added to the images by entering `php importImages.php /home8/Image/Directory/Location/ --comment="[[Category:XXX Images]]"`.
This allows for multiple images to be semantically queried.

Appendix E: Creating Venipedia Template Pages

In this project, several different types of Venipedia template pages were made. These pages allow for users to more easily create individual wiki pages that share the same format. Template are similarly useful in that, should a user choose to alter the formatting of each page in that category subsequent to running a mass import, they would simply need to edit the template page as opposed to editing each page individually; editing the template page will cause the changes to occur in each page that uses that template as well.

Template:Infobox

An infobox is a table, typically placed in the upper right hand corner of the page, which summarizes key points about the subject that the page is presenting. For the public art entries on Venipedia, this included such information as the piece's location, year of origin, and primary material. To create an infobox, search for *Template:Infobox XXX*; if the page does not exist, create a new one. An example for syntax of an infobox created is as follows:

```
<includeonly>

{{Infobox
|title = {{PAGENAME}}
|titlestyle =
|image = {{{image|}}}
|imagestyle =
|headerstyle = background:#ccf;
|labelstyle = background:#ddf;
|datastyle =

|header1 = Basic Information

|label2 = [[Property:PV ID|PV ID]]
|data2 = [[PV ID::{{{pvid|}}}]]

|label3 = Type
|data3 = {{{type|}}}

|label4 = [[Property:Subtype|Subtype]]
|data4 = [[Subtype::{{{subtype|}}}]]
```

```

|label15 = [[Property:Subject|Subject]]
|data5 = [[Subject::{{{subject|}}}]]

|label16 = [[Property:Time Period|Time Period]]
|data6 = [[Time Period::{{{timeperiod|}}}]]

|label17 = [[Property:Primary Material|Primary Material]]
|data7 = [[Primary Material::{{{primarymaterial|}}}]]

|header8 = Location

|label19 = [[Property:Parish|Parish]]
|data9 = [[Parish::{{{parish|}}}]]

|label110 = [[Property:Address|Address]]
|data10 = [[Address::{{{address|}}}]]

|label111 = [[Property:Coordinates|Coordinates]]
|data11 = [[Coordinates::{{{coordinates|}}}]]

|header12 = Approximate Dimensions

|label113 = Height From Ground (m)
|data13 = {{{heightfromground|}}}

|label114 = Height (cm)
|data14 = {{{height|}}}

|label115 = Width (cm)
|data15 = {{{width|}}}

|label116 = Diameter (cm)
|data16 = {{{diameter|}}}

|label117 = Surface Area (cm<sup>2</sup>)
|data17 = {{{surfacearea|}}}

|data18 = {{{image2|}}}
|data19 = {{{caption2|}}}

}}

</includeonly>

```

After creating the page *Template:Infobox XXX*, the user should then create the documentation page for that infobox, which should hold the namespace *Template:Infobox XXX/doc*. Though this page is not necessary to create for the infobox to display properly, it is nonetheless a useful page as it provides the format that the template should be in when it is placed on a page. An infobox template documentation page would have the following syntax, based on the above example of the infobox template:

```
=== Blank Template ===
<pre>
{{Infobox Street Altar
|pvid=
|image=
|type=
|subtype=
|subject=
|timeperiod=
|primarymaterial=
|parish=
|address=
|coordinates=
|heightfromground=
|height=
|width=
|diameter=
|surfacearea=
|image2=
|caption2=
}}
</pre>
<includeonly><!-- CATEGORIES AND INTERWIKIS HERE, THANKS -->
[[Category:Infobox templates]]
</includeonly>
```

Typing the text as it is displayed here on a wiki page and filling in the data fields with the given values will successfully display the infobox on the page. The fields at the bottom of the infobox labeled “image2” and “caption2” were inserted for those pieces for which we were in possession of unpublished Rizzi photos that we added. Leaving these fields blank will not affect the layout of the infobox.

By entering two successive colons (::) in the *data* field of the *Template:Infobox XXX* page when establishing the type of data that will be presented, Resource Description Framework

(RDF) tags are created for that type of data. RDF tags allow for users to search for all entries that share the same value for a given data type. For example, if the data type in question is the subject depicted in the work of art and the user is viewing a page in which the subject is a Madonna, RDF tags will then allow the user to then find all other works of art that depict a Madonna.

