

MUSEUM+VIS

Process Book

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Overview + Motivation

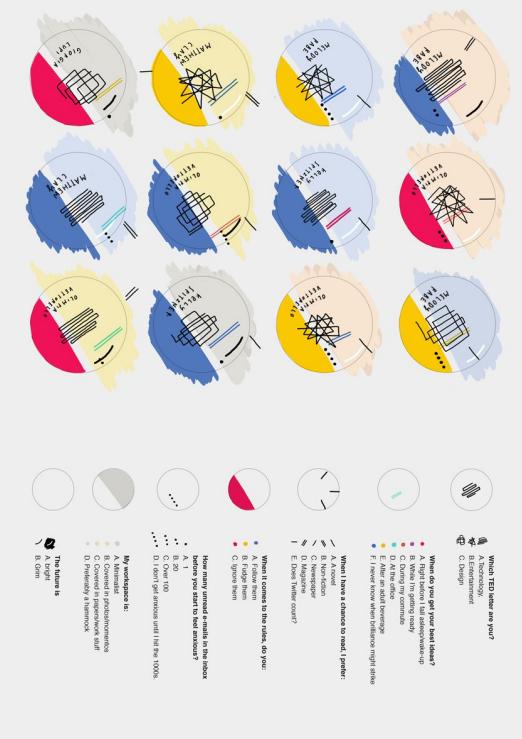
How prolific are museums in America? Are there trends in the artwork that they acquire? Is there anything interesting about the provenance of artwork? Our initial interest was sparked by the opacity of museums: the images we see at a museum only represent a small portion of the museums' collection. Our project is an attempt to unveil the museum and paint a picture, pun intended.



Frame vector created by vectorpouch, obtained from Freepik.com

Related Work

Anything that inspired you, such as a paper, a website, visualizations we discussed in class, etc.

 <p>Data Portraits</p> <p>Commonly used by the self-proclaimed data humanist, Georgia Lupi, data portraits are an illustrative method of conveying differences across entities that share similar attributes. While not the most precise data visualization, it is an artistic and interesting way to portray differences and similarities within a population.</p>	<p>Narrative Visualization: Telling Stories with Data</p> <p>Edward Segel and Jeffrey Heer</p> <p>Abstract—Data visualization is regularly promoted for its ability to reveal stories within data, yet these “data stories” differ in important ways from traditional forms of storytelling. Storytellers, especially online journalists, have increasingly been integrating visualizations into their narratives, in some cases allowing the visualization to function in place of a written story. In this paper, we systematically analyze these design choices and the resulting narrative experiences. We introduce a framework for analyzing narrative visualization, and we identify distinct genres of narrative visualization. We characterize these design differences, together with interactivity and messaging, in terms of the balance between the narrative flow intended by the author (implied by graphical elements and the interface) and the narrative flow experienced by the reader (implied by the user’s interactions). Our analysis informs design strategies for narrative visualization, including promising under-explored approaches to journalistic storytelling and educational media.</p> <p>Index Terms—Narrative visualization, storytelling, design methods, case study, journalism, social data analysis.</p> <p>1 INTRODUCTION</p> <p>In recent years, many have commented on the accelerating potential of data visualization. News organizations continue the recycling of data visualization. Politicians, activists, and television stations use data visualization to support their claims about global health and economics [10] and election results [9]. A recent feature in <i>The Economist</i> [6] explores the proliferation of digital data visualization in the media, noting that “the field is growing rapidly, including new sub-fields such as data journalism, data art, data design, and data storytelling.”</p> <p>Data visualizations have long been used to support storytelling, usually in the form of infographics, which are “data graphics with text.” In this form, the text conveys the story, and the image typically provides supporting evidence or related details. An emerging class of data visualization, however, is designed specifically for storytelling. Storytellers, especially online journalists, are increasingly integrating complex visualizations into their narratives.</p> <p>Creating data stories requires a diverse set of skills. Gershon and Page [12] note that effective story-telling “requires [...] skills like those familiar to movie directors, beyond a technical expert's knowledge of data visualization.” Storytelling techniques range from oration, prose, comic books, video games, and film production to applicable narrative visualization. We also expect this emerging class of data visualization to include data stories, an important way from traditional storytelling. Stories in text and film typically present a set of events in a tightly controlled progression. While data stories may also follow a linear sequence, they can be non-linear, they can also be interactive, inviting verification, new questions, and alternative explanations.</p> <p>Currently, data visualization tools focus on data exploration and analysis. Applications such as spreadsheets and visualization tools support an array of analysis routines and visual encodings. As such, these tools provide a powerful means for providing scant support for crafting stories with analysis results. As such, they provide powerful vehicles for discovering “stories”, but do little to aid narrators in telling them. Data visualization tools are becoming more and more richly integrate with the web (e.g., Many Eyes [25], Tableau Public [22], GeoTime Stories [8]), they are enabling the publication of data stories in a variety of media, and at many levels of abstraction. It remains an open question how the design of such tools might be evolved to support richer and more diverse forms of storytelling.</p> <p><small>• The authors are with Stanford University, Stanford, CA 94305. Email: {eugene, jeffrey}@stanford.edu Manuscript received 31 March 2010; accepted 1 August 2010; posted online 24 October 2010; mailed on 15 October 2010. For information on obtaining reprints of this article, please send email to: www.computer.org</small></p> <p>2 RELATED WORK</p> <p>Storytelling and expression are integral parts of human culture; storytelling has even been referred to as “the world’s second oldest profession” [12]. Without summarizing millennia of achievement, we describe a few of the key concepts informing narrative visualization.</p> <p>2.1 Narrative Structure</p> <p>The Oxford English Dictionary defines narrative as “an account of a series of events, esp. given in order and with the establishment of connections between them.” Central to this definition is the notion of a chain of causally related events. Stories of this form often have a beginning, middle, and end, and a clear plot line. Stories of this form are a series of events often involving tension or conflict, and a resolution.</p> <p>Since ancient times, people have tried to understand and formalize the elements of stories. For example, Aristotle in <i>Aristotle’s Poetics</i> [21] have developed typologies of dramatic situations and identified plot lines common to many narratives, such as the “hero’s journey” [5]. Stories told through writing have access to a different level of formality than stories told through film (e.g., split-screen sequences [3]). Bunnell [2] describes narrative devices for journalism such as the anecdote.</p>
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Question:

WHAT CAN IMPACT A MUSEUM??

With our exploration into museum data we are trying to understand patterns in artwork acquisition within museums. Do historical events, like depression or war, reflect in what artworks exist in a museum's collection? Is it obvious when there are new (and large) sources of income? Can we use patterns of acquisition as a proxy for what was going on in the world at the time? Or do museums respond only to their personal histories?

Although our data is limited, we may even be able to speculate whether museums tend to act independently (we would see different trends in artwork provenance and acquisition) or do they act like a pack (we would see similar trends in provenance and acquisition).

Data:

Our data is comprised of seven different publically available datasets published by the following North American museums:

- Penn Museum (link: <https://www.penn.museum/collections/objects/data.php>)
- Museum of Modern Art (link: <https://github.com/MuseumofModernArt/collection>)
- Canada Science and Technology Museums (link: <http://data.techno-science.ca/en/dataset/cstmc-smstc-artifacts-artefact>)
- Cooper-Hewitt Smithsonian Design Museum (link: <https://github.com/cooperhewitt/collection/tree/master/meta>)
- Minneapolis Institute of Art (link: <https://github.com/artsmia/collection>)
- Metropolitan Museum of Art (link: <https://github.com/metmuseum/openaccess>)
- Cleveland Museum of Art (link: <https://github.com/ClevelandMuseumArt/openaccess>)

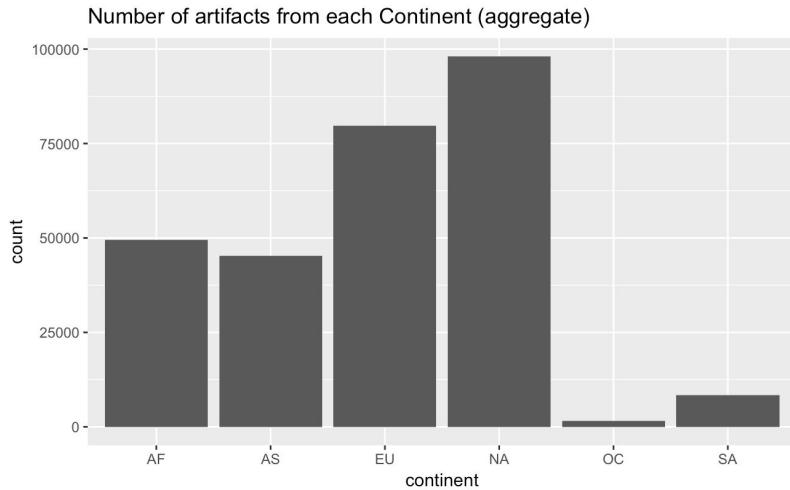
Initially, we had also planned to incorporate a dataset for the Williams College Museum of Art (link: <https://github.com/wcmaart/collection>). However, upon beginning our data processing, we realized that this dataset did not have acquisition date data, which is a necessary attribute for multiple parts of our proposed visualizations.

