



SHOWCASING TWENTY YEARS OF VENICE PROJECT CENTER RESULTS USING INTERACTIVE ONLINE INFOGRAPHICS

An Interactive Qualifying Project Report submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the Degree of Bachelor of Science

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Friday 22 October 2010

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Authorship Page

This project was completed with the equal participation of each team member. Without full cooperation and effort provided by each team member, this project could not have been successfully completed.

Abstract

Since 1988, students at Worcester Polytechnic Institute have been traveling to Venice, Italy to conduct public works projects on subjects ranging from public art preservation, boat and tide monitoring, to the origins of the Venetian people. Amongst the wealth of data accumulated over the project center's twenty year existence, few strides have been made to publish the information in a graphically stimulating and user engaging manner. This project contributed to the ongoing initiative of the Venice Project Center with the launch of a visualization and data resource website. In support of the continued advancement of information graphics and data manipulation in Venice, the website aims to showcase the work of the project center and its students. Techniques and software for large scale data representation both linear and geospatial were researched and several recommendations were made towards the progression of interactive information dissemination regarding the problems facing the city.

Executive Summary

Over the last twenty years, hundreds of projects have been completed by Worcester Polytechnic Institute students at the Venice Project Center. All of the data that has been collected is stored in boxes in the project center or on the VPC server. The data is generally inaccessible to the general public and the work completed here has not been realized to its full capacity. Most of the data collected is unique and can only be found through student projects. For this reason our project was established to unearth the valuable hidden information and create infographics to increase accessibility and awareness.

The demand for dynamic displays of information has risen with the prominence of the internet as a source for news and information. Industry leaders including IBM, Google, Yahoo, MIT and Stanford University are currently developing interactive web applications and frameworks for the graphical manipulation of data. The main difference between these visualization solutions lies in the intended user base. The increasing prominence of engaging infographics in online media has cultivated popular demand for premium interactive media. Gradually, the internet consuming world is increasing focus on graphic excellence versus editorial ability. In response to these trends in media the VPC has made strides to make Venice Project data available through the Venice 2.0 website.

Over the past 20 years the VPC has compiled a physical and virtual mountain of valuable data focused on the issues surrounding Venice. A large effort to show the accomplishments of VPC teams has begun with the creation of the Venice 2.0 website, team blogs, and Venipedia. The accomplishments of the VPC have been published in major print and digital publications such as National Geographic, WIRED, and BBC Radio, garnering worldwide recognition. However, the website does not fully showcase their data in a way that is visually captivating to the public and to potential sponsors. A poignant example of this problem is the current "Best of" section of the Venice 2.0 website, a work in progress towards showcasing major accomplishments that is vastly under representative of the 20 years of the groundbreaking work.

The use of information graphics has reached a critical point in policy decisions worldwide. Well designed, clear, and informative graphical displays of data are now expected at all professional levels and throughout academia. This trend has trickled down to the general public who are more strongly affected by appealing graphic design in print and online media. Our group researched the history and operating practices of infographic design from a broad spectrum of industry luminaries. With this in mind the goal of our project is to encapsulate the main trends of the city with regards to salient Venice issues, using information visualizations. The results of this project are intended to shed light on hidden Venice facts from the large body of VPC research and ultimately influence the policy and funding decisions in the city of Venice. The results of the project are published on the visualVenice2.0 website, and are evident of the tools and research done regarding the creation of useful and captivating infographics. By exposing this collection of previously hidden information to the public, it is now possible for anyone to access the information.

The goal of our project is to encapsulate the main trends of the city from twenty years of salient Venice data, using engaging and interactive online infographics. We will fulfill this goal using the following objectives:

1. Distilling Venice Project Center information into workable datasets
2. Creating and publishing powerful, engaging, and sustainable infographics using salient Venice data

In order to achieve our objectives, our team must first look into what data is available and selectively pull salient and useful information from the databases. Organization and analysis of the data will allow us to determine which datasets are most up to date and relevant to issues Venice is facing today. The second objective will be accomplished through the creation of the actual infographics. The team completed research on what the most effective ways to visualize data are, what the leading technologies available are that are available, and some examples of stand out information graphics. The last objective will be accomplished through the determination of whether or not our infographics were useful to outside organizations and to the VPC itself. This will be achieved by increased awareness of the work completed by students in Venice.

Throughout our work over the last four months the team was able to create a website in order to showcase our graphics, word clouds for the two main newspapers on Venice, and maps of prominent Venice data. The team also helped the other project teams with various graphics and websites that they needed completed for their projects.

Another forward-looking deliverable is a mock up issue of WIRED magazine as a layout for future projects. Ideally later VPC teams will create a yearly issue of the magazine in order to better showcase the hard work of the various Venice teams. In the mock issue the sections laid out and what should be featured in each section. The issue will contain concepts for three sections: *start*, *play*, and *found*. The *start* section will contain the main articles of the issue. *Play* will feature upcoming events in such as the Biennale, new movies that were filmed in Venice, and books centered in Venice. The last section, *found*, will contain information about the future of Venice and the VPC.



Figure 1: Example Cover of mockup WIRED Magazine

Article title here



BY AUTHOR NAME

Article Subtitle Below the Ribbon

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1 2 3 JAN 2010

Figure 2: Example of Inside Layout of Issue

Figure 1 is a mock-up cover of our WIRED magazine. It can be distinguished between the real WIRED because part of the “W” and the “E” are highlighted to represent Venice. Figure 2 is a mock-up of how an article in the magazine could look.

The visualVenice 2.0 website is an important deliverable that is the public vehicle of the visualization movement. The site is linked to the main VPC website, Venice 2.0 and all of the project graphics are featured on it. Some of the featured graphics are the Venice TimeMaps, the De’Barbari map, and the daily newspaper word clouds. The website is a place where different organizations and the general public will be able to find graphics about Venice that feature the data collected by the students of WPI. Figure 3 is a screen shot of the website.



One of the graphics that can be found on the website are the daily word clouds from the two main newspapers in Venice: *Il Gazzettino* and *La Nuova*. This automatically generated graphic allows people to easily perceive the main topics of the day in Venice by highlighting the popular topics and wordage in the respective newspapers. Figure 4 is an example of one of the word clouds featured from *La Nuova* on December 15, 2009.

Another feature graphic is the de'Barbari map of Venice. The importance of this graphic is the hope that eventually users will be able to edit the file and add color to the different sections of Venice. It will also allow the user to crop the picture or download it so that they can use the file for different things that they may need it for. Figure 5 is a panel from the de'barbari map from our website.

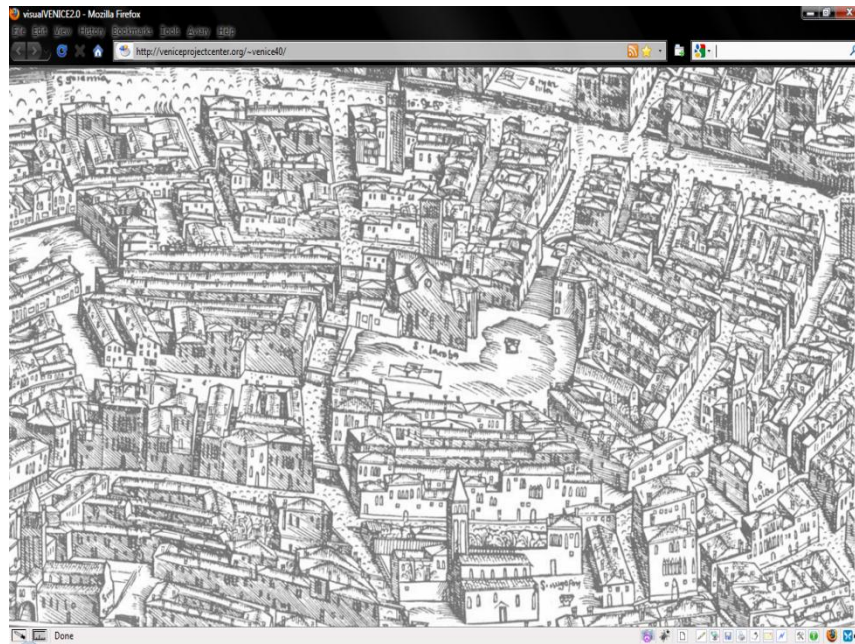


Figure 5: de'Barbari Map Online

The final graphics featured on our website are maps [or maps in progress] of the churches, public art, and stores. The churches map shows what paintings are located at the church as well as the painter that painted it. This is important because it will allow tourists to easily determine which churches are a must-see while they stay in Venice. They will be able to easily determine which artists are featured there and whether or not they want to see that piece of art. The map on the stores will be similar to figure 6 featured below. The map shows clusters rather than points to make it easier to view that data while at a low zoom level. Once zoomed in the user is able to locate the stores by their pins. When they click on a pin they will receive information about the store including location as well as merchandise sold there. The last map is of the public art in Venice. It is similar to the stores map in that it features clusters which allow you to zoom. The map also allows you to click on each piece and receive information about it.

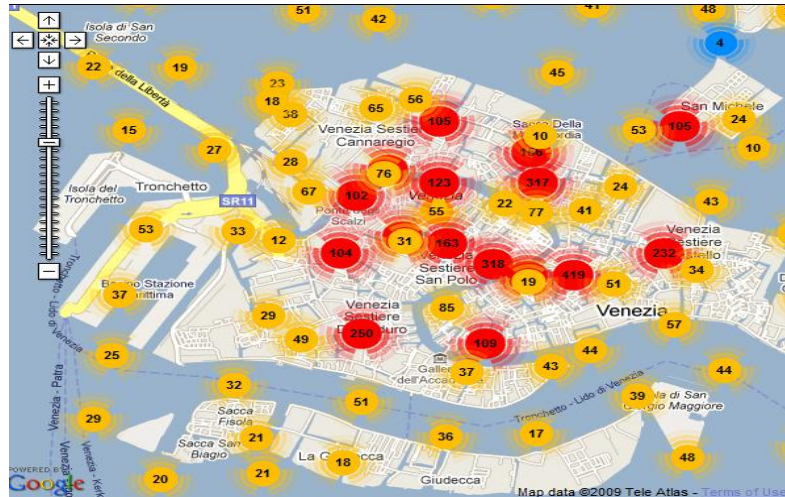


Figure 6: Example of ClusterMarker API

The last deliverable produced by the team was helping out the other project groups with their graphics. The team helped the Postmodern Postmortems team with their virtual reality game. The feature that we created is the center which allows you to click, enter a password, and then find out more information about each piece. Also, our team helped with the Venetian Origins team by working on two of their websites, ArchEasy and UScript. In addition our team supported the Ships team create an infographic featuring all the data they collected in an easy and understandable.



Figure 7: Postmodern Postmortems Flash Application

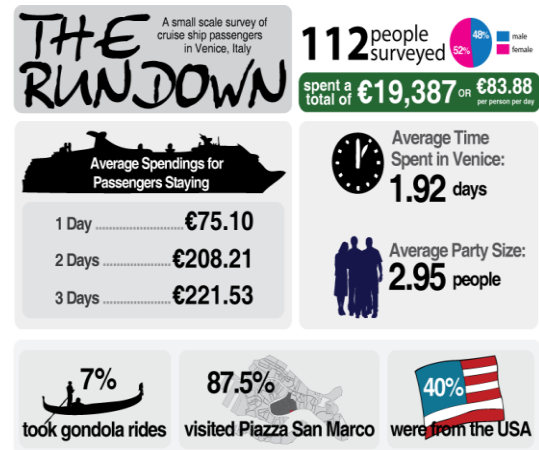


Figure 8: Cruise Ships Infographic



Figure 9: Screen Shot of UScript Website

Infographics are one of the foundations for a well rounded project. They allow you to take your data and display it in an interesting and enlightening way. With the continued creation of infographics, more people will be aware of the work the Worcester Polytechnic Institute students are completing at project centers around the world as well as on campus. We therefore recommend that more projects like this one be completed in the future.

Infographics are employed to make collected data available to the general public. Thus, an increase in the creation of infographics for the VPC would make more of the data collected here available for other organizations and social networks, such as 40xVenezia, to use. By making them available to the public, they can hopefully be used in policy and decision making and will help to improve different issues facing Venice. This would not only demonstrate the usefulness of the graphics but also show the importance of their creation for different project centers.

For a future project we recommend a team determines how useful and sustainable our graphics are to the VPC and other organizations that we collaborated with. This objective is important because it will let future teams know how to people are using our graphics and if the data was up to date. Also it will quantify how useful the data that other teams collected is to Venice organizations. This goal can be achieved in many ways, the first by surveying different organizations to see if they know about our graphics and if they have used them. The second most obvious way would be to set up a survey on the visualVenice 2.0 website that asks the user if the graphics were easy to understand helpful to what they were looking for.

The ground work has been made for future project teams to continue the work at we started by unearthing more data from the VPC. We recommend that in the future our methodology be adapted so that the matrices and determination of data is completed well in advance of arrival in Venice. Any infographic team will need as much time on the ground in Venice as possible to adapt to the needs of other teams.

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1 Introduction

Since 1988, students at Worcester Polytechnic Institute in Massachusetts have been traveling to Venice, Italy to conduct public works projects including boat traffic regulations, tide monitoring, and the origins of the Venetian people. Twenty years of Venice Project Center (VPC) data exists in reports and studies that are unknown to the general public. Professor Fabio Carrera, lead advisor to the students, has worked to create a website showcasing the accomplishments of the project teams over the years. Venice 2.0 is the current initiative for the dissemination of project information and news. While the original intentions of the site have nearly been fulfilled, there is still not any publicly viewable information regarding the majority of past projects and their collected data. A potential solution to the underrepresentation of these meticulously collected records is the employment of cutting edge infographic and internet technologies.