Template:Page

For lengthier bits of information that would not otherwise fit in an infobox, sections in the main body text of the page are needed. This may include such things as the text of an inscription that appears on a piece of art or a description of its specific location at the address listed (what floor the piece is on, alignment in comparison with doors/windows/other pieces near it/etc.). For these fields of information, a page template must be created prior to importing the data. Making page templates starts with a search of Venipedia for *Template:Page XXX*. From there, the user should create or edit the page and enter in the proper fields they are looking to display in the page body. For example, the syntax used may be:

```
<includeonly>

==Description==
{{{description|}}}

==Location==
{{{location|}}}

==Inscription Text==
{{{inscription|}}}

==Bibliography==
{{{bibliography|}}}

{{Map Street Altars}} {{{Street AltarsNav}}} [[Category:Street Altars]]

</includeonly>
```

The equal signs surrounding words denote headers in the syntax of the wiki, and the entries inside the brackets are the names of the data fields into which information will be input.

To ensure both convenience and ease when transferring in large amounts of data at once, our team combined the infobox and page templates into one unified template. As such, the

template for both the infobox and the page for art type XXX may be found under *Template:Page XXX* on Venipedia.

Template:Map

By inserting the syntax *[Category:XXX]* into a page, it will include that page in the list of all entries to that category on Venipedia. From there, a map may be generated by reading the coordinates from each listing. To create a map, start by searching Venipedia for *Template:Map XXX*. If a map template does not already exist, then create a new page for it. From there enter:

```
<includeonly>
==Location==
{{#compound_query:
|[[{{PAGENAME}}]];?Coordinates;?PV ID;icon=Red Marker.png
|[[Category:Sculptures]][[Coordinates::+]];?Coordinates;?PV
ID;icon=Blue Marker.png
|limit=500
|height=500px
|format=map}}
</includeonly>
```

This will generate a map in which the page being viewed is indicated with a red marker and all other items in the category are indicated with a blue marker.

Appendix F: Mass Import of Data into Venipedia

Note: You must have admin privileges on Venipedia in order to be able to use this function to import data.

The first step to importing large quantities of data into Venipedia is to assemble all of the data into a spreadsheet. The file type for this spreadsheet must be CSV, or comma-separated values, in order for it to work properly. From there, the title of each column must be formatted very specifically. Only three column types are allowed by the DataTransfer extension:

- *Title* – This column will list the title of each individual page that is created. Every field in the spreadsheet that is filled out in the same row as a given title will be input onto the page with this title
- *Template:Template_Name[data_field_name]* – The entries in this column will be placed into the proper data field for the template page specified. For example, if the column pertains to the primary material in the patere category, then the title of the column should read *Template:Page_Patere[primarymaterial]*
- *Free Text* – This column heading is reserved for text that doesn't have a data field in a template. Typically, an entry of this type will include a map template (*{{Map XXX}}*) or a category tag (*[[Category:XXX]]*)

Title	Template:Page_Patere[PVID]	Template:Page_Patere[image]	Template:Page_Patere[type]
Patera: Cannaregio 1257A	CN1257_40A	[[File:CN040A.jpg 200px]]	Patera
Patera: Cannaregio 1257B	CN1257_40B	[[File:CN040B.jpg 200px]]	Patera
Patera: Cannaregio 1257C	CN1257_40C	[[File:CN040C.jpg 200px]]	Patera
Patera: Cannaregio 1257D	CN1257_40D	[[File:CN040D.jpg 200px]]	Patera

When the table has been formatted as such and the user has ensured the every field has a matching label in the template page, they are ready to import. Accessing Venipedia, the user should log in and then type into the search bar *Special:ImportCSV*. On this page, select the table to be imported and click 'Import,' at which point Venipedia will process this request for you.

One page will be created for each row of the spreadsheet (save for the header row). Once the import is complete, a message should tell you how many pages were successfully created as well as if there were any errors.

If, after an import is completed, the user discovers errors in the pages they have created or would like to add new information, they would simply need to re-import the data under the same namespaces. This will cause Venipedia to overwrite the previously created pages with all of the new information, so all page information will need to be included.