Given that our data came from seven unique sources, each of which had its own style that it used to format the data, there was a substantial amount of data cleaning required in order collate all of these datasets into a single dataset to feed into D3. As stated in our proposal, at a minimum, each dataset needed to describe an artifacts using a name, a country or region that it originated from, a date for when it was in use, and a date for when it was acquired by the museum. Each of the above datasets recorded these attributes, but in order to access them, we needed to create a different feature extractor for each dataset. To this end, we developed a Python script that processed each museum dataset separately, collated them into a single csv file, and then dropped any rows for which data was missing, which resulted in a cleaned dataset with over 280,000 artifacts. Contrary to what we initially proposed and at the suggestion of our TA, we did not subset any of the data and only dropped data from our final dataset to be used with D3 if there were missing values.

In order to make the data in our final dataset more easily usable in D3, we derived two attributes for all of our original data: continent of origin and the [ISO three digit country code](#), which were both derived from the country of origin for a given artifact. This necessity also encouraged us to use Python to develop our processing script, as there is a Python package (PyCountry) which enabled us to derive these attributes from the country of origin.

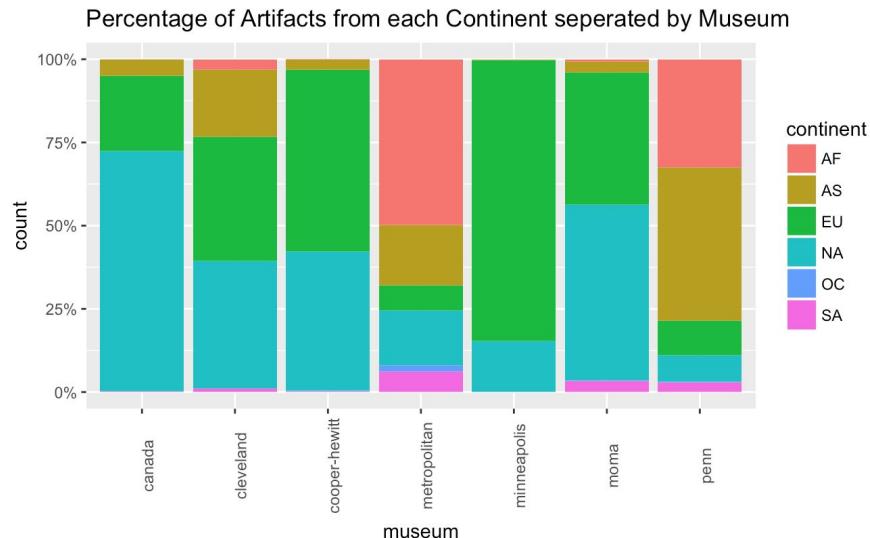
Exploratory Data Analysis:

One of the first visualizations that we used to explore our data was a simple bar chart to see which continents artifacts were predominantly coming from. This chart is shown below:



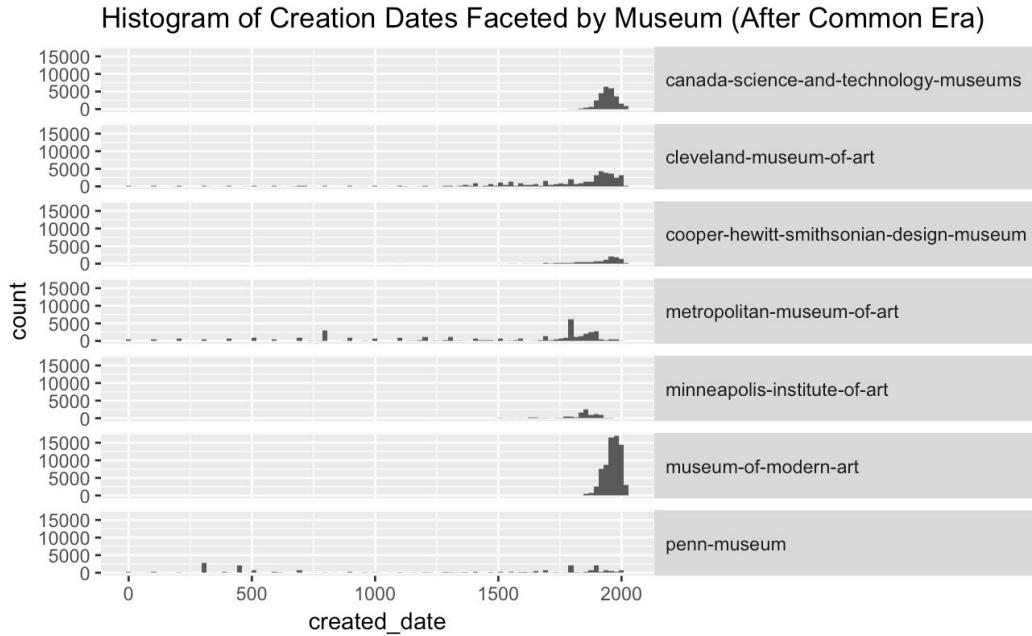
While the visualization itself is incredibly simple, the message it delivers is also readily clear, if not slightly predictable: there is a clear bias in North American museums to display artifacts from North America and Europe.

To explore this bias further, we created stacked bar charts, which shows the proportion of artifacts from each continent for each museum. This chart is shown below:



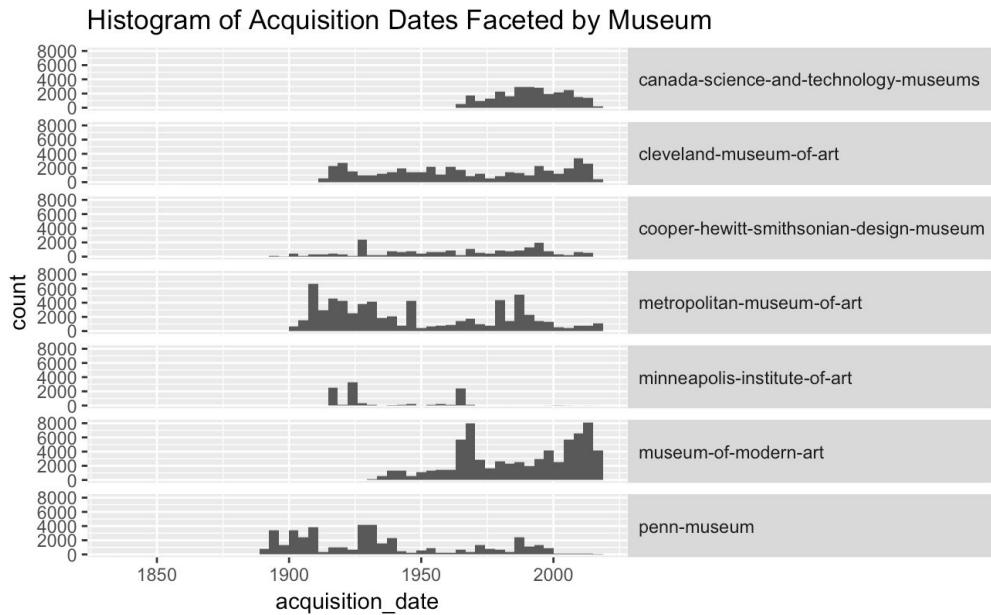
From this chart, the potential for bias that we saw above becomes even more readily apparent. For all but the Met and the Penn Museums, North American and European artifacts make up well over three-quarters of their collections and for several, it appears that proportion is close to one-hundred percent. Additionally, we can see that a proportionally large number of African artifacts can be found at the Met and a proportionally large amount of Asian artifacts can be found at the Penn Museum. This initial data exploration is what encouraged us initially to use parallel coordinates to display this data and as we approach the milestone, we have not yet figured out the best way to present this information to a user of our visualization, as we believe that this is a fairly impactful piece of the story that we want to tell.