Prior to the involvement of the student project center located in Venice pressing issues facing the city received less international and local attention. Responding to this critical lack of support, several groups of Venetians and non-Venetians formed to tackle the issues. One such group, 40xVenezia, is a social network comprised of middle-aged Venetian professionals concerned with the problems of Venice. 40xVenezia revolves around an online social networking website where issues are discussed and ideas are suggested. The ultimate goal of all of these organizations is preserving the impressive history of Venice through community and government sponsored work. To that end an increased accessibility of information will facilitate the creation of more targeted solutions to the problems facing the city and its people. Venice is just one example of a city where information design has the potential to bridge the gap between research data and solutions for the public.

The demand for dynamic displays of information has risen with the prominence of the internet as a source for news and information. Industry leaders including IBM, Google, Yahoo, and major universities are currently developing interactive web applications and frameworks for the graphical manipulation of data. The main difference between these visualization solutions lies in the intended developers and end users. Increasing prominence of engaging infographics in online media has cultivated popular demand for premium interactive media. Gradually the internet content-consuming world is focusing on graphic excellence versus editorial ability. In response to these trends in media the VPC has made strides to make Venice Project data available through the Venice 2.0 website.

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current "Best of" section of the Venice 2.0 website, a work in progress towards showcasing major accomplishments that is vastly under representative of the 20 years of the groundbreaking work.

The use of information graphics has reached a critical point in policy decisions worldwide. Well designed, clear, and informative graphical displays of data are now expected at all professional levels and throughout academia. This trend has trickled down to the general public who are more strongly affected by appealing graphic design in print and online media. Our group will be researching the history and operating practices of infographic design from a broad spectrum of industry luminaries. With this in mind the goal of our project is to encapsulate the main trends of the city with regards to salient Venice issues, using information visualizations. The results of our project are intended to shed light on hidden Venice facts from the large body of VPC research and ultimately influence the policy and funding decisions in the city of Venice. After utilizing the tools necessary to create the captivating infographics for past and future VPC data we publicly published our results on the visualVenice 2.0 website. By exposing this collection of previously hidden information to the public, it is possible for anyone to access the information including organizations and social networks like 40xVenezia.

2 Background

Information graphics are anything that is used to display knowledge or data visually. The use of infographics has been well known throughout history. For centuries, people have been using graphics to show their audience the information they want known. Graphics can be traced back to ancient civilizations that drew pictures to tell their stories all the way to present day where companies and organizations use graphics for presentations and policy decisions.

2.1 Information Graphics before Computers

In early history, prehistoric civilizations used cave drawings to depict a story. These could be considered the first known information graphics. These images were called petroglyphs. These graphics were used for a variety of things, such as keeping track of cattle and sheep. Later, the early civilizations began to draw maps. One example is the map at Çatalhöyük which dates back to around 7500 BCE. These graphics are an invaluable tool for looking back at the history of ancient civilizations.¹ The earliest form of writing began with the scratching of pictures on clay tablets and walls. This method was perfected by the ancient Egyptians in 4000 B.C with the use of hieroglyphics. The hieroglyphs were used to decorate the walls of the temples. They were also used in the tombs of the pharaohs in order to show the pharaohs the way into the afterlife and help them to make it through all the gates. They have taught the historians about the culture of the ancient civilization.²



Figure 1: Hieroglyphics from the Tomb of Sety I

¹ (Rajamanickam 2005)

² (Millmore)

Following the Egyptians, around 1400 B.C. the Bible was written which is the earliest form of writing combined with images. This is important to the history of infographics because it shows how text can be visually displayed to help the reader understand the story being presented. This is an example of how authors try to intertwine text and visuals in order to make the information more understandable.³

The Renaissance is the next example of authors trying to coherently mix graphics and text. During the Renaissance, many artists and scientist flourished including Leonardo da Vinci, Copernicus, and Galileo. All three of these scientists used graphics and images to display their information in order for the people to better understand their theories. The renaissance brought about change in art and science. It created new ways for art to be displayed, which has influenced artists since then.⁴ During the Renaissance, an important invention that has influenced graphics is the invention of the printing press in the 15th century. Johann Gutenberg first used the printing press to publish the bible. Gutenberg printed approximately 200 bibles which were then sold at the 1455 Frankfurt Book Fair. The printing press spread rapidly; in 1500 more than 2500 European cities had printing presses. “The printing press certainly initiated an "information revolution" on par with the Internet today. Printing could and did spread new ideas quickly and with greater impact.” This invention made the spread of ideas much faster as well as the spread of art. The art could then be combined with the texts which lead to the first newspaper in 1605. Johann Carolus published the first printed newspaper, *Relation*, in Strasbourg, which is now part of France.⁵

³ (Biblica)

⁴ (Gascoigne)

⁵ (Gascoigne ; Kreis 2004; Kreis 2004)



Figure 2: A Page from Copernicus' Book on Heliocentric Theory

In the 1600 and 1700s, many advances were made in the field of data visualizations. In 1644 a graphic by Michael Florent van Langren, a Flemish astronomer, believed to be the first visual representation of statistical data showed how to determine longitude at sea which proved to be invaluable to sailors. This was influential because of the way that the data is displayed. It could have been displayed in

table form but instead the viewer gets a better sense of the wide variation in gaps which can only be seen in graph form. In the mid 1680s the first multivariable plot was derived from empirical data, a theoretical curve relating barometric pressure to altitude, and the first known weather map, showing prevailing winds on a map of the earth. William Playfair, from the 18th century, is considered the inventor of most of the graphical forms widely used today by many people. He was responsible for the first the line graph and bar chart and later the pie chart and circle graph. Graphing remained rather scarce until the early 1800s due to data that was complex enough being scarce.⁷

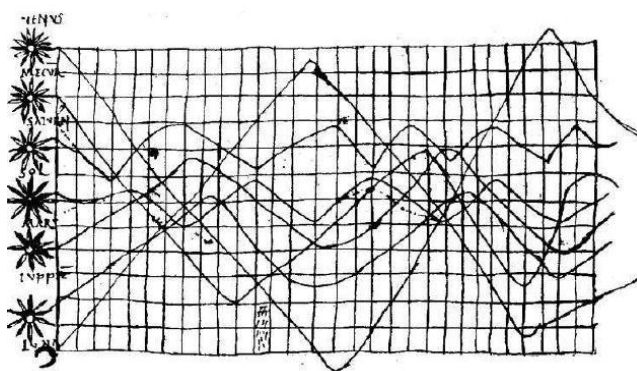


Figure 3: Oldest Recorded Graph by an Anonymous Author

The earliest graphical depiction was in the 10th century by an anonymous author, which showed the changing of the seven prominent bodies of space over time. The vertical axis represents the inclination of the planetary orbits and the horizontal axis shows time which was divided into thirty intervals. Following, in the 14th century was the idea of a proto bar graph which showed the relationship between values in a table. This graph was published by Nicole Oresme Bishop of Liseus. As well, we see the use of the camera obscura by Reginer Gemma-Frisius in 1545 to record an eclipse of the sun and the first modern cartographic atlas by Teatrum Orbis in 1570. These things combined to show the early ages of data visualization.⁶

⁶ (Friendly 2006)

⁷ (Friendly 2006)

The 1800s was the beginning of graphics that are still used today. In 1825, the Ministry of Justice in France instituted the first centralized national system of crime reporting, collected quarterly from all departments and recording the details of every charge that came before the French courts. In 1855, Dr. John Snow produced his famous dot map showing deaths due to cholera. This was indeed a landmark graphic

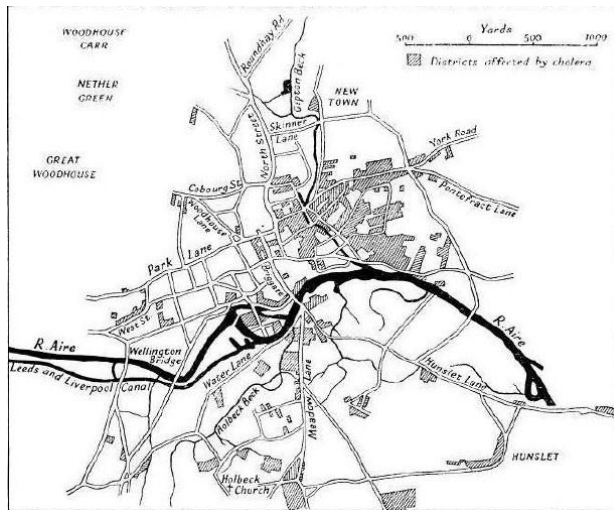


Figure 4: A Portion of Dr. Robert Baker's Cholera Map of Leeds

discovery that marks a high-point in the application of thematic cartography to human topics. By the mid-1800s, all the conditions for the rapid growth of visualization had been established. Official state statistical offices were established throughout Europe, in recognition of the growing importance of numerical information for social planning, industrialization, commerce, and transportation.⁸

William Playfair is another person who created information graphics before computers. He was a Scottish political economist, who Edward Tufte credits as one of the greatest inventors of

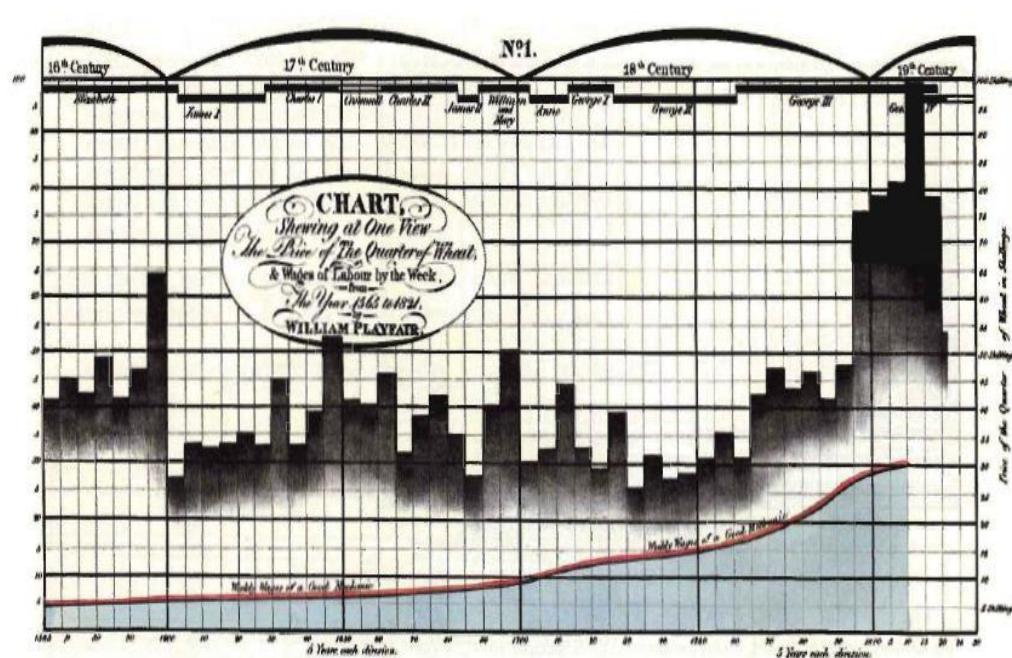


Figure 5: William Playfair's bar chart on the price of wheat versus the increase in wages.

⁸ (Friendly 2006)

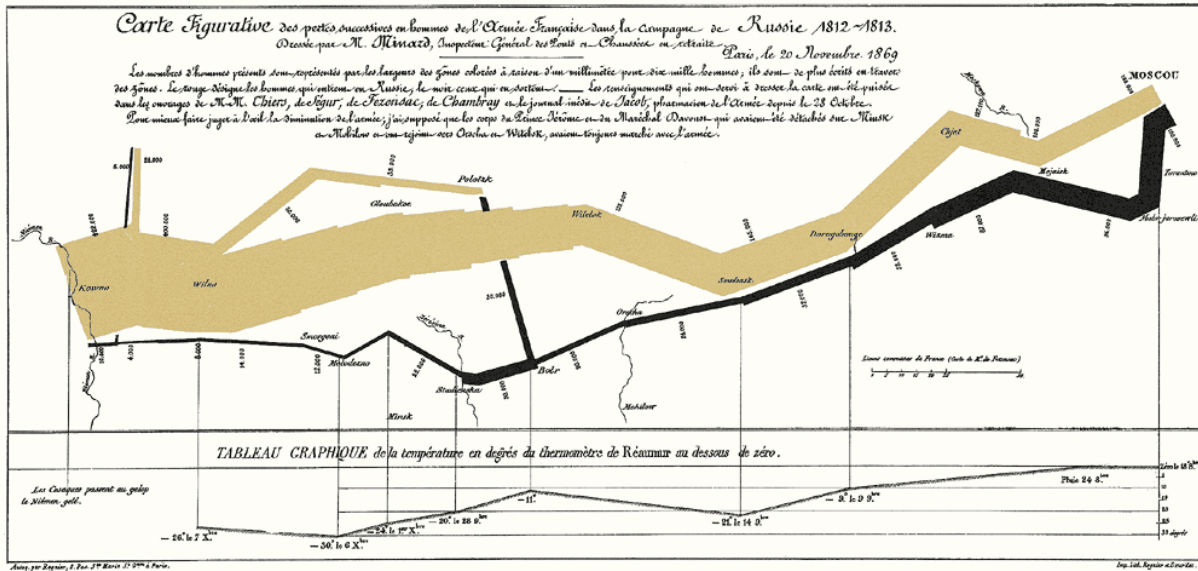


Figure 6: Charles Minard's Napoleon's March

modern graphical design. The graphic showed whether or not the price of wheat had changed relative to the increase in wages. His graphic is an example of a time-series graph. The graphic shows prices of wheat, wages, as well of the reigns of kings and queens. It covers the time period of 1565-1821. This graphic is important because it is one of the first bar graphs created.⁹

A useful type of graphic is a narrative graphic of space and time. It illustrates how multivariate graphics can be used to tell a story. Charles Minard's graphic published his flow map of Napoleons March of 1812 in 1869. This graphic shows, the army's location and direction, showing where units split off and rejoined the declining size of the army, as well as the low temperatures during the retreat. Edward Tufte says this "may well be the best statistical graphic ever drawn." Charles Minard also created many other graphics that have set the way for current artists, such as maps that incorporate pie charts to display information.¹⁰

2.2 The Rise of the Modern Infographic

By the early 1900s statistical graphing and visualization of complex information was no stranger to scientists and mathematicians alike. The year 1910 marked the first English textbook dedicated to the sole purpose of creating representative and accurate depictions of data. With *The Construction of Graphical Charts*, John Bailey Peddle, a professor of machine design at the Rose Polytechnic Institute set the standard for

⁹ (Tufte 2001)

¹⁰ (Tufte 2001)

future generations of information designers.¹¹ Peddle's book is heavy on mathematical formulas and complex graphing techniques, but is nevertheless a great stepping stone for future information graphic design publications.