Appendix G: Inserting a table into Venipedia

	Heading for column 1	Heading for column 2	Heading for column 3
Heading for row 1	text for row 1, column 1	text for row 1, column 2	text for row 1, column 3
Heading for row 2	text for row 2, column 1	text for row 2, column 2	text for row 2, column 4

The coding below, when pasted into a Venipedia page, will produce the table that is pictured about.

```
{|border="1" cellpadding="5" cellspacing="0" align="center"  
|-  
|  
! scope="col" style="background:#efefef;" | Heading for column 1  
! scope="col" style="background:#efefef;" | Heading for column 2  
! scope="col" style="background:#efefef;" | Heading for column 3  
|-  
! scope="row" style="background:#efefef;" | Heading for row 1  
|text for row 1, column 1  
|text for row 1, column 2  
|text for row 1, column 3  
|-  
! scope="row" style="background:#efefef;" | Heading for row 2  
|text for row 2, column 1  
|text for row 2, column 2  
|text for row 2, column 3  
|}
```

Appendix H: Basics of Google KML

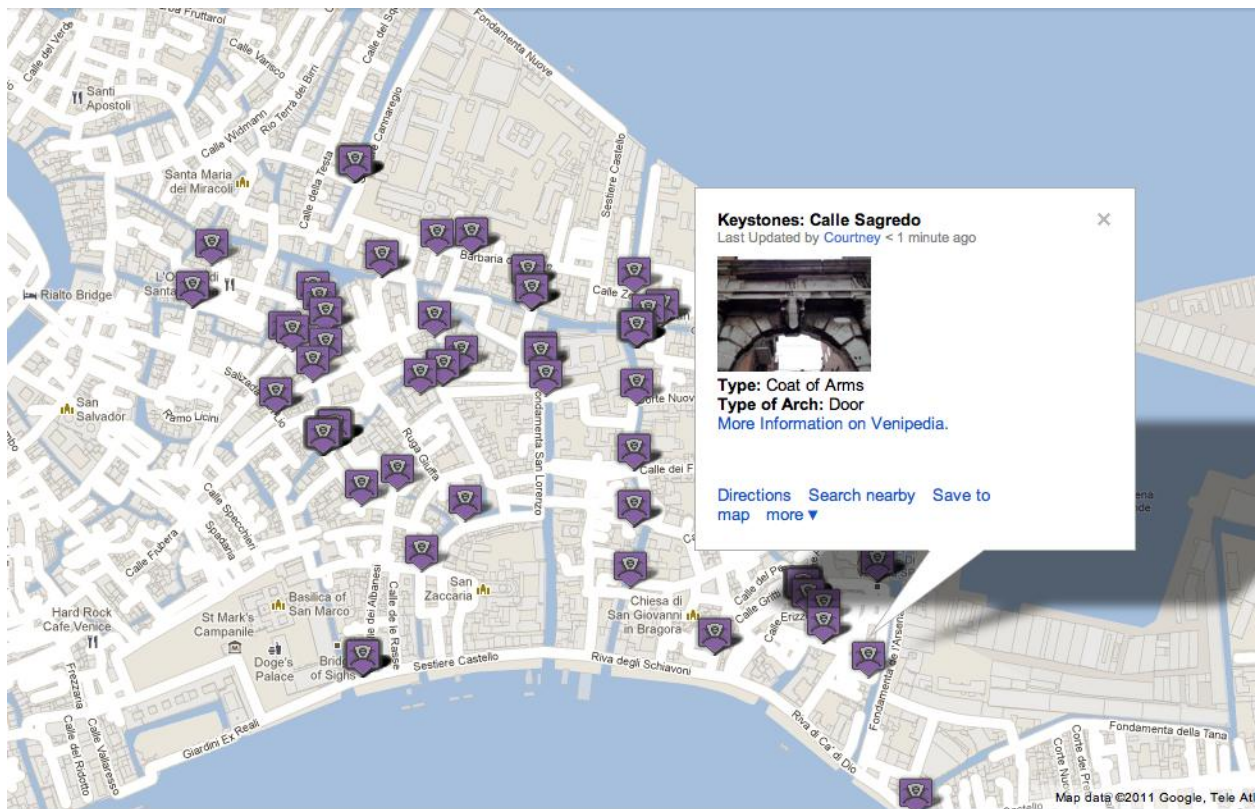


Figure 58: Example Map of Decorative Keystones Generated by KML

Both Google Maps and Google Earth can read from Keyhole Markup Language (KML). KML contains geographic information that can be displayed on a map. The basic components of a KML file are a Document and one or more Placemarks. The coding can be written in any text editor program, then uploaded on Google Maps or Google Earth.