Moving away from this particular exploration, we also analyzed the creation dates of the artifacts present in these museums to see if there was anything potentially interesting in the spread of creation dates for these artifacts. The histograms showing this spread for creation dates during the Common Era are shown below:



Again, while these results are not surprising, they do point us towards useful things to potentially highlight in our storytelling piece of the visualization: it is clear that the Canada Science and Tech museums and the Museum of Modern Art are clearly more inclined towards collecting artifacts from within the last 500 years, whereas the other museums have a considerably longer-tailed range of dates from which there artifacts were collected. On the opposite end of the spectrum, the Cleveland Art Museum, the Met, and the Penn Museum all pull a significant number of artifacts from a much earlier time period than their peers.

Moving on to the final piece of data analysis that is intimately tied with our question of trendiness of museums, we turn our attention towards acquisition dates of artifacts. Below, we have a histogram showing the spread of acquisition dates for each museum:



From these histograms of acquisition dates, we can see that there is a substantial amount of collection during the early 1900's, especially for the Met and the Penn Museum. Additionally for these two museums, we can see that there is specifically a large amount of collection in the decade leading up to World War II. In this same vein, we can see that the Cleveland Museum and the Minneapolis Institute has a substantial amount of collection during the 1920's, which could possibly be due, in part, to World War I and the economic success of America during the Roaring 20s.

Moving on, we see that the Cleveland Museum, the Minneapolis Institute, and especially the MoMA acquired a large amount of artifacts during the 1960's and the early 1970's. The Met collected a lot of artifacts during the 1970's and early 1980's. Finally, and perhaps unsurprisingly, the Canada Science and Tech Museums and the MoMA collected a substantial amount of artifacts after the 2000's.

These are definitely salient points to emphasize in both the storytelling portion of our visualization, as well as providing reasonable evidence that looking at the decision making of museums is an interesting subject to consider.

To better understand these trends in artifact acquisition, we looked closer into individual museums histories. We included relevant histories for museums with interesting events (some museums were excluded due to either a lack of information or lack of defining events).

MoMa:

https://www.moma.org/interactives/moma_through_time/

April 15, 1958	MoMA caught on fire!
Feb 1, 1999	PS1, a separate modern art museum, officially became a part of MoMA and was renamed to MoMA PS2
2018	Patricia Phelps de Cisneros donated 102 pieces of Latin American art

The Met

<https://www.metmuseum.org/about-the-met/history>

1971 - 1991	New wings were added to the main Met building
1925	The Met Cloisters, through Rockefeller donations, acquired most of its art collection

Cleveland Art Museum

<http://library.clevelandart.org/history>

1939	Most significant donation, Julia Morgan Marlatt died this year, and donated William H. Marlatt's collection of 300+ fine press printed books
1957	\$33 million donated by Leonard Hanna
1967	Established a joint Cleveland Museum of Art/Case Western Reserve University art history and museum studies program

Penn Museum

<https://www.penn.museum/about/our-story>

1889	Penn-led expedition to Nippur results in objects from Mesopotamia
1890	Museum changes location to a bigger campus
1915	Harrison Wing opens with collections from Asia
1924	Coxe (Egyptian) Wing opens
1929	Museum receives funding from Eldridge Johnson, founder of the Victor Talking Machine Co.
Great Depression and WWII	Interrupted construction and expansion of the museum
1971	Academic Wing opens

Minneapolis Museum of Art

<https://new.artsmia.org/about/mission-and-history/>

1974	Museum expands
2006	Another wing opens

Historical Events

In addition to looking at the personal histories of the museums, we wanted to note major historical events that could have affected the acquisition practices of museums.

1914 - 1918	WWI
1920 - 1929	The Roaring 20s
1929 - 1939	The Great Depression
1939 - 1945	WWII
1945 - 1973	Post-WWII economic expansion and prosperity
1982 - 1987	Economic boom of the 80s
2008 - 2010	Housing bubble burst leading to recession

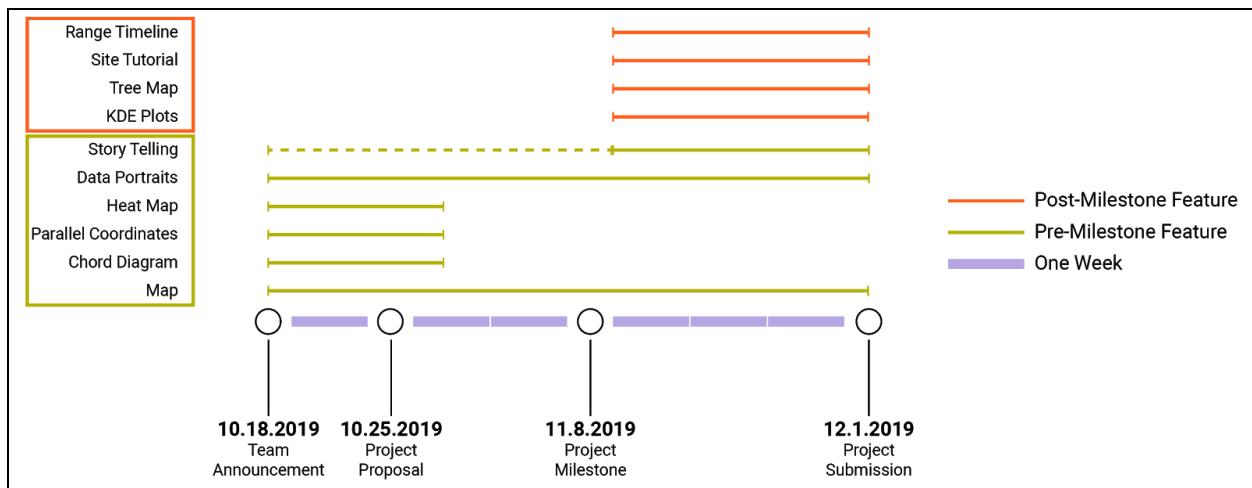
Design Evolution:

The following section walks through individual components of our design, presents the development of the layout throughout the project, and finishes with additional components that were added after the milestone. In our process, we considered many different visualizations that would enable us to tell a story and show aggregate comparisons of museums in North America as well as characteristics of individual museums.

We received feedback from Kiran (our TA) and Lizzie Indra Kumar, Bond Denhalter, and John Lund. The notes from these feedback sessions can be found in the [Appendix](#).

Designs in order of appearance:

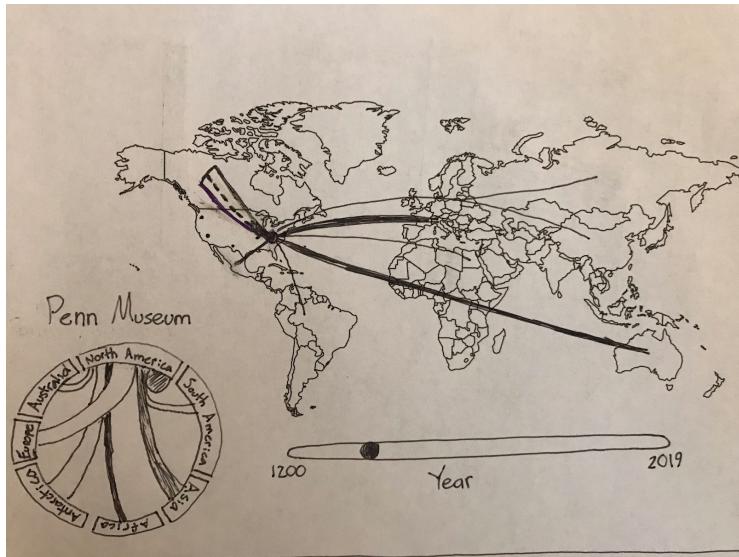
- [Chord Diagram](#)
- [Parallel Coordinates](#)
- [Heat Map](#)
- [Data Portraits](#)
- [Layout](#)
- [KDE Plots](#)
- [Data Stories](#)
- [Tree Map](#)



The diagram above shows the conception and implementation of features and functionalities in the site,

CHORD DIAGRAM

Original Design and Justification



Chord Diagram overlaid on Geographic map

Each ribbon represents the number of artifacts that a museum gets from a certain country (or continent if country would be too cluttered). Clicking on the ribbon breaks it up into multiple ribbons, which encode the type of artifact using color. A year slider is provided to allow users to explore changes over time. In addition, a chord diagram is shown in the bottom left for the selected museum to show the same data, but not geographically positioned.

Initial Feedback on Design

Chord Diagram

On review, we found that chord diagrams may not be necessary, since they will only be showing the connection between North America and other continents.