Shortly after the First World War, Otto Neurath, an Austrian philosopher with a team of artists and data specialists, created the first symbolic pictorial language for conveying information. The Isotype (International System of TYpographic Picture Education) project had the specific goals of creating awareness of a war ravaged country's suffering economy and educating ordinary Austrians in public affairs in order to motivate social change.¹² Isotype was the first true abstract representation of data in a way that people could readily understand. By establishing this new pictorial language of sorts, Neurath and his circle of information designers launched an entirely new thought

process for looking at data. Isotype proved that when information is portrayed with human perception in mind, complex data can be more effectively and efficiently communicated to a wider audience. As seen in the figure at left, the use of pictograms is ubiquitous in today's modern infographics.

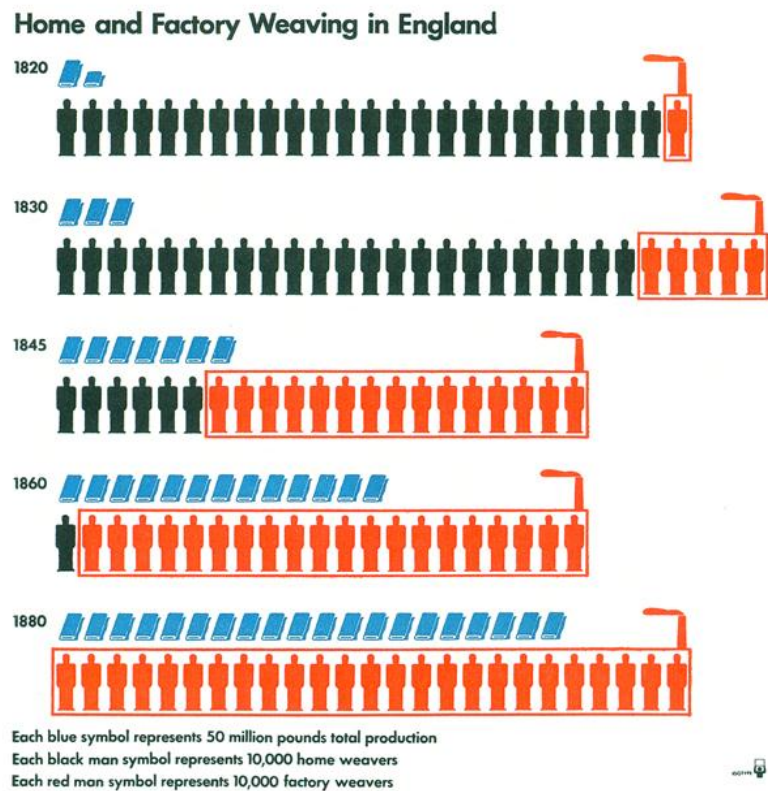


Figure 7: Home and Factory Weaving in England from 1820 to 1880

¹¹ (Peddle 1910)

¹² (Twyman n.d.)



Figure 8: Food Stamp Usage in the US

An important development in technology that would later define the entire genre of infographics was the debut of the fully automatic computer in 1944. The IBM Automatic Sequence Controlled Calculator, also known as the Mark I computer, was the first computer that did not require human interaction once it started. Weighing in at over five tons and about 50 feet long, the massive electromechanical calculator was proposed by a Harvard graduate student named Howard H. Aiken. Seizing the opportunity to head the development of the milestone technology, IBM

provided Aiken with staff and resources to complete his vision. The computer was completed in February of 1944 and presented to Harvard University on August 7th of the same year. The Mark I was used by the Navy during World War II to populate military calculation tables and charts, and after the war to aid in solving complicated calculations across many fields.¹³ The digital age had officially begun.



Figure 3: The IBM ASCC (Mark I) at Harvard

As computers became more powerful and widely used across different disciplines, applications and programming languages were developed to streamline computations and mathematical analysis.

¹³ (IBM Corporate Archives n.d.)

The 1960s saw an important development in how we analyze and visualize spatial data. The first fully operational Geographic Information System (GIS) was employed in Canada to manage and study information collected in the Canadian Land Inventory.

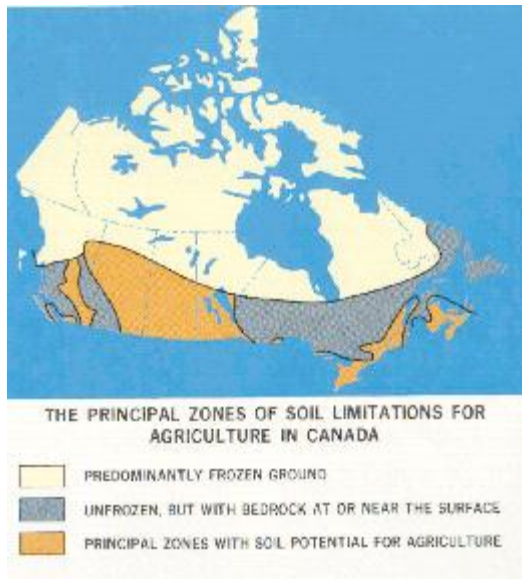


Figure 10: A graphic produced with the CGIS

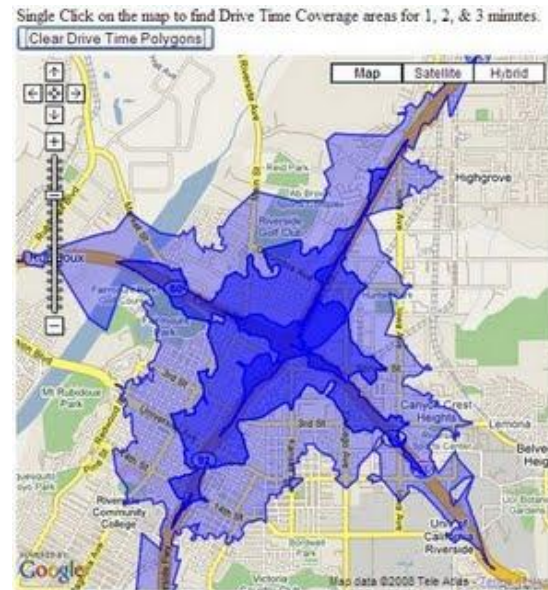


Figure 9: Google maps API is a powerful GIS

GIS provided a fast, accurate, and useful means of creating cartography-based graphics – so useful in fact that over 15,000 maps were produced making it one of the largest repositories of spatial information on Canada available today.¹⁴ Geographic Information Systems provide an important tool for visualizing spatial information and have played a large role in influencing modern infographics and have been continuously improved over the years.

Shortly after the advent of GIS, the technology to render interactive visualizations on computers was introduced. In 1969, a probability plotter allowed users to interactively control a power transformation on a screen. A similar, but more advanced system was available in 1974, PRIM-9 allowed visualizations in 3D to be rotated, projected, isolated, or masked for analysis. These developments propagated a trend of increased user interaction with computers and their applications to data visualizations for years to come.¹⁵

¹⁴ (Zeiss)

¹⁵ (Friendly 2006)

The true introduction color to the world of newspapers can be traced to the 1982 debut of *USA Today*. Considered by some as a revival of newspaper popularity and the solidification of graphics as a vital part of news communication, the first issue contained a full page color weather map created by George Rorick. The visually appealing, yet information infographic can be seen below. Rorick's weather graphic intelligently turned the generally mundane weather statistic into exciting and accessible information graphic that appealed to a wider audience.¹⁶

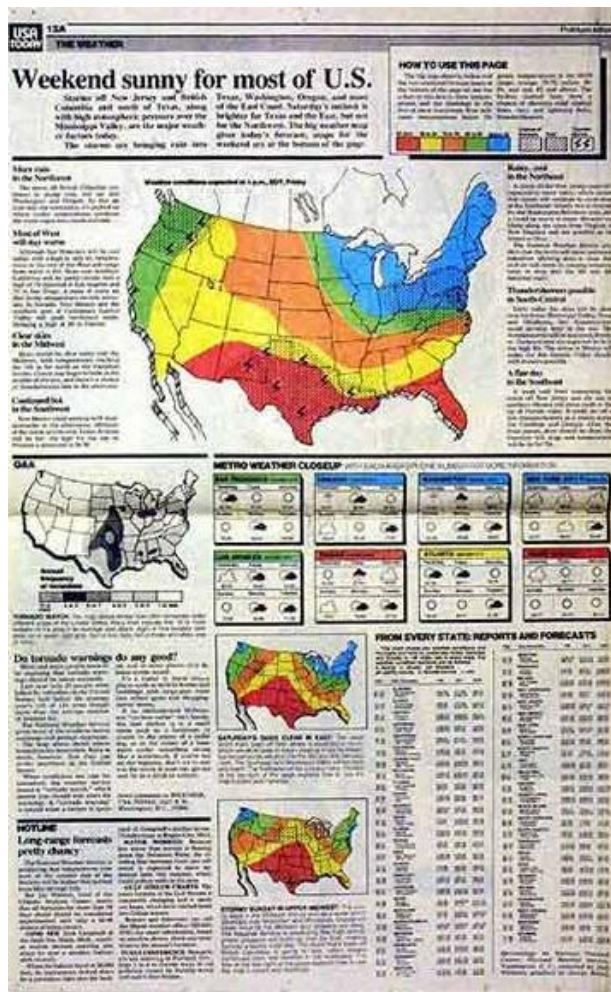


Figure 11: USA Today's 1982 Debut Weather Map by George Rorick

While information graphics became more ubiquitous across print and media sources, the availability of software to create more sophisticated infographics increased drastically. The processing power and widespread popularity of personal computers were the perfect venue for graphic software to be available to the masses. As the digital age progressed and businesses began to adopt computers into the normal work day, information graphics – bar charts, line charts, pie charts – were now able to be produced by anyone. The obvious problem with this was that software users had no graphical design sense when constructing these graphics, resulting in a steady stream of mediocre data visualizations. This situation was particularly interesting because with the advent of sophisticated computer software, our society actually regressed to some degree and lost sight of the years of statistical glory once exuded by the likes of Charles Joseph Minard and William Playfair.

¹⁶ (Rajamanickam 2007)

2.3 The Modern Era of Infographics and Beyond

During the early 2000's the foundations for a fundamentally different kind of internet blossomed into what is now called Web 2.0. Specifically a convergence of underlying technologies and social paradigm shifts has allowed the Internet to develop into the medium it is today. As this evolution of the medium has progressed the expectations of end users has grown from a passing interest to a ravenous hunger for data and meaning.^{17 18}

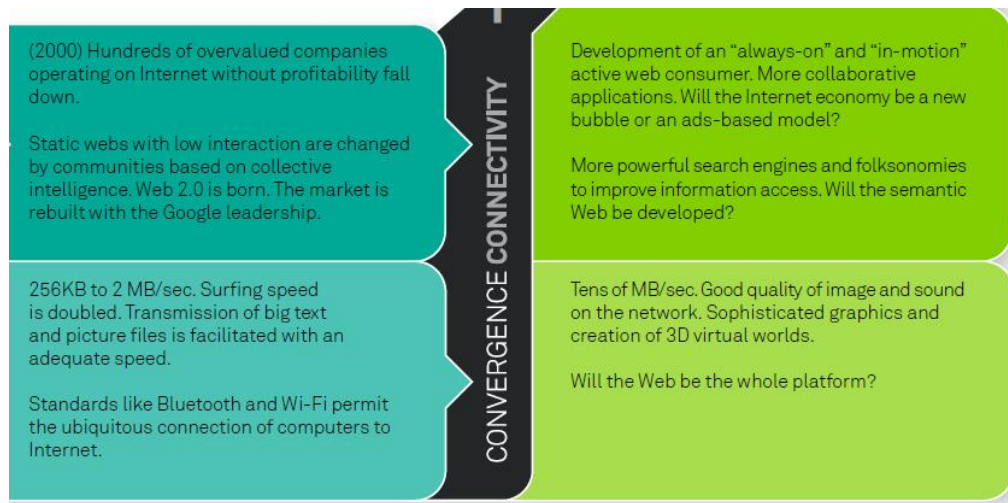


Figure 12: Part of a Stanford Infographic on the Growth of the Web

Web scripting languages began to grow in usage which allowed developers increasingly dynamic control over what were still very traditional websites. Technologies such as Adobe's Flash enabled artistic and graphically designed interfaces to create a new layer of interaction between users and web pages. Social interaction through the internet was fostered as the complexity of these technologies proliferated and the internet install base reached critical mass in developed nations.(Gube 2009, 1) By utilizing this new potential websites such as Myspace.com and Facebook.com have revolutionized the way millions of people interact with each other and the internet.