1. Example KML coding from Keystones Map

The following coding is an example from one point on the map and the relevant information that is contained in its dialogue box. In this instance how to display the name, location, type, and subject matter of the piece are shown in the coding. Also included is how to link to the Venipedia page for that piece and the picture stored on www.venice2.0.org.

```
<Placemark>  
  <name>Keystones: Calle Dietro il Campanile</name>
```

```

<description>
  <![CDATA[
    <a href="http://venice2point0.org/gallerystorage/"></a><br/>
    <b>Type: </b>Coat of Arms<br />
    <b>Type of Arch: </b>Door<br />
    <a
href="http://venipedia.org/index.php?title=Keystone:_Castello_64">More
Information on Venipedia.</a>
  ]]>
</description>
<styleUrl>#normalPlacemark</styleUrl>
<Point>
  <coordinates>12.35891,45.43394</coordinates>
</Point>
</Placemark>

```

2. Uploading a KML File to Google Maps

Before uploading the file, the code should be checked for any errors before uploading to Google Maps. If there is an error in the KML, the only error message that will be shown is that Google cannot upload the file.

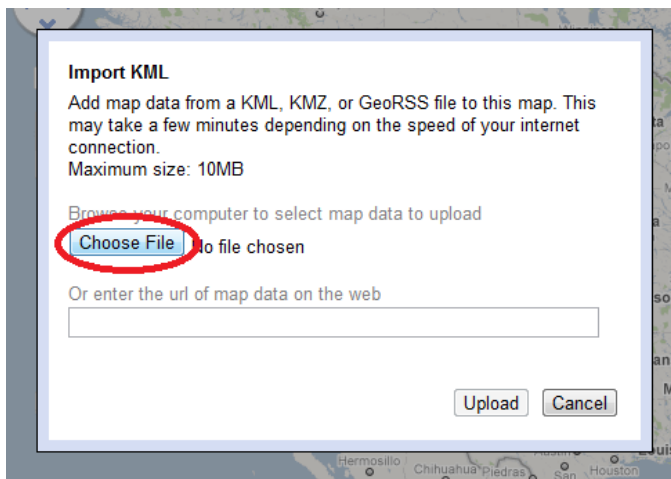
To import a KML document into Google Maps, first navigate to www.maps.google.com, then click — “My Maps”.



Click — “Create New Map”.

Click — “Import”.

Then, navigate and select the KML file saved on your computer.



Finally, select “upload” to see your map.

3. Beyond the Basics

Further KML instruction can be found at <http://code.google.com/apis/kml/documentation/>. This page contains a link to a KML Tutorial as well as Google’s KML Documentation and Developer’s Guide. Also refer to the 2010 PreserVenice Report, Appendix C for a further break down of the coding and its meaning.

Appendix I: Prioritization Algorithm Explanation

PV ID: The PreserVenice ID number assigned to each piece (not considered)

Codice: Rizzi's code for the object, matching to the entry in his printed catalog (not considered)

Civico: Sestiere code and address (not considered)

Sestiere: Sestiere code (not considered)

Indirizzo: Street name (not considered)

Anno: Year, either approximate or exact. Years that were unknown were assigned and average rating: 2.

Earliest year: 300 AD

Latest year: 1860 AD

Range: 1560 years

Divide by 5: the interval is 312 years

Ratings: 4= 300 to 612

3= 613 to 924

2= 925 to 1236 or 0

1= 1237 to 1548

0= 1549 to 1860

Materiale: Material making up the object. The assumption was made that Istria stone is plentiful and therefore less important. The same can be said for Greek marble, to a lesser extent.

Categories were simplified and standardized to the following categories:

Ratings: 4 = legno

3= terracotta, stucco

2= aurisina, carrara, costozza, marmo, nanto, pietra, tenera, verde, verona

1= greco

0= altro, Istria

Tipo: Type of object; used to determine rarity.

Ratings: 4= scultura

3= patera, edicola, rilievo

2= croce, simbolo, stemma, mascarone

1= decorazione

0= iscrizione, camino, frammento

Sottotipo: Subtype; not considered

Iscrizione: Whether an inscription is present as determined by whether text exists in the "iscrizione" field.

Binary rating: 4= has inscription
0= has no inscription

Note: Notes on condition and other factors. We eliminated anything not pertaining to condition and standardized the terminology.

Ratings: 4= lesione (lesions), corrosione (corrosion), abraso (abrasion)
3= disgregamento (broken up), fratture (fracture)
2= danni (damage), degrade (degraded), illegibile (illegible), esfoliazione (exfoliation), sbrecciato (busted)
1= sporco (dirty), annerito (blackened), manca (missing)
0= no note provided

Famiglia: Whether a family is identified with the piece.