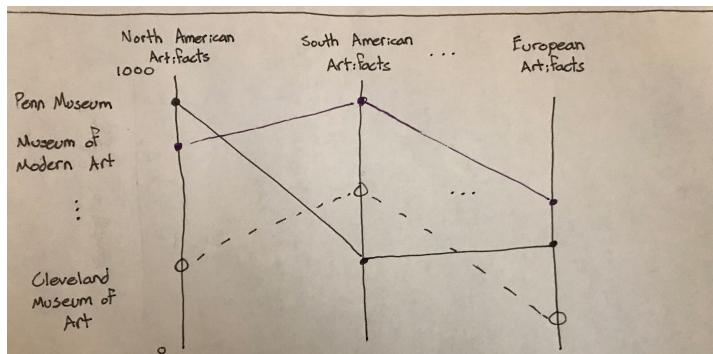
As a result we decided not to include the chord diagram in this view.

Map Connections

Again on review, we received multiple comments that ribbons would result in a visually cluttered map. As a result, we decided to experiment with other marks and channels to indicate data provenance based on country.

PARALLEL COORDINATES

Original Design and Justification



Parallel Coordinate of Artifact Continent of Origin

Each vertical axis represents a specific continent. The line chart connecting this axis represents how many artifacts from that continent each museum has. This allows for easier comparison than the geographical map does. Additionally, a slider could be implemented to see how this changed over time.

Initial Feedback on Design

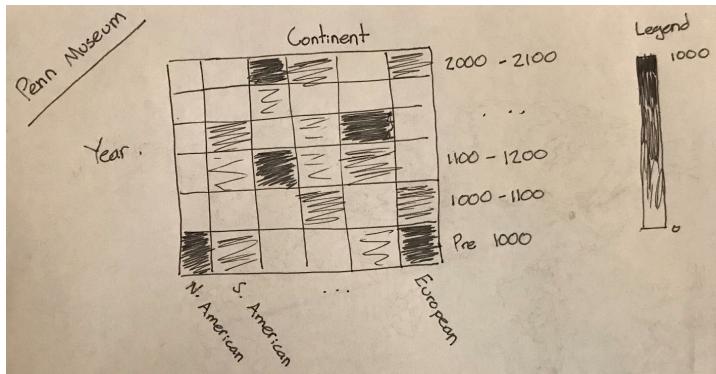
We received mixed feedback on the use of Parallel coordinates. While visually attractive, the flow of across the parallel coordinates is not representative of the data structure nor is it semantically meaningful.

An alternative design to show the distribution of artifact location origin would be to use a tree map.

At the time of the project milestone, we have not discussed an alternative visualization.

HEAT MAP

Original Design and Justification



Heat Map comparing continent of origin with time of use/creation of artifact

A heatmap like this would be generated for each museum. The vertical axis represents bins for when the artifact was created/used and the horizontal axis represents the continents of origin for the artifact. The heatmap allows for exploration of if museums tend to favor newer or older materials and from where.

Initial Feedback on Design

While the heat map is an appropriate way of showing the relative distribution of artifact provenance it may not be a super interesting visualization.

We decided to make this a nice to have feature after further data exploration.

DATA PORTRAITS

Original Design and Justification



Data Portraits

Using attributes of the collection, we will generate portraits for each museum. These visualizations are less for legibility and more for comparing the general attributes of the museum.

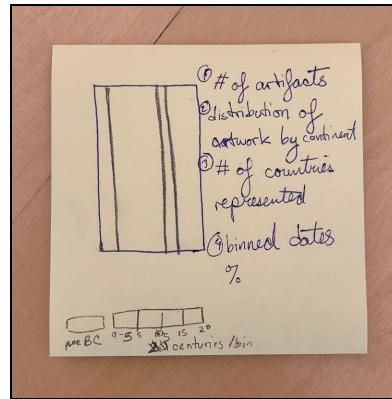
Initial Feedback on Design

The initial inspiration (*to the left*) is highly stylized, and instead we decided to opt for a more simplistic iteration of a data portrait.

Inspired by Georgia Lupi and the Abstract Expressionism movement of post-WWII artists, we opted for a more formulaic and simpler visual representation of the museums.

Mockups

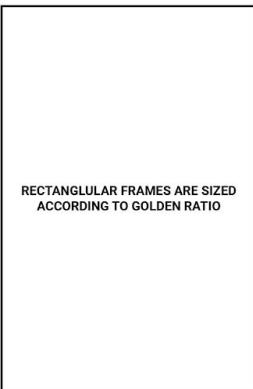
We began by looking at different Abstract Expressionism art, looking specifically for the use of bold colors and geometric shapes. Once we selected an artist for inspiration we created a rough mockup using pen + paper of what the portrait could look like.



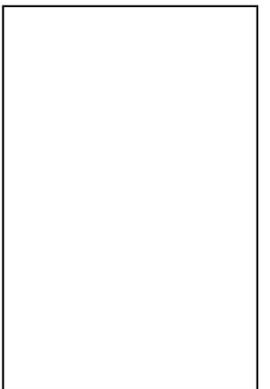
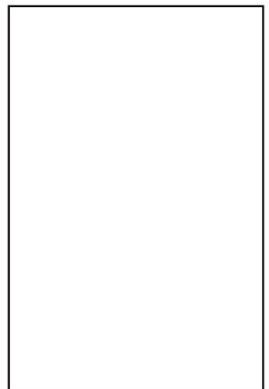
Pleased with the rough sketch, we used Adobe Illustrator for cleaner mock-ups. After implementing the design in code using fake (but representative) data, we altered the design slightly to both make the coding easier and incorporate a more organic element into the design.

MUSEUM+VIS Gallery

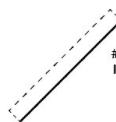
OUTLINE



RECTANGULAR FRAMES ARE SIZED
ACCORDING TO GOLDEN RATIO



CREATED DATE OF ARTIFACT

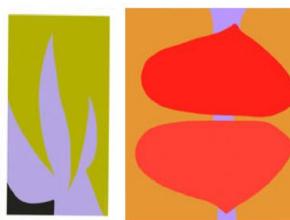


OF ARTIFACTS
IN COLLECTION



MAUD MORGAN

1903-1999



IMAGES COURTESY OF ARTSY.NET

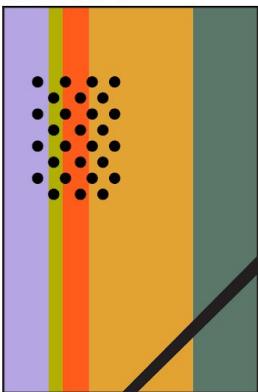


COLOR PALLETTE

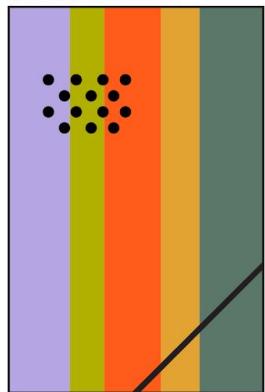
MUSEUM+VIS Gallery

PRE-CODING MOCK-UP

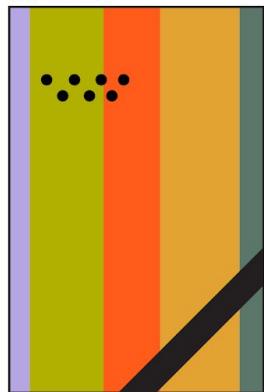
MUSEUM OF MODERN ART



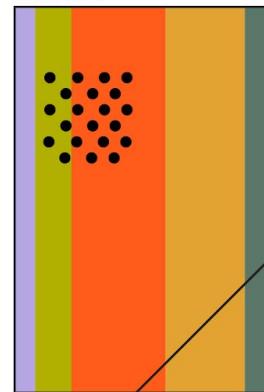
CLEVELAND MUSEUM OF ART



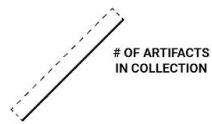
COOPER-HEWITT



PENN MUSEUM



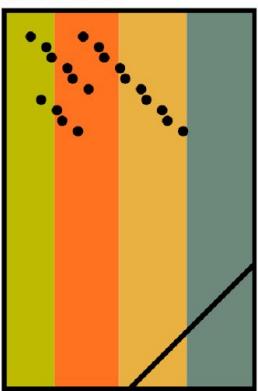
CREATED DATE OF ARTIFACT



MUSEUM+VIS Gallery

POST-CODING

FAKE MUSEUM DATA



DOTS EVOLVED INTO MORE ORGANIC STRUCTURE
EACH DOT REPRESENTS 5 COUNTRIES

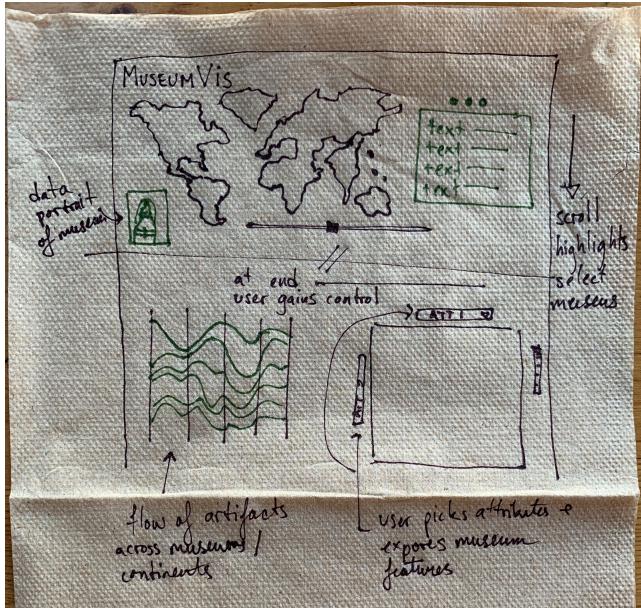
THE VARIATION OF THE DIAGONAL LINE WIDTH IS
LESS DRAMATIC
IN ORDER TO AVOID CODING IT AS A <PATH> THE MAX
WIDTH OF THE LINE WILL REMAIN THE SAME AS THE
FRAME BORDER