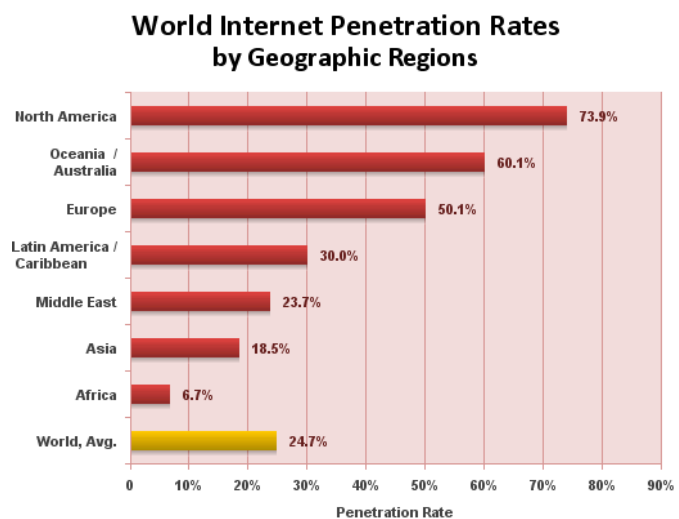
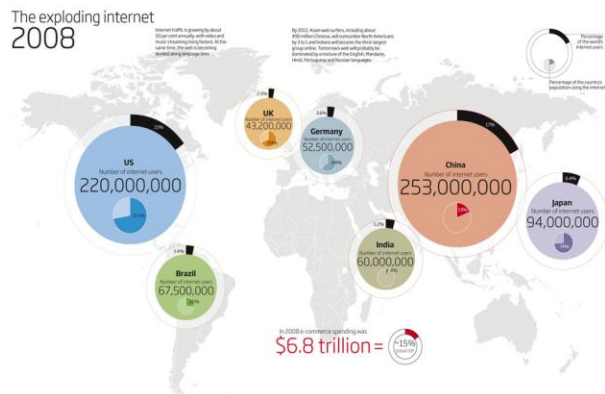


Figure 13: Chart of Percentages of Internet Access Worldwide

¹⁷ (Anonymous2009)

¹⁸ (Jenkins 2006)

Although industry luminaries such as Edward Tufte regularly write about best practices in infographics, the field is largely dominated by amateur designers and office workers.^{19 20}



The new social internet culture has given the means of infographic production and to anyone who wishes to use them. While tools such as Adobe's suite of products still dominate the top tier of graphic design, open source and freeware programs such as GIMP are democratizing professional grade tools. These trends are currently working to accelerate the speed and beauty of the way people find information in their daily lives.^{21 22 23 24 25}

Figure 14: Graphic Depicting the Exploding Growth of the Internet

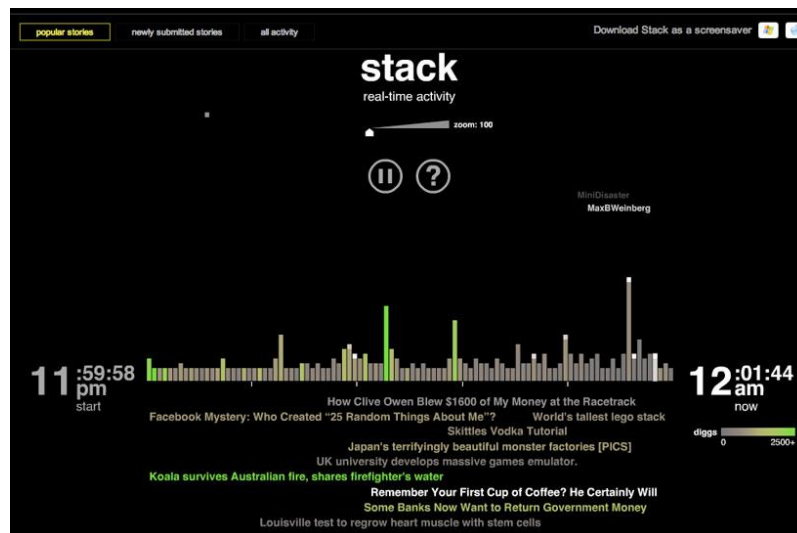


Figure 15: A Site Dedicated to Visualizing Twitter Trends and Data

¹⁹ (Tufte 2006)

²⁰ (The PHP Group 2009)

²¹ (McCandless)

²² (Gemignani 2006)

²³ (Few 2004)

²⁴ (Krum)

²⁵ (Wiederkehr 2009)

3 Methodology

The goal of our project was to encapsulate the main trends of the city from twenty years of salient Venice data, using engaging and interactive online infographics. The project team fulfilled this goal using the following objectives:

1. Distilling Venice Project Center information into workable datasets
2. Creating and publishing powerful, engaging, and sustainable infographics using salient Venice data

The project took place between Tuesday October 26th and Friday December 18th. Using student collected data collected from in and around Venice relevant to the issues facing the city, infographics were prototyped and published to a publicly available website on the project center server. The following section details how the objectives were completed in Venice, with the first section detailing the process for dataset selection and the second section outlining the method used to create and publish the infographics

3.1 Distilling Venice Project Center information into workable datasets

The single most important requirement for creating an engaging and informative infographic is the data itself. Conversely, the rows upon rows of seemingly useless information that make up a dataset would remain isolated, deep within databases, without the visualizations being made possible by infographics. The relationship between information and visualization exists because of our unique desire to understand growth, trends, problems, results, or performance – and tell the rest of the world about it. To communicate the issues surrounding Venice, we looked into what data is available and selectively pulled salient and useful information from the databases.

3.1.1 Selecting salient datasets

To determine which types of information visualized, we first analyzed what is out there. To accomplish this problem our group will use various comparison and discussion methods to decide what best represents the most pressing issues of the city.

First, a criteria was established for what attributes of datasets make them the most appealing to our endeavors. To decide on these characteristics and information metrics, our group discussed key datasets mentioned by the advisors and those currently being focused on by other groups.

Important aspects of a relevant dataset will be brainstormed by the team and compiled into a matrix. The matrix will be used to compile a list of the sets that we are most interested in visualizing. Each member of the group will add new datasets to the list as they are encountered. Using the matrix, we analyzed the

content and attributes of the compiled information and looked for possible trends, relationships, or issues that encompassed multiple datasets.

3.1.2 Downloading and organizing the datasets

After we determined which sets are deemed most useful and interesting for infographic representation, we had to connect to and download the salient datasets. This step may require scraping of a statistic website for the most recent information depending on what is decided in the selection phase. An important consideration is whether or not the sources of “current” data are reliable or sustainable. This would be discussed by the team and evaluated on a case by case basis.

The final step was to compile and organize the data into a single team database. To accomplish this, the datasets being used for a single infographic were grouped and normalized such that they were easily referenced in the later creation of graphics. The database files were maintained on the Venice Project Center server such that all content will be accessible in the future.

3.2 **Creating and publishing powerful, engaging, and sustainable infographics using Salient Venice data**

Creating and publishing power and engaging infographics is a large work cycle that requires consideration for every detail of the final product. Each infographic is a consolidation of data, graphic design principles, and a goal. Through the following core steps our group created an effective infographic production pipeline that allowed us to produce useful infographics regarding the city of Venice.

3.2.1 Content Analysis

The process began with a series of content analysis sessions where the data and any other relevant information were reviewed for trends and key facts. The primary goal of these sessions was to find the most important facts that can be drawn from the given data. Our group produced two matrices of important attributes of both the data we were given and a general set of infographics. The matrix of datasets allows objective comparison of a diverse group of datasets in an attempt to decide which dataset will have an infographic made to represent its data.

Dataset	Proprietary	Online	Format	Last Updated	Update Frequency
Venice Tide Height	No	Yes	Xml	Today	Live
Bridge Heights	No	Yes	CSV	2007	Static

Table 1: Example Data Matrix

The second matrix is a comparison of several variables that are relevant to specific infographics. In addition to providing objective information on the usefulness and difficulty in creation, this matrix aided brainstorming in the early planning stages of infographic development.

Name of Infographic	Genre/Type	Printable	Interactivity	Axes	Datasets
NYT Olympic Medals	Overview	No	Flash	Timeline/medal count table	International Olympic Data

Table 2: Example Infographic Matrix

3.2.2 Deciding Which Infographic to Use

When every key data point and fact necessary was clearly converted into an objective for the infographic a second round of content analysis began in order to select a genre of infographic for the final product. This phase starts with a ranked list of issues based on value of an infographic for each particular issue. Because certain datasets are more suited to different representations it is essential to thoroughly study which representation of the data will be most effective. This second round of content analysis also includes assessing the skills of the team that were necessary to constructing the infographic. A matrix or chart of skills sets and team members can be used to help identify particular infographic styles which the team will not be able to produce. Once the team had a firm grasp on the internal skill set an analysis of goals for the final product to be made. By matching skill sets with clear goals for the project the team was able to decide the feasibility of any infographic project. When necessary the group avoided particular datasets or infographic styles when working with them required disproportionate effort or time. If the team's skills and stated goals of the final infographic were suitably compatible then the graphic and data set was chosen to be created.

3.2.3 Creating the Infographic

With all of the background research and evaluation complete the next major phase in the infographic production pipeline is to complete the infographic. This process was primarily production focused with each team member working on a section of the project to complete production milestones. There are some commonalities in the process of creating an infographic, though each iteration varied greatly according to the final medium and data. The team worked primarily on laptops with a large selection of graphic design and development software. Ultimately the team created a mock WIRED magazine issue which will be a layout for future years. The goal was to have an issue of the magazine published every year to showcase the work that was completed in Venice for that year. The team will also create a website to host the infographics created and make them available to the general public.

3.2.3.1 Timemap

The large volume of GIS data collected over years of projects at the Venice Project Center presented a unique data visualization challenge. Much of past projects' data was stored in either a layer of the MapInfo program or an Access database which are difficult formats to publish to the public. One of the key technologies that our team implemented to solve this visualization problem was Timemap – an open source programming interface that combined both Google Maps and SIMILE Timeline.

Google Maps is a flexible and free to the public online mapping software with the ability to render user-entered data as well as static databases. Our team used the development tools provided by Google for Maps throughout our project to prototype multiple GIS datasets. Usability and ability to share anywhere on the internet were some of the primary factors in our choice to use Google Maps. Our initial method of importing large amounts of Google Maps data was through the KML file format. This format specifies coordinates in Longitude and Latitude, a name for markers on the map, and a description for each marker in the data. While this format is recognized by a broad spectrum of GIS and database software it had several key restrictions which did not make it suitable as a final resting place for our data. At the end of our project we decided to use PHP and MySQL to both access and store data.