Binary rating: 4= family known
0= no family given

Autore: Whether a sculptor is identified

Binary rating: 4= sculptor known
0= no sculptor given

Soggetto Generale: We eliminated the Soggetto column and combined it with the Soggetto Generale one, replacing "religioso" with the appropriate sub-category (usually "simbolo" or "persona") and "altro" with whatever could classify it more precisely (e.g., an "altro" object with the subject of "fenice" was modified to become "Fauna").

Ratings: 4= persona, madonna, angelo, cristo, santo, busto,
3 = fauna
2= flora
1= simbolo
0= no subject given

Conservazione Rizzi Numere: For reference comparisons (high numbers signify good condition)

Conservazione Numere: For reference comparisons (from past IQPs that assigned their own number)

Phone Wire, Electric Wire, Other Wire:

True: Wire = 2

Iron Present, Other Metal:

True: Metal = 4

Hooks:

True: Metal = 3

Tiranti:

True: Metal = 4

Shutters:

True: Risk = 3

Pipes:

True: Risk = 4

Flower Pots:

True: Risk = 1

Height, Width: Dimensions of an object, when given.

> 301cm, dimension = 4

221 to 300cm, dimension = 3

141 to 220cm, dimension = 2

61 to 140cm, dimension = 1

0 to 60cm, dimension = 0

Diameter: Dimension of a circular object, when given.

> 61cm, dimension = 1

0 to 60cm, dimension = 0

Distance from Ground: The measurements in this field do not all agree with respect to units and some are clearly incorrect. Although we have not included this field in our prioritization, it would be useful for future projects if the results are checked.

Surface Area: The surface area of the object, calculated in whatever manner previous projects chose. We selected the interval of 800 because it gives a reasonably even distribution between all of the objects that have measurements for surface area provided.

Ratings: 4= 3201 and up

3= 2401 to 3200

2= 1601 to 2400

1= 801 to 1600

0= 0 to 800

Appendix J: The Top 100 Pieces by Restoration Priority

- | | | |
|-------------|-------------|-------------|
| 1. CS 245 | 29. SC 139 | 57. CN 162A |
| 2. SP 269 | 30. CN 270 | 58. CS 042 |
| 3. CS 018 | 31. CN 137 | 59. DD 044 |
| 4. CN 178 | 32. CN 277 | 60. CN 074A |
| 5. CN 072 | 33. DD 172 | 61. SP 017A |
| 6. CS 326 | 34. SC 145D | 62. CN 399 |
| 7. SP 108 | 35. SC 146D | 63. CN 153 |
| 8. SP 245 | 36. SC 147A | 64. CN 268 |
| 9. SM 161 | 37. SM 395 | 65. CN 419B |
| 10. CS 141 | 38. SP 351 | 66. CN 420A |
| 11. SP 312 | 39. DD 024 | 67. CS 219 |
| 12. CN 074C | 40. CN 073 | 68. DD 147 |
| 13. CN 212 | 41. SP 230 | 69. DD 041 |
| 14. SP 218 | 42. CN 177A | 70. SC 144F |
| 15. CS 309 | 43. CN 225 | 71. SC 144N |
| 16. DD 196 | 44. SP 156A | 72. SM 250B |
| 17. SC 035 | 45. CN 236 | 73. SP 113A |
| 18. DD 203 | 46. CS 408B | 74. SP 114A |
| 19. SM 359A | 47. CS 108 | 75. SP 156B |
| 20. SC 203 | 48. CN 067 | 76. SP 026 |
| 21. SP 322 | 49. SM 136B | 77. SP 028A |
| 22. SP 276 | 50. CN 326 | 78. CS 009 |
| 23. CN 261 | 51. CN 385D | 79. M_CS 28 |
| 24. SM 308 | 52. SM 020B | 80. SC 046 |
| 25. CS 196B | 53. SP 017B | 81. CN 074D |
| 26. SM 145 | 54. DD 098 | 82. CN 074E |
| 27. DD 126 | 55. CN 163 | 83. CN 206A |
| 28. SM 069 | 56. SM 362B | 84. CN 303 |

- 85. CN 362A
- 86. CN 363C
- 87. CN 391
- 88. CN 448
- 89. CS 264B
- 90. CS 264C
- 91. DD 299
- 92. DD 316B
- 93. DD 316C
- 94. SC 167B
- 95. SC 142E
- 96. SC 191D
- 97. SC 027
- 98. SM 087A
- 99. SM 101
- 100. SM 197