COLORS AND MAPPING TO DATES REMAIN THE SAME

LAYOUT

Original Design and Justification



Layout

User scrolls through ~3 museums (there will be an option to click through the same examples). At the end of the examples the exploratory buttons appear and enable the user to see the flow of attributes across museums over continents and over time (by dragging the timeline). The heat map lets users explore the different attributes present in one museum at the given time and is also responsive to the timeline drag.

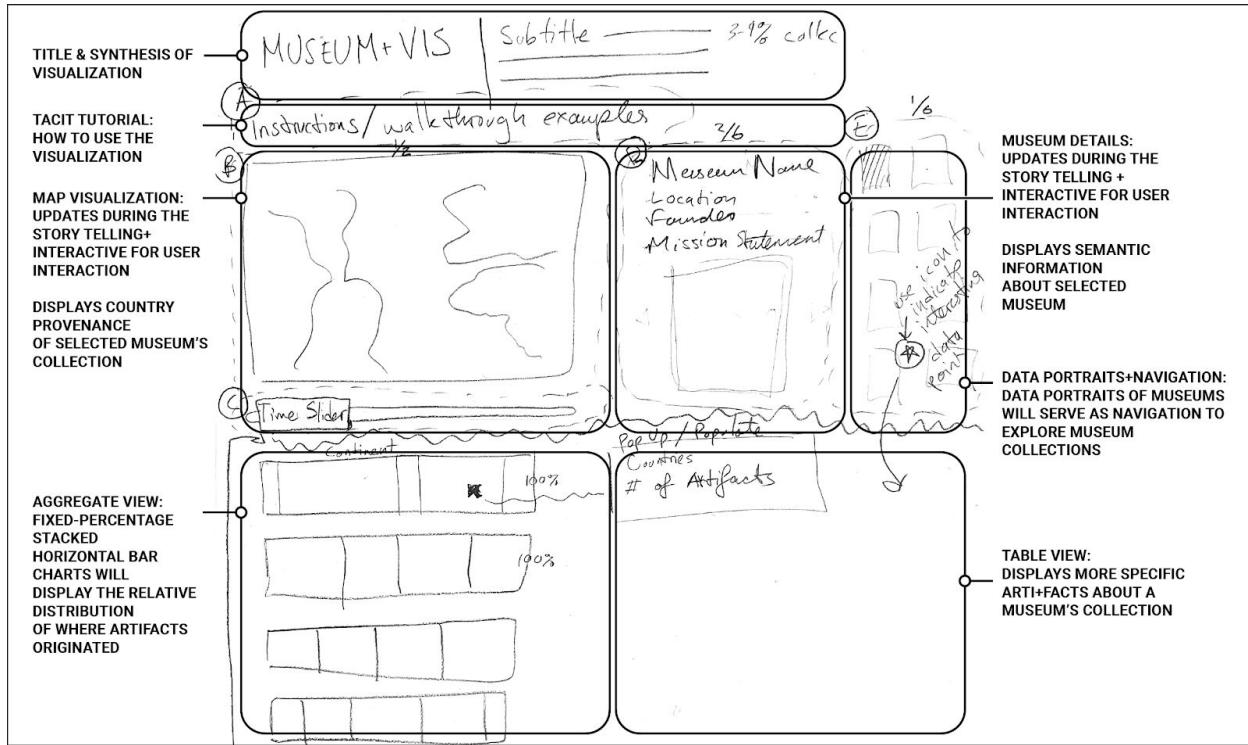
Initial Feedback on Design

Initially we had planned to incorporate scrolltelling into our design, but decided against it because it was unjustified interaction and we believed we could have more straightforward storytelling using buttons and the interactive slideshow method.

Layout Revisited

After receiving feedback from both other students and our TA, we decided to revisit the layout to clarify the different types of interaction and the storytelling components of the vis.

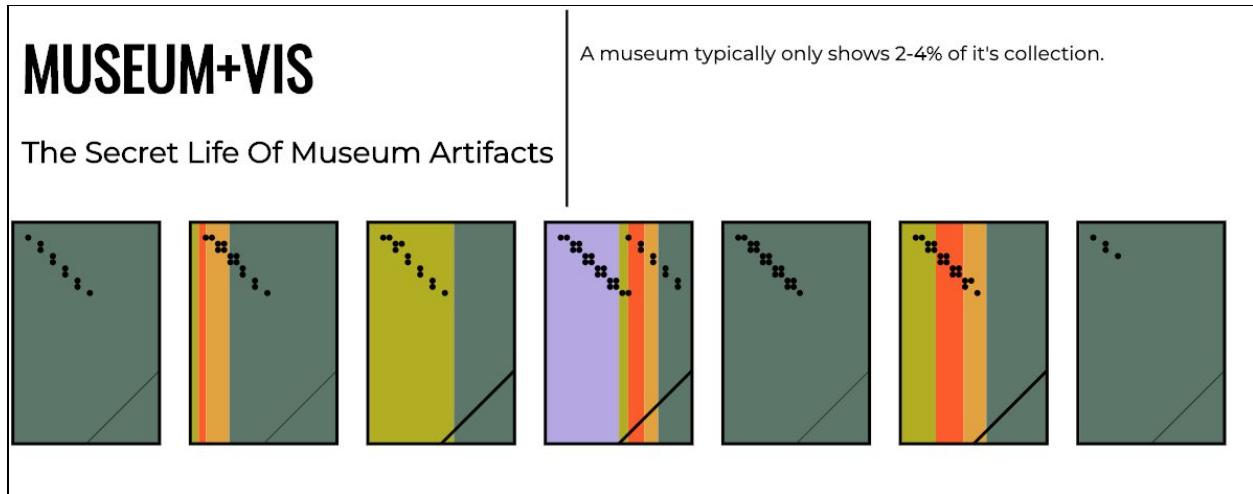
Mockups



11.4.2019

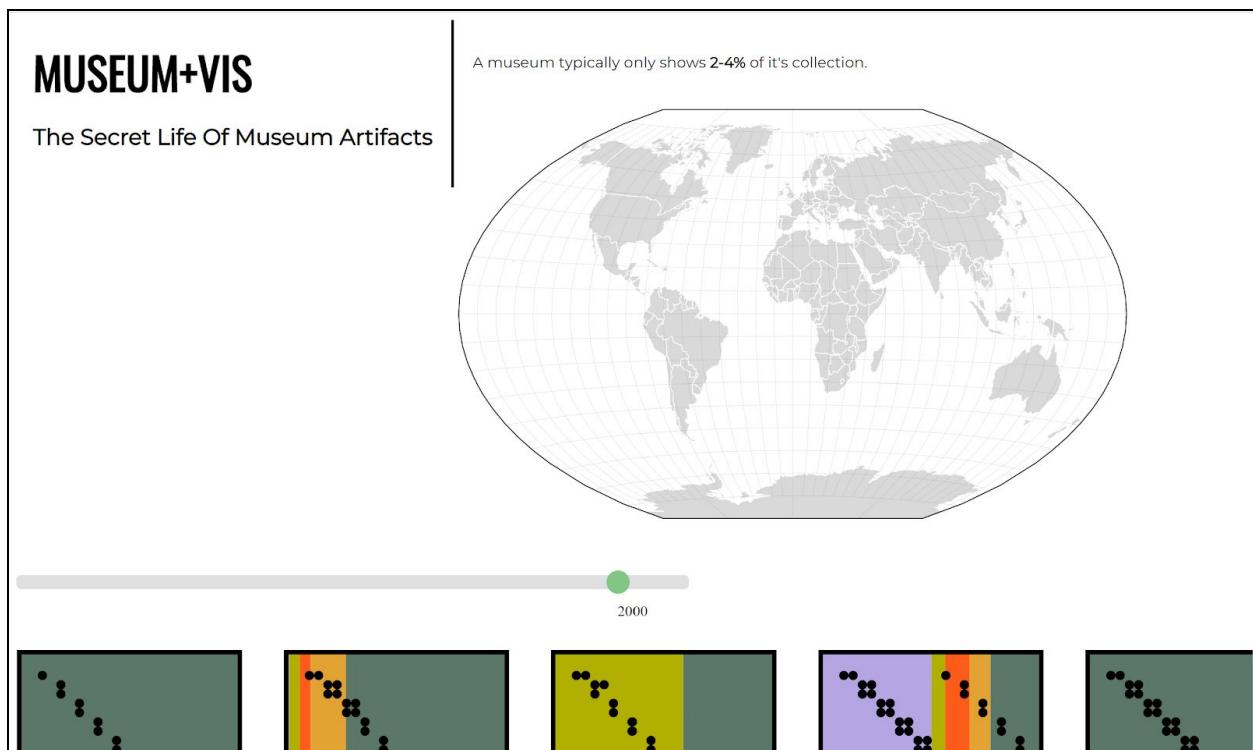
This was our initial sketch where we outlined the sections and fleshed out the interactivity and storytelling elements.