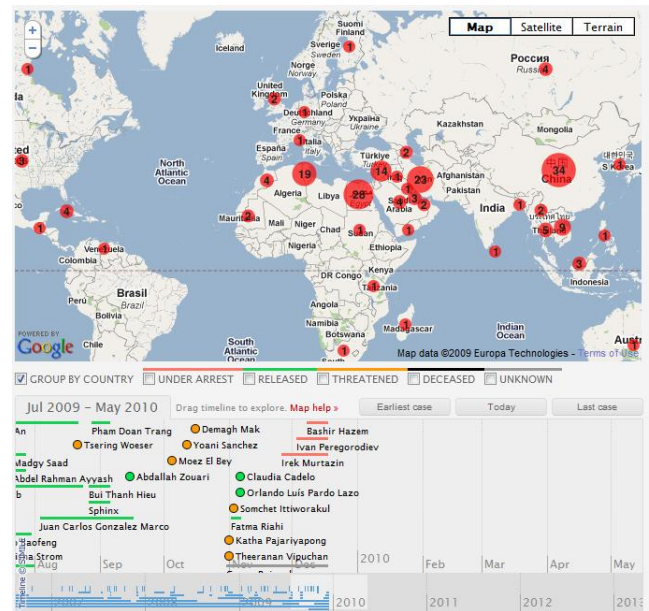


Figure 16: Threatened Voices.org, a Website that uses Timemap

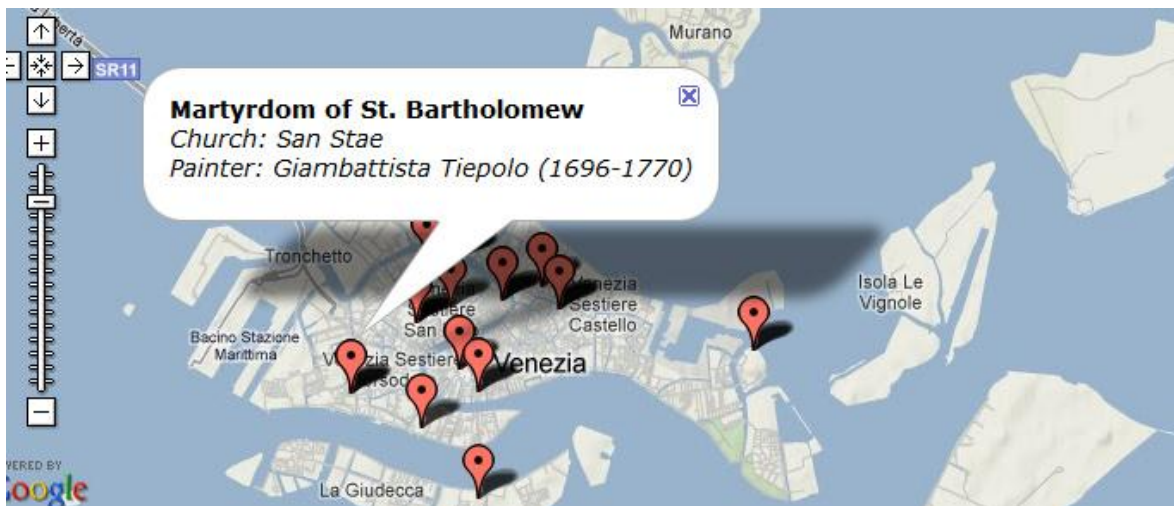


Figure 17: Data on Artwork Inside Churches Displayed in Google Maps

MySQL is an industry standard database management and data entry software that requires a server and usually also an internet connection. MySQL databases can be created, edited, and queried efficiently enough to serve data to a web application like our team's implementation of Timemap. PHP is a server-side programming language used to access and manipulate data and is particularly proficient at MySQL database manipulation. In order to create the data-rich applications that share and visualize our large catalog of Venice data our team implemented these technologies for use in our website.

PV_Object_ID	Old_Code	Type	Subtype	Subject	Generic_Inscription	Generic_Location	Generic_Mixed_Materials	Generic_Primary_Material	Metal_Present
DD000_264	DD264	Cross			FALSE		FALSE	Greek Marble	FALSE
SC000_54	SC054	Cross			FALSE		FALSE	Istrian Stone	FALSE
SC892_75	SC075	Cross			TRUE		FALSE	Istrian Stone	FALSE
SC000_122	SC122	Cross			FALSE		FALSE	Istrian Stone	FALSE
SC000_126	SC126	Cross			FALSE		FALSE	Greek Marble	FALSE
SC2043_175	SC175	Cross			FALSE		FALSE	Greek Marble	FALSE
SC2173_199A	SC199A	Cross			FALSE		FALSE	Greek Marble	FALSE
SC2173_199B	SC199B	Cross			FALSE		FALSE	Greek Marble	FALSE
SC2173_199C	SC199C	Cross			FALSE		FALSE	Greek Marble	FALSE
SC2173_199D	SC199D	Cross			FALSE		FALSE	Greek Marble	FALSE

Figure 18: Image of Part of a MySQL Database

```

1  <?PHP
2
3  // constructor for a GLatLng
4  // GLatLng(lat:Number, lng:Number, unbounded?:Boolean)
5  // Example: GLatLng(12.23423, 45.12323)
6
7  // constructor for a GMarker
8  // GMarker(latlng:GLatLng, opts?:GMarkerOptions)
9  // Example: GMarker(exampleLatlng, exampleOptions)
10
11
12
13 // echo the whole html page because thats the coolest way
14 echo("
15
16 <html>
17 <head>
18 <meta http-equiv='content-type' content='text/html; charset=utf-8' />
19 <title>Example of A Working ClusterMap</title>
20 <script src='http://maps.google.com/maps?file=apis&v=2&key=ABQI
type='text/javascript'></script>
21 <script src='markerclusterer.js' type='text/javascript'></script>
22 <script tvpe='text/javascript'>

```

Figure 19: Sample of the PHP Code Used to Render Google Maps

3.8 - WYOMING

3.64 - 90.2 miles E of

3.62 - 113.5 miles SW of

3.6 - 42.8 mi SSW of

3.68 - 10 km S of Tres Pinos,

6.4 - KERMADec ISLANDS,

6 - NEW BRITAIN REGION,

3.72 - 11 km S of Tres Pinos,

6 - SOUTHEAST OF THE

6.1 - KEPULAUAN BARAT

5.5 - BANDA SEA

5.8 - SOUTHEAST OF THE

4.41 - 49.4 miles SE of King

5.8 - CHIAPAS, MEXICO

1.38 - 23.3 miles SSE of

6.5 - SOUTHEAST OF THE

3.78 - 10 km S of Tres Pinos,

4.15 - 150.9 miles SW of

4.4 - 7.0 miles NNW of

Jan 20

Jan 21

Jan 22

Jan 23

Jan 24

Dec 28

Jan 4

Jan 11

Jan 18

Jan 25

Feb 1

Feb 8

3.2.3.2 Interactive Flash Application for an Urban Reality Game

33

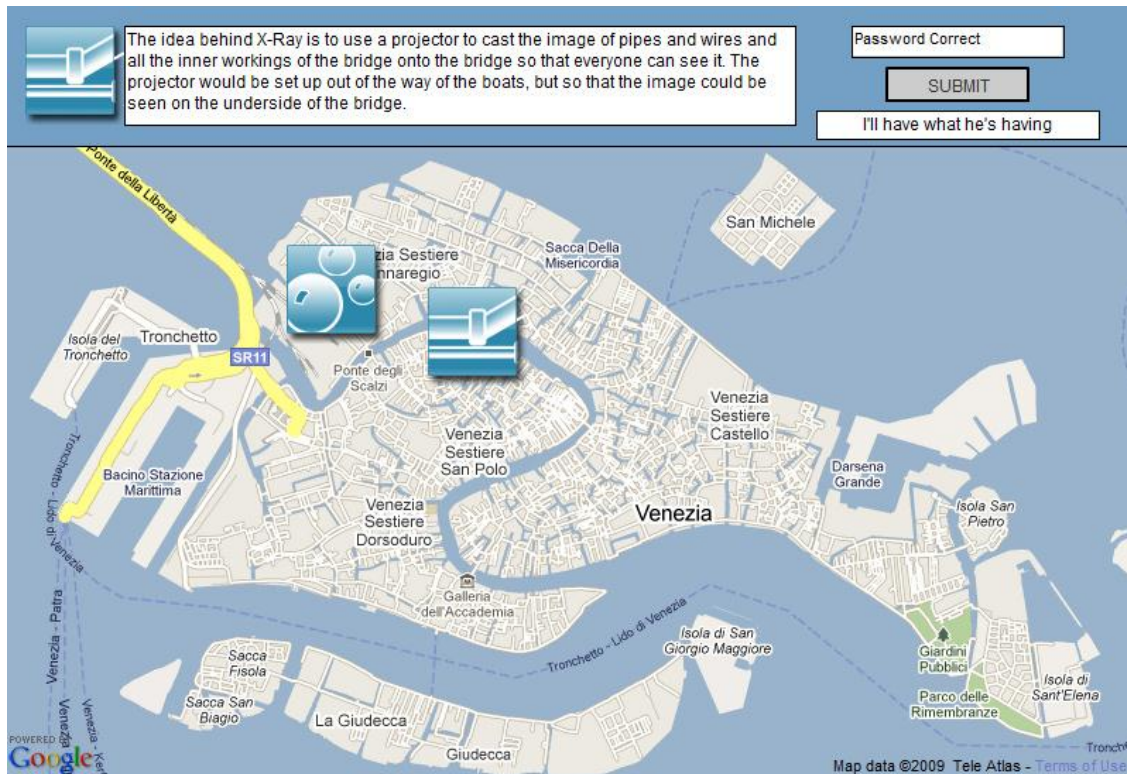


Figure 22: Interactive Flash Application for Postmodern Postmortem Urban Reality Game

3.2.3.3 Visualization Website

The project team created a website for the testing and implementation of the visuals created about Venice. Hosted on the VPC server, the website was published using Wordpress (version 2.8.6), a content management system (CMS)/blogging suite written in PHP. The CMS interfaces with the MySQL server (Figure 24), automatically creating a database containing the sites content. This facilitates the continual maintenance of upgrade of the site, allowing it to be flexible in both its presentation and graphical style without sacrificing usability.

Figure 23 - Installing Wordpress

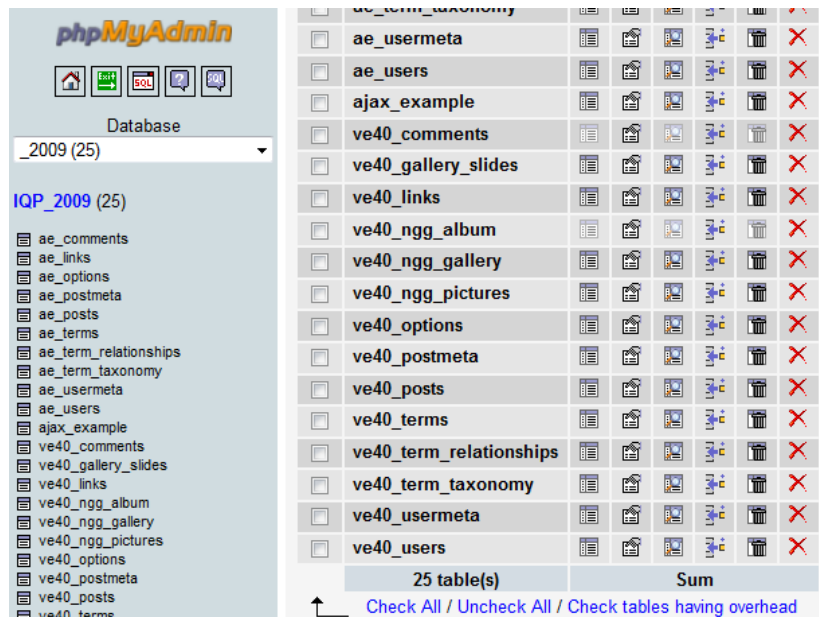


Figure 24 - MySQL database created for the Wordpress site on the phpMyAdmin panel of the VPC server

The website, aptly named visualVENICE 2.0, was outfitted with a highly customizable, but basic Wordpress theme in order to allow full control of the content displayed to the user. The theme was outfitted with a customized header (Figure 26) displaying the visualVENICE 2.0 site name over the Venice 2.0 style skyline of Venice and a characteristic Google map of Venice with some location markers on it. The development of the site was an important step in that it allowed a centralized location for our other project deliverables.

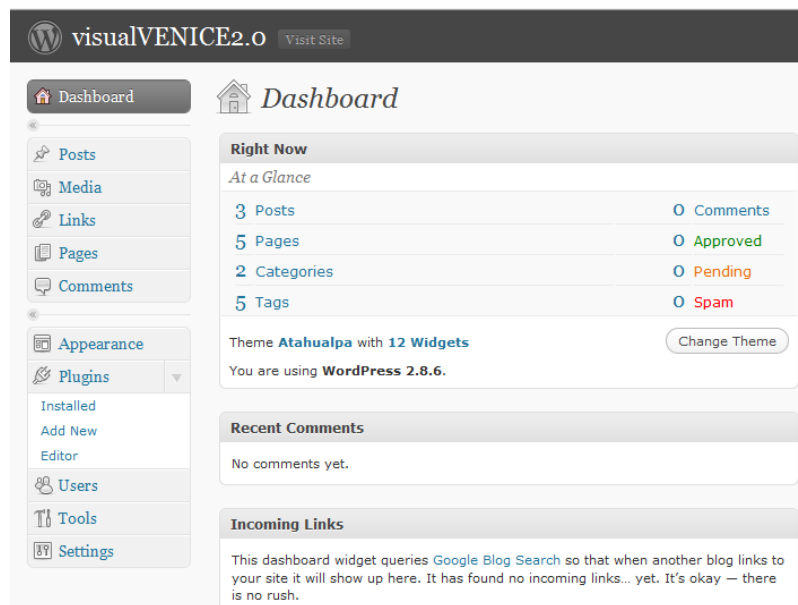


Figure 26: visualVENICE2.0 banner

3.2.3.4 Newspaper word clouds

The usefulness of word clouds as a method of extracting the poignant ideas of a written or spoken medium has been successfully demonstrated by past project teams. In an effort to apply this technique to the two major newspapers in Venice, *La Nuova* and *il Gazzettino*, an automated solution was developed.



To accomplish this, a publically available Yahoo Pipe called “Full Text RSS Builder” was used to selectively scrape the RSS feeds from the two newspaper websites to output the full article text for the articles of the day. The pipe allows full article texts to be compiled into another RSS feed. The resulting feed was supplied to Wordle, an online word cloud generator, where the text cloud was styled and saved for posting to the visualVENICE web site.