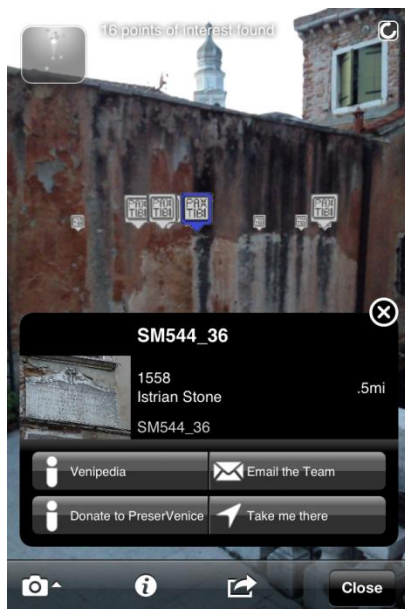
Appendix K: Modifying the Existing Mobile Application

Using the existing Layar scripts written by the 2010 PreserVenice team, our team modified the existing framework in order to adjust and improve the Layar application. For more information concerning the application as previously developed, please refer to the 2010 PreserVenice team report.⁸⁷

The Database

The information for the Layar application is stored in a MySQL database. The application primarily relies on two tables in this database: [type of art]_Table and [type of art]_ACTION_Table. The table that was primarily modified was the Inscriptions table, and for the purposes of this appendix, [type of art] will be replaced with Inscription. INSCRIPTION_Table contains information relevant to the piece itself, such as the title, latitude and longitude, and material of construction, while ACTION_INSCRIPTION_Table contains information relevant to the Layar user interface.

Modifying the User Interface



ACTION_INSCRIPTION_Table is used to modify the user interface on Layar. The information stored here affects the user interface for any layer that draws its information from this database. ACTION_INSCRIPTION_Table contains 13 different types of data. The most important of those are listed below:

- **poiID:** This value corresponds with the “id” value in INSCRIPTION_Table. All rows with poiID 1, for example, will affect all points of interest with the “id” value of 1. Note that multiple different rows can share the same poiID. This means that that particular point of interest will have multiple buttons on it.

⁸⁷ Ascare et al, “PreserVenice: Preserving Venetian Material Culture.”

- **Label:** This is the text that will appear on the buttons when the layer is active. In this case, the “label” values for the rows corresponding to this point of interest read “Venipedia,” “Donate to PreserVenice,” “Email the Team,” and “Take me There.”
- **uri:** This affects what happens when each of these buttons is selected. It is different for each button. The “Venipedia” button’s uri is a link to that particular Venipedia page, while the “Email the Team” button’s uri is “mailto:preservenice@gmail.com.” More information about this can be found [here](#).
- **AutoTriggerRange and AutoTriggerOnly:** Not modified. More information can be found on the [Layer wiki](#). These fields should be “0”
- **contentType:** Either “text/html” for web links, or “application/vnd.layar.internal” if using another phone application. Currently, the only use of “application/vnd.layar.internal” is for the email button, as the “take me there” button is built-in.
- **id:** No two rows should have the same ID.
- **Method:** “GET” by default.
- **Params:** Null by default.
- **CloseBiv:** “0” by default.
- **showActivity:** “1” by default.
- **activityMessage:** Null by default.

The types are covered on the Layar wiki.

Creating buttons on the Layar interface

Much of the functionality of Layar is built into the application itself. However, we had the option of creating buttons that added functionality to the user interface.

Creating an HTML button

Step 1:

The first step was determining which point of interest this button will be related to. the poiID field in ACTION_INSCRIPTION_Table needs to be the same as the ID field in

INSCRIPTION_Table. For instance, say Inscription_2 has an ID of 2 in INSCRIPTION_Table. The poiID in ACTION_INSCRIPTION_Table needs to be 2 if the button is associated with Inscription_2.

Step 2:

The next step is simply making sure that the fields are all correct. The uri field should be the URL of the webpage, contentType should be text/html, and activityType should be 1. All other fields can be left as their default values, which are listed above.

Creating an email button

Step 1:

The first step was determining which point of interest this button will be related to. the poiID field in ACTION_INSCRIPTION_Table needs to be the same as the ID field in INSCRIPTION_Table. For instance, say Inscription_2 has an ID of 2 in INSCRIPTION_Table. The poiID in ACTION_INSCRIPTION_Table needs to be 2 if the button is associated with Inscription_2.

Step 2:

The next step is simply making sure that the fields are all correct. The uri field should be “mailto:something@somewhere, contentType should be application/vnd.layar.internal, and activityType should be 5. All other fields can be left as their default values, which are listed above.

More information can be found in this [tutorial](#) online.