In-progress Screenshots



11.4.2019

Data portraits created on separate branch. No map vis.

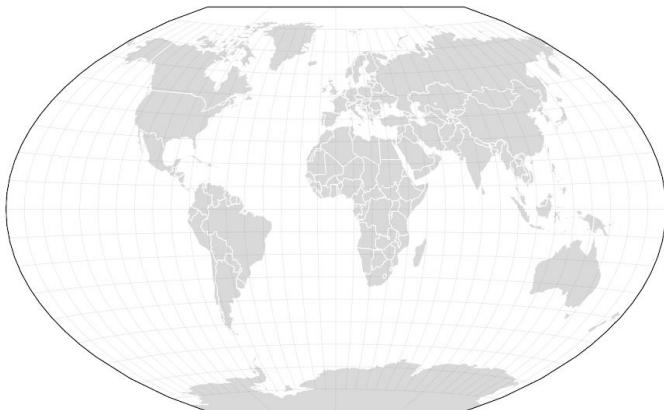


11.5.2019

Map and data portrait visualizations merged. Formatting of containers leads to wonky views.

MUSEUM+VIS

The Secret Life Of Museum Artifacts



Canada Science and Technology M
Ottawa, Ontario | Canada



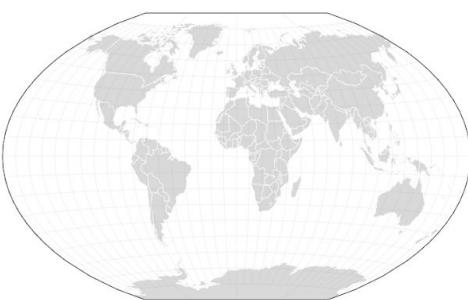
11.6.2019

Implementation of grid, header elements, and storytelling buttons. The sizing of the font is too big.

MUSEUM+VIS

The Secret Life Of Museum Artifacts

A museum typically only shows 2-4% of its collection.



Test Title

Test Subtitle

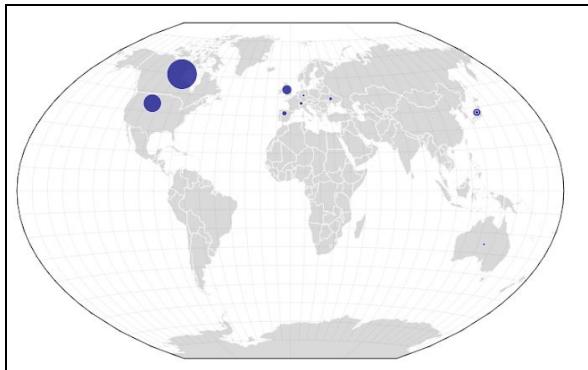


11.6.2019

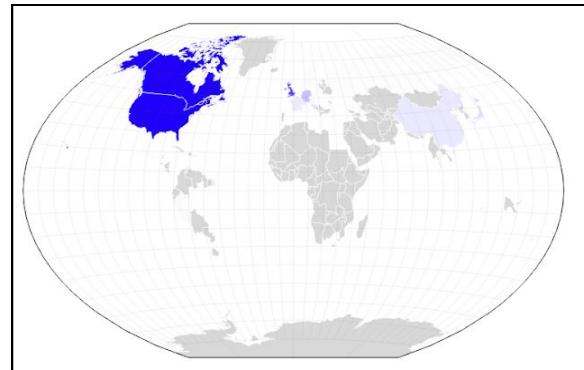
Data portraits scaled and adjusted. North American data added to dataset.

11.7.2019

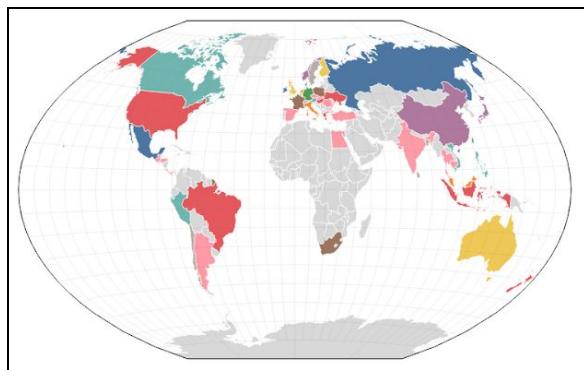
We decided to explore different methods of visualizing the encoded collection data on the map. The two design spaces we explored were the bubble map and choropleth.

**11.7.2019**

Bubble map initial view.

**11.8.2019**

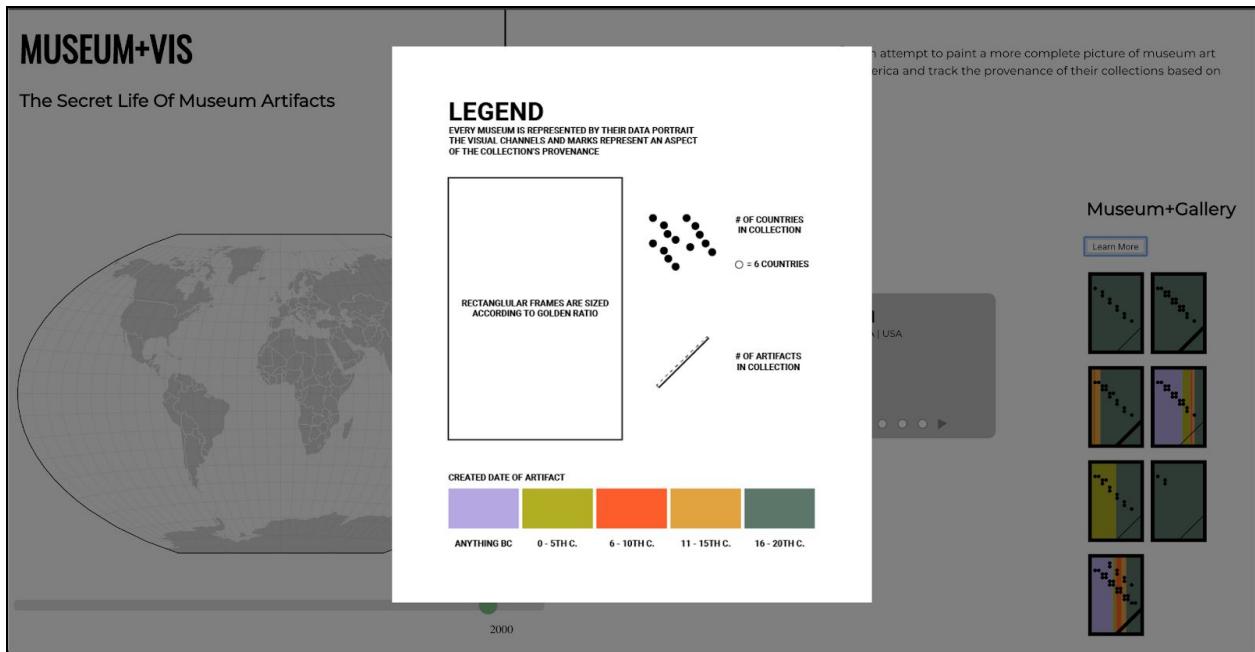
Opacity scale to visualize encoding the data on the map. Added the museum descriptions to the museum tabs along with museum website.