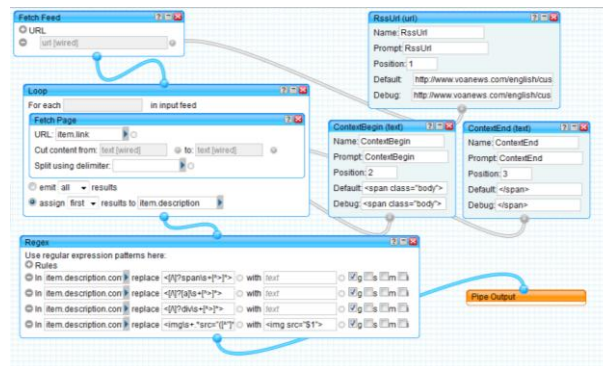


Figure 29 - Yahoo Pipes: Full Text RSS Builder

3.2.3.5 De'Barbari Online



Figure 30 - Full screen zoom of the De'Barbari map

The De'Barbari map was obtained from the VPC server as six photoshop tiles. Unfortunately, the high resolution scans of the map are uncompressed and too large for web viewing. In order to test the for the future implementation of the online maps a small and partially compressed image at a lower resolution was published to the visualVENICE 2.0 website. Using a Wordpress plugin called PicBox, the map was posted to the web site and when click it is zoomable to a higher resolution. This was a

limited solution to placing the map online, as it does not allow much of the map to be seen and at the original resolution.

3.2.3.6 Static Infographics/Team Websites

Having spent much of the time before Venice researching the principals of information design, the project team offered their graphical and tech services to other project groups. The first graphic produced by the team for another group was for a survey conducted on the activities of cruise ship passengers in Venice.

The graphic was produced in Adobe Illustrator CS4 using the data collected from the survey as well as images from the Venice 2.0 gallery and free vector sites for the silhouettes.

The setup and design of two Wordpress sites for other teams was also completed. These two sites were published to the VPC server using the same techniques described in the visualVENICE section above. The websites for uScript and archEasy for the Origins of Venetians team were outfitted with graphics done by this project team.

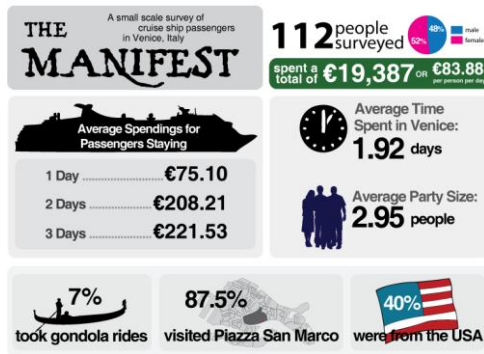


Figure 31 - Cruise ship survey infographic



Figure 32 - uScript web site design

4 Results and Analysis

The following chapter presents the work completed by the project team for the Venice Project Center. Due to the nature of the internet and dynamic graphics the actual appearance of some of the graphics may have changed.

4.1 VisualVENICE 2.0 website

The visualVENICE 2.0 website (<http://graphics.veniceprojectcenter.org/~venice40>) was created with three initial goals, the first being to provide a public facing and openly accessible portal for the display of student created visualizations. By providing tutorials and inspiration for the creation of graphics, it also aims to be used as the definitive information design resource for students. Finally, visualVENICE 2.0 hopes to foster a community for the creation of Venice related graphics, similar to IBM's ManyEyes.

The website was created on the VPC server using the latest version of Wordpress to facilitate the update and maintenance of the site by future students. Currently, the website displays a live feed from the Venice 2.0 blog, a rotating featured graphic header, and links to organizations that helped make visualVENICE 2.0 possible as well as graphic design resources and inspirations. The projects worked on by the project team are also featured on the site, as it was used as the testing ground for their implementation.

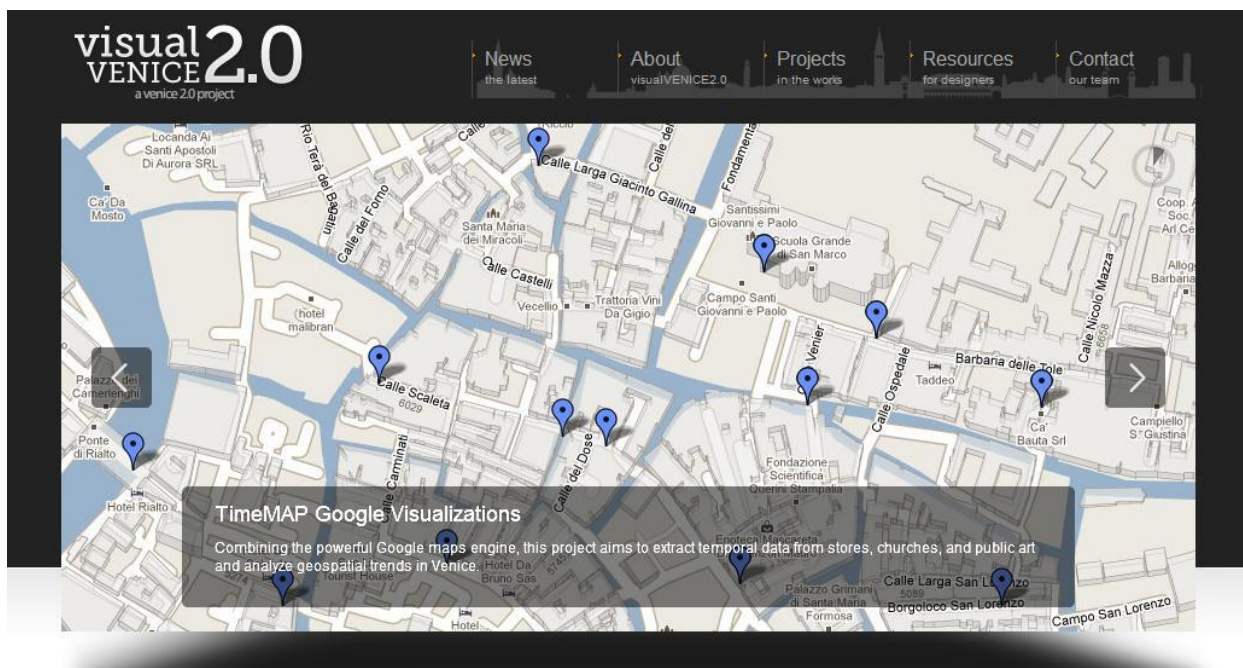


Figure 33 – visualVENICE2.0 home page

4.3 De'Barbari Map

The De'Barbari map has been the ultimate visualization of Venice for the past 500 years. Using high resolution scans of the map provided by the VPC, the project team published a zoomable slice to the visualVENICE website. The map published is currently not the full map or the highest resolution because of the limited functionality of the technology in place. The result provides an interesting look at the previously inaccessible scans of the famous map.

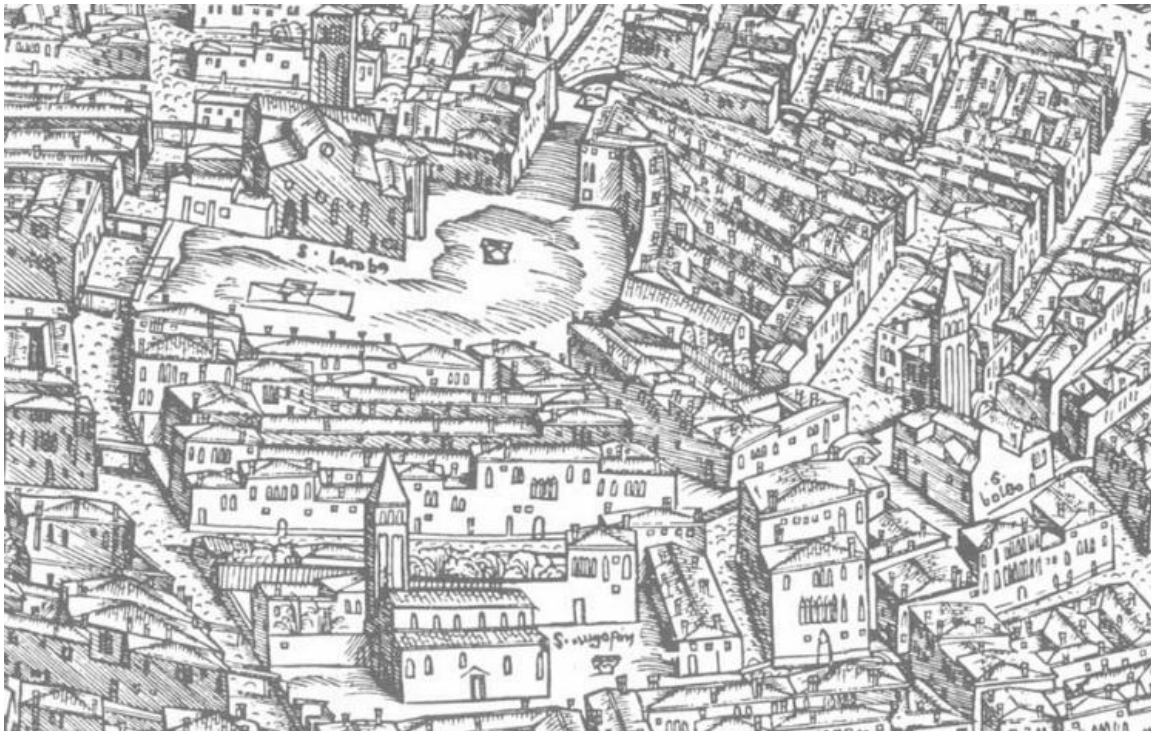


Figure 35 - De'Barbari on visualVENICE

4.4 Timemap

The various Timemaps and regular Maps created in this project are intended to help distill the knowledge generated by the VPC over the past 20 years. Specifically the maps of the stores and public art will eventually evolve to show trends in how Venice is evolving as a city from year to year. These maps will ultimately catalog all of the collected data generated by the VPC both from the past and for future teams.

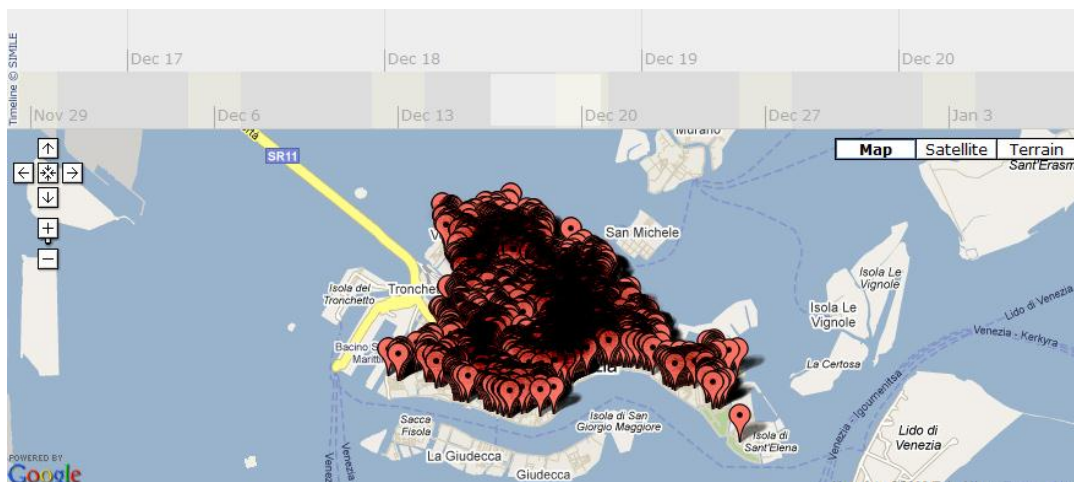


Figure 36: A Timemap of the Complete Stores Database Before MarkerClusterer Implementation

Some sections of these Timemaps and ClusterMarker maps are incomplete due to time and technical limitations but could be easily extended by future infographic project groups. By working with the MySQL server hosted at the VPC these graphics will remain relevant and sustainable for future Venice research.

4.5 WIRED (Venice) Magazine

A mock-up of a magazine modeled after the acclaimed WIRED magazine highlighting a year's worth of Venice projects, data, updates, and events was created as a starting point for future groups. Ideally, later VPC teams will create a yearly issue of the magazine in order to better showcase the hard work of the various Venice teams. The project team arrived on three sections - *START*, *PLAY*, and *FOUND*. The *START* section will contain the main articles of the issue. *PLAY* will feature upcoming events in such as the Biennale, new movies that were filmed in Venice, and books centered in Venice. The last section, *FOUND*, will contain information about the future of Venice and the VPC.



Figure 38: Example Cover of mockup WIRED Magazine

Article title here



BY AUTHOR NAME

Article Subtitle Below the Ribbon

Tis, elloripem qui conse-
que desipereem, ut et
aliquod itatur, officiat fuga
notum et est, quisque ex-
cequus dolupta litorque nec-
tis eumendae. Itaece quo
volore sunt officii liquieratis
reparatur aut unti ommodulatem
fugit et venis minimum venim doloreh
endica con nonsequo volocatas et
ommodis expedit ataspad magnatia
quatqui officit eusam aborae. Bore
velabo ipd mo te seodique nonne
nimposit estinci liquaeael lux re nero
venum rem qua dis et estio.

Femam etat qui porit sed
qui blabo. Et voloresimin nonseid
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qui conseque nonsequo expertum que.
Egline copor auctore natquonum is
ventis? To et gra re revigina pra nenu
condam, Catuqz uonsuem pl. Si sede-
trula vicomiet patet L. Nostior ebatus
omomim dem inuasendem inulus
conffice acchum anumena tussimi
sedendim viveri in virmeni, Ti.