**11.8.2019**

Different color scale to visualize encoding the data on the map. Color scale needs some work, but it shows the countries where the artifacts originated at least.

11.8.2019

We ultimately decided to use the bubble map because it was the better encoding for the differences in artifact acquisition amounts.



11.8.2019

We added a legend that users could click to better understand how the data portraits were created.



11.8.2019

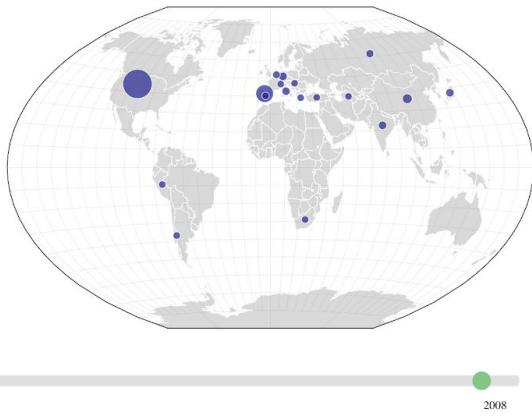
Fixed the formatting of the middle portion (the description boxes). The description boxes now change on each click of the data portraits on the right.

MUSEUM+VIS

The Secret Life Of Museum Artifacts

A museum typically only shows 2-4% of its collection.¹ In an attempt to paint a more complete picture of museum art collections, we turn to seven museums found in North America and track the provenance of their collections based on country of origin, year of creation, and year of acquisition.

¹Source: New York Times



CLEVELAND MUSEUM OF ART

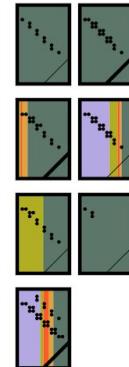
Cleveland, OH | USA

<https://www.clevelandart.org>

The Cleveland Museum of Art offers dynamic experiences that illuminate the power and enduring relevance of art in today's global society. The museum builds, preserves, studies, and shares its outstanding collections of art from all periods and parts of the world, generating new scholarship and understanding, while serving as a social and intellectual hub for its community.

Museum+Gallery

[Learn More]



11.8.2019 - Project Milestone Release

Link: https://github.com/madicooley/museum_vis/releases/latest



Interesting Vis/Story Points

① Skew towards NA + Europe
↳ both on aggregate + individual



② Spread of artifacts
↳ can we look @ how much it they have and see the spread?



③ Artifact acquisition
↳ will need to do some qual research here to explain spikes



1960-70s: Cleveland, Minneapolis, MoMA

1970-1980: The Met

2000+: Canada Science + Tech + MoMA

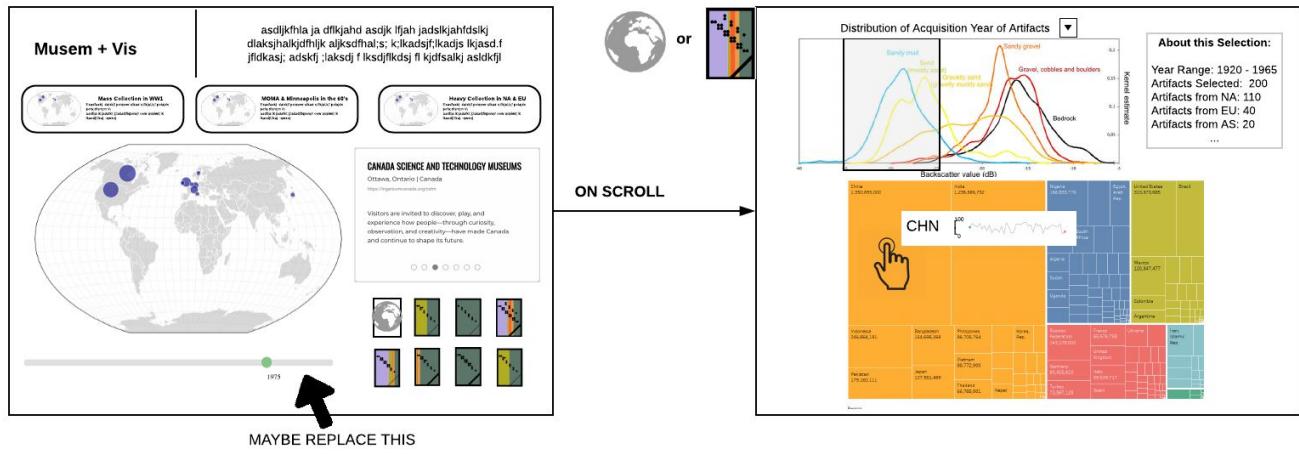
April 16, 1958 MMA caught on fire as a result
↳ most art was saved

Feb 1, 1999 P&G became
a part of MoMA P&G

2018: Patricia Phelps de
Cisneros donated 11th Latin
American art

1971-1991: wings added to
the MET

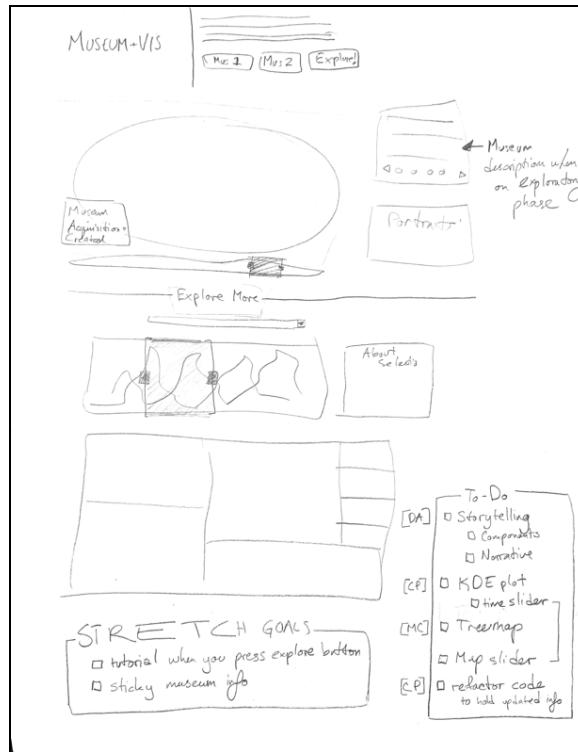
1925: Met Cloisters via Rockefeller
organized most of its artwork



MAYBE REPLACE THIS

11.13.2019

Post feedback from TA (see Appendix), we individually worked on new layouts and adjustments to the visualization.



11.13.2019

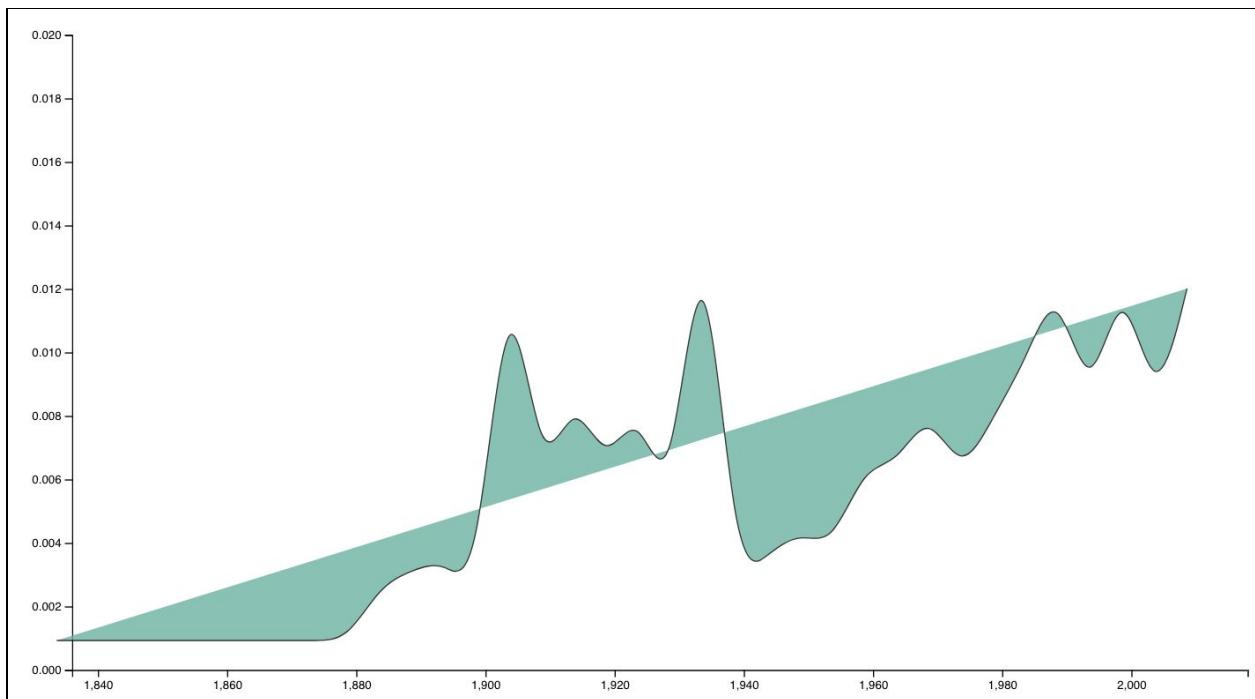
After presenting our ideas, we combined features we agreed upon and created a to-do list for the next week and a half.