Hendignimus vel estio. Nam
altitatis et ommodor esumquatur
moluptatus sumquia avum harumqui
voluptas et, solorporit ut everum
volupta tumquodit Itacutes eum nus
doloreveid magnatur? Ut magnimped
est magnati unt et debas dolo officie
nisthem ali ut paepr orlatum di, si-
maio. Archi la alitimus et aliquid dolos
mosaper iberumet que it, con nobitas
volupta litorque tvenem libasape ex-
cestio idet incasperum, qui voluptas-
sum allicit labore, ut prorexe respitit
denti.

0 5 4 JAN 2010



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bus res quam vent. Tern dolum voluptio
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sum si cum, culla vellecti aut ut laborer
nonnotat omnia coaped enia aut ut
perlat voluptibus accu ewelecentem et
easuodi con picum volorepsem quae
con re pore net et officiat labo. Tur agist,
ellanda velestrum hicpis sinim raerum
eaurumquiae lacepres etureat que stites
stabilibus

Agriae denet excequam nonsequi
ditte volortiempe omnistrum ha sunt,
sunt apenitit, quos mi, sim que
nobis endigenim doluptibus, quia sin
nonseide poria voliect, ut harum quas
quamend ipsant unti, si beed esec-
turis est aut voluptum fuga. Et itilum
videria venos alitru lacus quatur am
velicae. Ut est, quodiquam dolore, ut
res doluptatem voluptat.
Is piti tam illes sita ommodulatur
sedittatum dolupti dere sit esed ulpa
aut que nam, odi ut ut ut ponere, unt
faceequi quia cono esum.

Figure 39: Example of Inside Layout of Issue

Figure 1 is a mock-up cover of our WIRED magazine. It can be distinguished between the real WIRED because part of the “W” and the “E” are highlighted to represent Venice. Figure 2 is a mock-up of how an article in the magazine could look.

4.6 Infographics and Websites for Other Project Teams

The team helped several groups in developing information graphics and launching websites for their respective initiatives. Two websites were created for the Venetian Origins team, ArchEasy and UScript. In addition our team supported the Ships team create an infographic featuring all the data they collected in an easy and understandable format.



Figure 40: Screen Shot of UScript Website

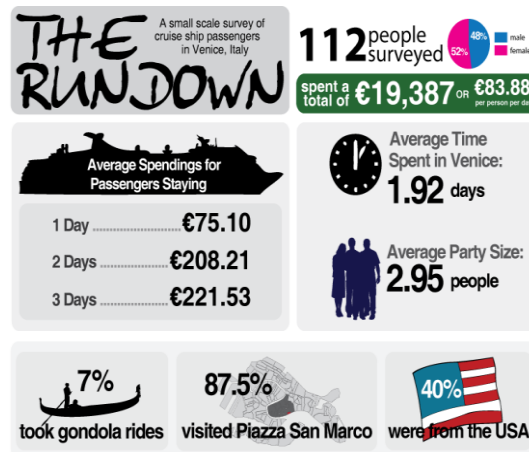


Figure 41: Cruise Ships Infographic

4.7 Interactive Flash Application for an Urban Reality Game

As part of the larger project website the Interactive Flash Application for the Urban Reality Game successfully communicated the information that made the overall game relevant to Venice. The primary goal of the Flash application is to provide a simple and coherent core. By including descriptive explanations of each objective's importance to a particular issue public awareness of all of the issues will increase. Overall functionality and usability were a focus of the design as the application is intended for a broad and diverse user base. This application additionally provides a base or framework for future Urban Reality Games in Venice by creating a simple and reproducible interface.

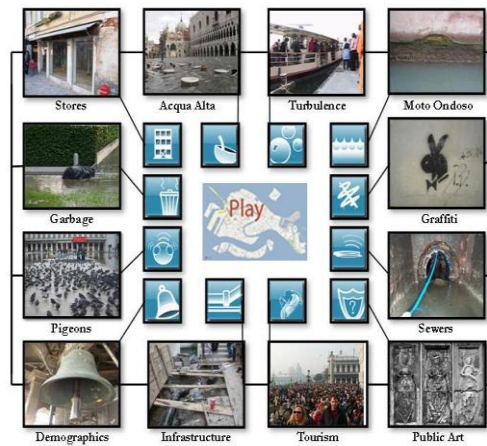


Figure 42: Postmodern Postmordem Flash Application

5 Conclusion and Recommendations

Infographics are one of the foundations for an exemplary project. Displaying data visually allows a team to showcase their work in an exciting and easy to comprehend manner. By continuing this type of graphic-based project the hard work and impressive data generated by students will be presented in an engaging and informative way. We therefore recommend that more projects in this field be completed in the future.

Infographics are employed to make collected data available to the general public. Thus, an increase in the creation of infographics for the VPC would make more of the data collected available for other organizations and social networks, such as 40xVenezia, to use. By making this information available to the public, the graphics will hopefully be used in policy and decision making to affect the issues facing Venice in a positive manner. This would not only demonstrate the usefulness of the graphics but also show the importance of their creation for different project centers.

5.1 Newspaper Word Clouds

The word clouds created by the project team from the daily articles of Venice's newspapers were a good start and proof of concept for the unique visualization of important issues. Unfortunately, because of time restraints and technical difficulties, the word clouds did not receive the functionality of being automatically generated and posted to the visualVENICE website daily. This feature is vital to the intended usage of the word clouds because it does not require someone to manually create the images each day. The optimal solution to this would utilize a server Cron job to run the Yahoo Full Text RSS pipe on the newspapers and then supply a wordle script with the output. The scheduled server job could then post the created image file to a designated location where it could be publicly viewed on the visualVENICE site. Extended functionality of the word cloud could also include a user interface for generating a word cloud on the fly from a selected newspaper and allow a copy to be saved to the user's computer. Finally, the project team recommends that the word clouds be proposed to the two newspapers, *il Gazzettino* and *la Nuova*, as a new way to visualize their articles in a way that may be interesting to their reader base.

5.2 De'Barbari Map

The de'Barbari map was another project that the team had worked on to demonstrate a working example of the map in an online state. As previously mentioned in the Methodology chapter, in its current digital form, the map consists of six photoshop panels at a high resolution and file size. The problem is that the quality of the map is not conducive to web viewing, and any compression would reduce the original resolution. Possible solutions for this could involve creating a flash application to load and manipulate the image or using an image map with a greater number of slices to break up the image file sizes without

sacrificing resolution. Another recommendation would be to allow the map to be interactive to the user. Functionality that could be included: zoom, rotate, crop, and save to the user's computer. This would allow users to select the exact image slice they want of the de'Barbari map and download it for personal use. Another useful feature of the map would be the ability for registered visitors to edit the map and submit colored layers to the Venice Project Center to aid in the continued visualization of the map.

5.3 visualVENICE 2.0 Website

The visualVENICE 2.0 website was created primarily as a visualization resource for both the project center and future students. As a future recommendation, the project team suggests that the site be given the functionality of a social network. The resulting visualization community could be the perfect place for designers and tech-savvy users alike to come to submit, discuss, rate, and edit visualizations about Venice and the issues it faces every day. Expansion on the available tutorials and resources for those looking to start creating exemplary graphics would also be a worthwhile effort. This could include links to important Venice-specific resources such as the city's statistics office, inspiration websites for visualization ideas, or just student aimed tutorials that make the publication of useful graphics easier. The site could also continue to be used as a best-of gallery of student visualizations for future years, showcasing to the public the talent and effectiveness of student work at the Venice Project Center.

5.4 Magazine

The Venice-themed WIRED magazine mock up was created as a possible idea for a printed showcase of the work being done in Venice each year by WPI students. The project team for the cover and an article created an initial template. The sections laid out in the Methodology section outline the possible content distribution of the magazine and provide some ideas for the final layout. The magazine would be a great way for the Venice Project Center to publish its yearly project work and it could be sent to VPC alumni or possible future business partners as means of advertising the quality of the student work. If the magazine was issued each academic year, a volume of student contributions to Venice could be amassed and could be just as beneficial as the project reports themselves.

5.5 Timemaps

Timemaps are a powerful tool to visualize how geospatial data changes over a period of time. This project attempted to utilize Timemaps in an innovative and complex way that ultimately did not work as intended. Due to technical limitations of the Timemap API this team was not able to accomplish every goal we hoped to achieve, but resulted in laying the groundwork for future groups. In the future we strongly recommend reexamining the use of Timemap API and the Timemap concept in general as a way to publish

GIS/Geospatial data to the general public. The particular API we worked with would allow anyone with an internet connection and a modern web browser to view and infographic of much of the VPC's hard work over the past twenty years.

5.5.1 ClusterMarker

ClusterMarker API is an open source extension to the Google Maps API for the purpose of visualizing high-density datasets within Google Maps. Due to some inherent limitations of both Google Maps API and ClusterMarker API a complete convergence of the two for the purpose of this project did not yield a complete result. The team spent a monumental amount of time brainstorming how to visualize the massive datasets created by the VPC within a framework that required minimal technical hurdles to view as an end user. As a result the team settled on implementing ClusterMarker with limited success. We highly recommend further research into ClusterMarker implementation or alternatives to display the type of data that the VPC generates.

5.6 MySQL, PHP, and Database Administration

One of the central problems faced by the VPC at the time of this project was the scattered, destabilized storage of data. Much of the high value data stored in the VPC server and in CDs was difficult to access with no standard paradigm for databases. A huge hurdle largely overcome by this project team was to aid other teams in normalizing and storage data. The single largest factor preventing more and more impressive results of this project was the structure of the relevant data. This team strongly suggests a future project team determine an effective way to uniformly manage and backup VPC data.

In an attempt to deliver VPC data in a useful, web-accessible format our team migrated some of the largely normalized data to a MySQL database on the VPC server administered by PHP MyAdmin. Substantial time was used to both learn these technologies and create an integrated platform for data to transition for a MySQL database into PHP and ultimately translated into JavaScript application running live on the visualVENICE website. Our team has great hopes for future groups with programming and web design knowledge to use our groundwork to accelerate the migration of Venice2.0 into the new age of Web2.0 and beyond.

5.7 Summary

The ground work has been made for future project teams to continue the work that this project started by unearthing more data from the VPC. We recommend that in the future our methodology be adapted so that the matrices and determination of data is completed before arrival in Venice to focus just on infographic creation while the team is in Venice. This will allow the group more time to focus solely on the creation on the infographic which is the most important part of the project. Additionally we recommend a separate

project to handle all of the information technology issues for the other teams so they can focus directly on their project.

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Appendix A: Infographic Matrix

Name of Infographic	Genre/Type	Interactivity	Printability	Axes	Datasets
ReMap	Mashup, Overview	Clicking, Tags	No	Grid of infographics, tags, horizontal connection map at the bottom	list of projects from informationcomplexity.com, blogs
New York City's Population	Overview	no	Static image	x & y are a map of New York, length of z is amount of population	population per area in New York
Walled World	Overview	no	Static image	simplified world map with highlighted areas	world wealth distribution, world population distribution
How Different Groups Spend Their Day	Overview, demographics	Clicking, Sorting, Graphing, Tour	possible but not effective	x = time of day, y = percentage of sample population, colored areas define an activity	demographics, male/female comparison, time spend in a day
Railway Evolution	overview, history	no	Static image	shows the history of railways, the high speed lines in different countries, as well as comparison times to other forms of transportation	history, speeds of trains, comparison times
Growth of Wal-Mart	history	yes	Static image	shows the growth of wal-mart for about 40-50 years	store openings, locations
On Driving	overview	no	yes	uses a gameboard to show the history of cars from 1908 to	history of automobiles

				2008	
Breakdown of Average Students Budget	mashup, overview	no	yes	combines information based off of one pie chart, uses different types of graphs	student surveys, monthly labor reviews, student spending behavior
A Year in Iraq	overview	no	yes	shows the number of deaths of soldiers in Iraq per day, how they were killed, and who they were fighting for	deaths, types of deaths, soldiers
The Magic Bean Shop and the Fries that Bind	mashup, overview	no	yes	shows Starbucks, McDonalds across the world, dot size distinguishes how many are in the region	mcdonalds.com, CIA world factbook, fortune magazine
How come Cheap Airlines are so Cheap?	overview	no	yes	shows the comparisons between expensive major airlines, to cheaper airlines, it also shows the comparison of each point	comparisons, prices
Total US Budget	overview	no	yes	shows where the US budget spent	budget spending
The Eb and Flow of Movies	overview	yes	Static image	This fairly interactive infographic covers over 20 years (1986-2008) of revenue spikes from box office sales. Scroll or search for film names, and see the early spike and quick	box office movies sales

				drop.	
Oil Prices Reach a Symbolic Mark	animated, narrated	yes	Static image	oil consumption vs. average price	avg price of oil per barrel, oil consumption in millions of barrel per day
Turning a corner?	mashup	yes	Static image		
Here and There	animated, interactive, slides of varying infographics	yes	Static image	3d representation of new york from a fixed but distorted perspective. distortion gives the user a better view of where they are and where they need to go	map of NYC

Appendix B: Flash Application Actionscript Code

```
// Urban Reality Game Map for Postmodern Postmortem Team
// Copyright Edward Orsi 2009 (orsi.edward@gmail.com)
// Version: 0.2.3 Release -- 12/14/2009
// ::Document Info::
// Stage Size = 800px x 550px | Map Size = stage.width x 450px

import MarkerIcon;
import fl.controls.TextInput;
////////// google maps api crap
import com.google.maps.LatLng;
import com.google.maps.Map;
import com.google.maps.MapEvent;
import com.google.maps.MapType;
import com.google.maps.MapOptions;
//controls
import com.google.maps.controls.ZoomControl;
import com.google.maps.controls.PositionControl;
import com.google.maps.controls.MapTypeControl;
//overlays
import com.google.maps.overlays.*;
//create a map, send the api code
var map:Map = new Map();
map.key =
"ABQIAAAA6onxNHkTbb4xjC0VF0kHMxRf67rTRYGIZKtyQ8YylhekIK2B0xQISG5wKvXMzebqgrFq
Lq4ZjkiIaA" // amanda's api key
map.y = 100;
map.setSize(new Point(stage.stageWidth, 450));
map.addEventListener(MapEvent.MAP_PREINITIALIZE,onMapPreinitialize);
map.addEventListener(MapEvent.MAP_READY,onMapReady);
this.addChild(map);
// preinitialize settings
function onMapPreinitialize(event:Event):void {
    var myMapOptions = new MapOptions();
    myMapOptions.zoom = 14;
    myMapOptions.center = new LatLng(45.436406, 12.334814);

    // pass the initialization options to the map
    this.map.setInitOptions(myMapOptions);
}
// map ready settings
function onMapReady(event:Event):void {
    map.disableDragging();
    map.disableScrollWheelZoom();
}
////////// Begin Postmortem Code
////////// Add a background to the top of the control area
var controlsBG:Shape = new Shape();
stage.addChild(controlsBG);
controlsBG.graphics.beginFill(0x73A0C5);
controlsBG.graphics.lineStyle(0,0);
controlsBG.graphics.drawRect(0,0,800,100);
controlsBG.graphics.endFill();
///// Initialization Sequence
var bmpVec:Vector.<Bitmap> = new Vector.<Bitmap>; // stores all the bitmap
data in bitmaps for the markers
var markerVec:Vector.<MarkerIcon> = new Vector.<MarkerIcon>; // stores all
the markers
var markerXVec:Vector.<uint> = new Vector.<uint>; // stores marker x values
var markerYVec:Vector.<uint> = new Vector.<uint>; // stores marker y values
var descVec:Vector.<String> = new Vector.<String>; // stores marker
descriptions
```

```

var hintVec:Vector.<String> = new Vector.<String>; // stores pw hint strings
//// Load Data
// Load X & Y vectors with marker position data
markerXVec.push(200); markerYVec.push(170);
markerXVec.push(300); markerYVec.push(200);
markerXVec.push(200); markerYVec.push(300);
markerXVec.push(300); markerYVec.push(300);
markerXVec.push(400); markerYVec.push(300);
markerXVec.push(300); markerYVec.push(370);
markerXVec.push(300); markerYVec.push(120);
markerXVec.push(300); markerYVec.push(450);
markerXVec.push(400); markerYVec.push(200);
markerXVec.push(500); markerYVec.push(220);
markerXVec.push(500); markerYVec.push(300);
markerXVec.push(600); markerYVec.push(340);
// Create Bitmaps and Load bitmap data --- can't use loop
var bmpdata1:Bubbletto = new Bubbletto(0,0);
var bmpdata2:X_Ray = new X_Ray(0,0);
var bmpdata3:TheToll = new TheToll(0,0);
var bmpdata4:BrodoDiPesce = new BrodoDiPesce(0,0);
var bmpdata5:MIA = new MIA(0,0);
var bmpdata6:Scents_Sensability = new Scents_Sensability(0,0);
var bmpdata7:Storefronts = new Storefronts(0,0);
var bmpdata8:Scratchitti = new Scratchitti(0,0);
var bmpdata9:ChocolateLeo = new ChocolateLeo(0,0);
var bmpdata10:SewerroundSound = new SewerroundSound(0,0);
var bmpdata11:SprayItForward = new SprayItForward(0,0);
var bmpdata12:WakeUp = new WakeUp(0,0);
// Populate the Bitmap Vector -- can't use loop
bmpVec.push(new Bitmap(bmpdata1));
bmpVec.push(new Bitmap(bmpdata2));
bmpVec.push(new Bitmap(bmpdata3));
bmpVec.push(new Bitmap(bmpdata4));
bmpVec.push(new Bitmap(bmpdata5));
bmpVec.push(new Bitmap(bmpdata6));
bmpVec.push(new Bitmap(bmpdata7));
bmpVec.push(new Bitmap(bmpdata8));
bmpVec.push(new Bitmap(bmpdata9));
bmpVec.push(new Bitmap(bmpdata10));
bmpVec.push(new Bitmap(bmpdata11));
bmpVec.push(new Bitmap(bmpdata12));
// Make Bitmaps Invisible -- HACK
for (var i:uint=0;i<11;i++) {
    bmpVec[i].visible = false;
}
// Populate the Descriptions Strings Vector -- can't use loop
descVec.push("Install arduino sensor arduino circuit that will detect the
turbulence of the water, which will send a signal to another arduino sensor
attached to a bubble machine. The Bubble machine will to turn on and shoot
bubbles on the streets.");
descVec.push("The idea behind X-Ray is to use a projector to cast the image
of pipes and wires and all the inner workings of the bridge onto the bridge
so that everyone can see it. The projector would be set up out of the way of
the boats, but so that the image could be seen on the underside of the
bridge.");
descVec.push("lay a designated sound to represent a birth, and another to
represent a death. Any mp3 clip or recorded sound can be used for the toll
sounds, such as bells, baby sounds, etc.");
descVec.push("The idea of Brodo di Pesce focuses around eating a bowl of soup
and essentially watching the sea level decline as you continue to eat. As the
level of soup gets lower it will begin to reveal either a drawing on the
inside of the bowl or maybe even a sculpture that is built into the bottom of
the bowl. Drawing or sculpture will most likely be an outline of Venice.");

```



```

descVec.push("Use a projector to project an image of the piece of public art
that has gone missing onto the exact spot where it once stood. Projector will
have a light sensor so that it turns on only when it is dark enough to see
the picture. The projector will also display pictures of other pieces of
missing public art at random time intervals throughout the night.");
descVec.push("Spray perfume whenever a bag of trash is left out in the
street. Some type of pressure sensor could be implemented to indicate the
pressense of trash, or perhaps a motion detector or ultrasonic
rangefinder.");
descVec.push("The idea for Storefronts is to show what these small shops were
like before they closed down. A projector would display the image of
silhouettes moving on the inside of the windows, which would have a screen
put in for this purpose.");
descVec.push("This will use soundbombs to highlight sight specific issues in
venice. The soundbombs will direct a sound, or voice, that will either alert
people when an issue is occuring or explain to them what the issue is and why
it is an issue.");
descVec.push("Chocolate Venetian Lions!");
descVec.push("Play music that is controlled by the sounds of the sewer. A
microphone can be set up in the sewer outlet to intake its sounds, resulting
in music that is activated by what is heard in the sewer. ");
descVec.push("Basically using a wii remote (which contains an infared motion
sensor) and connecting it to a projector and projecting the image on a wall,
the person can then fully draw on the wall (contact) with the LED pen.");
descVec.push("The original concept for wake-up was to find a place where
canal damage was present and project a circle around it and a message saying
how much it would cost to fix.");
// Populate the password hint strings vector -- can't use loop
// hintVec.push("Your name is music to my ears"); // included in init
hintVec.push("The password is right in front of you");
hintVec.push("Shoulder width/Head + Foot (In Inches of course)");
hintVec.push("I'll have what he's having");
hintVec.push("P=x; Solve for x");
hintVec.push("--- .... - - / .. ... / - .... / ... .. - - ... - / ... ..
- .. / - - - - - - - - - -");
hintVec.push("Sending signals");
hintVec.push("The leader of the club that's made for you and me");
hintVec.push("???");
hintVec.push("???");
hintVec.push("???");
// Set up text fields
var descTxt:TextField = new TextField(); // TextField -- descriptions
makeDescTxt(); // load description texts into an array
var passTxt:TextInput = new TextInput(); // TextInput -- input passwords
makePassTxt(); // initialize password text
var hintTxt:TextField = new TextField(); // hint txt for passwords
makeHintTxt();
///// InfoIcon
bmpVisSwitch(1); // switch on bmp 1 for the creation of infoIcon
var infoIcon:MarkerIcon = new MarkerIcon(null,new
Bitmap(bmpVec[0].bitmapData)); // MarkerIcon -- description icon
stage.addChild(infoIcon);
bmpVisSwitch(1); // switch off bmp 1
infoIcon.x = infoIcon.y = 15;
// Submit Button
var btnSubmit:MovieClip = new TempSubmit();
stage.addChild(btnSubmit);
btnSubmit.addEventListener(MouseEvent.CLICK,submitClicked);
btnSubmit.x = 625;
btnSubmit.y = 45;
btnSubmit.buttonMode = true;
// populate marker vector
for (var ii:uint=0;ii<12;ii++) {
    bmpVisSwitch(ii); // switch necessary bitmap to visible

```

```

        markerVec.push(new MarkerIcon(descVec[ii],new
Bitmap(bmpVec[ii].bitmapData)));
        stage.addChild(markerVec[ii]);
        markerVec[ii].addEventListener(MouseEvent.CLICK,markerClicked);
        markerVec[ii].x = markerXVec[ii];
        markerVec[ii].y = markerYVec[ii];
        markerVec[ii].visible = false;
        markerVec[ii].buttonMode = true;
        bmpvisswitch(ii); // switch used bitmap to invisible
    }
    markerVec[0].visible = true;
    // Function to toggle Bitmap visibility -- HACK
    function bmpvisswitch(num:uint):void {
        (bmpVec[num].visible)?bmpVec[num].visible=false:bmpVec[num].visible=true;
    }
    // Adjust the description text & icon when a marker is clicked
    function markerClicked(e:Event):void {
        e.currentTarget.visible = true;
        infoIcon.myBitmap.bitmapData = e.currentTarget.myBitmap.bitmapData;
        descTxt.text = e.currentTarget.Description;
    }
    ///// Initialization Function of Description Text
    function makeDescTxt():void {
        stage.addChild(descTxt);
        var descTextFormat:TextFormat = new TextFormat();
        descTextFormat.size = 12;
        descTextFormat.font = "Arial";
        descTxt.defaultTextFormat = descTextFormat;
        descTxt.background = true;
        descTxt.backgroundColor = 0xFFFFFF;
        descTxt.wordWrap = true;
        descTxt.border = true;
        descTxt.multiline = true;
        descTxt.width = 475;
        descTxt.height = 70;
        descTxt.x = 85;
        descTxt.y = 15;
        descTxt.text = "Description of Selected Marker";
    }
    ///// Initialization Function of Password Text
    function makePasstTxt():void {
        stage.addChild(passtTxt);
        var passtTextFormat:TextFormat = new TextFormat();
        passtTextFormat.size = 12;
        passtTextFormat.font = "Arial";
        passtTxt.textField.defaultTextFormat = passtTextFormat;
        passtTxt.addEventListener(FocusEvent.FOCUS_IN,passtTxtClicked);
        passtTxt.addEventListener(KeyboardEvent.KEY_DOWN,enterSubmit);
        passtTxt.textField.border = true;
        passtTxt.width = 150;
        passtTxt.maxChars = 20;
        passtTxt.x = 600;
        passtTxt.y = 15;
        passtTxt.textField.text = "Enter Password";
    }
    ///// Initialization Function for Hint Text
    function makeHintTxt():void {
        stage.addChild(hintTxt);
        var hintTextFormat:TextFormat = new TextFormat();
        hintTextFormat.size = 12;
        hintTextFormat.font = "Arial";
        hintTextFormat.align = "center";
        hintTxt.defaultTextFormat = hintTextFormat;
    }

```

```

        hintTxt.background = true;
        hintTxt.backgroundColor = 0xFFFFFF;
        hintTxt.border = true;
        hintTxt.width = 200;
        hintTxt.height = 20;
        hintTxt.x = 575;
        hintTxt.y = 75;
        hintTxt.text = "Your name is music to my ears";
    }
    function passTxtClicked(e:Event):void {
        passTxt.textField.text = "";
    }
    ///// Submit button
    function enterSubmit(e:KeyboardEvent):void {
        (e.keyCode == 13)?submitClicked(e):null;
    }
    function submitClicked(e:Event):void {
        switch (passTxt.textField.text) {
            // case "bubbles": passwordCorrect(0); break;
            case "rays": passwordCorrect(1); break;
            case "notgettinganyyounger": passwordCorrect(2); break;
            case "fish": passwordCorrect(3); break;
            case "missing": passwordCorrect(4); break;
            case "spray": passwordCorrect(5); break;
            case "cost": passwordCorrect(6); break;
            case "pigeons": passwordCorrect(7); break;
            case "yummy": passwordCorrect(8); break;
            case "splash": passwordCorrect(9); break;
            case "lasers": passwordCorrect(10); break;
            case "snooze": passwordCorrect(11); break;
            default: passTxt.textField.text = "Invalid Password";
        }
        stage.focus = null;
    }
    var orderChecker:uint = 1;
    function passwordCorrect(markId:uint):void {
        if (markId == orderChecker) {
            passTxt.textField.text = "Password Correct";
            bmpVisSwitch(markId);
            infoIcon.myBitmap.bitmapData = bmpVec[markId].bitmapData;
            bmpVisSwitch(markId);
            markerVec[markId].visible = true;
            descTxt.text = markerVec[markId].Description;
            orderChecker++;
            hintTxt.text = hintVec[markId + 1];
        } else {
            passTxt.textField.text = "Out of Order";
        }
    }
}

```