KDE PLOTS

11.21.2019

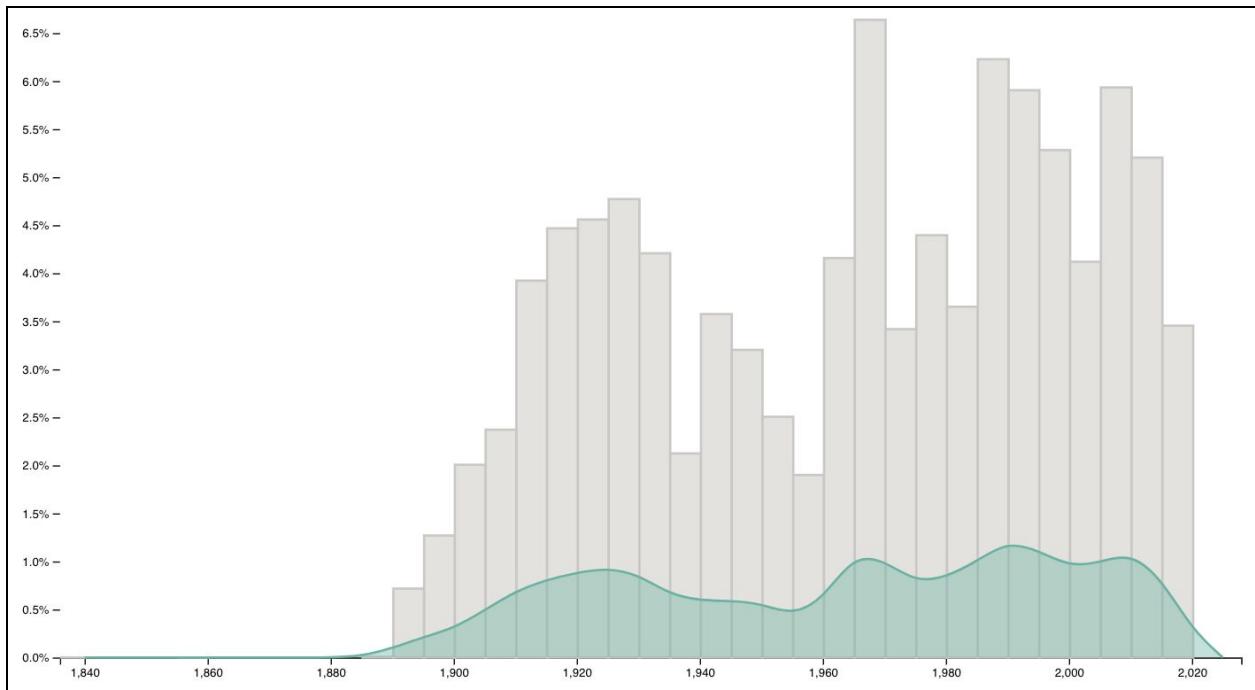
As part of our initial design, we had envisioned enabling an exploratory functionality. Given that the map focuses on acquisition data within a museum, we wanted to support comparison and analysis across museums.

Our initial data visualization included using histograms, but after feedback from our TA we decided to implement KDE plots.



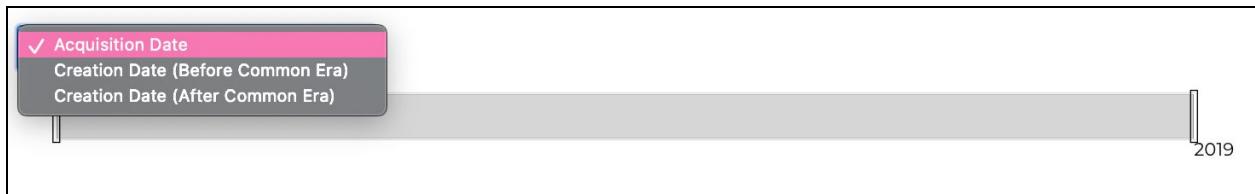
11.21.2019

In progress screenshot of KDE plot (or abstract art, your pick).



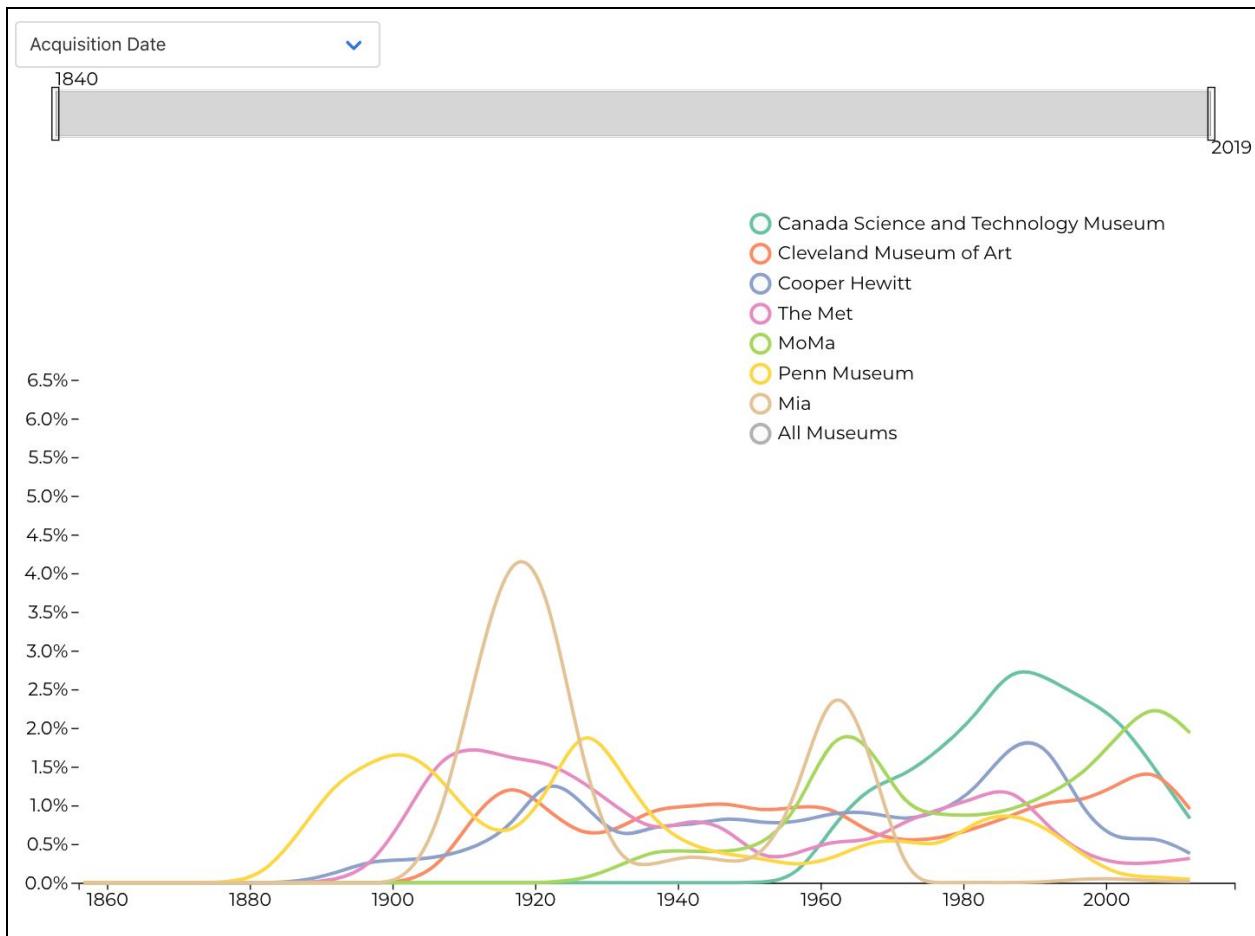
11.21.2019

Updated plot.



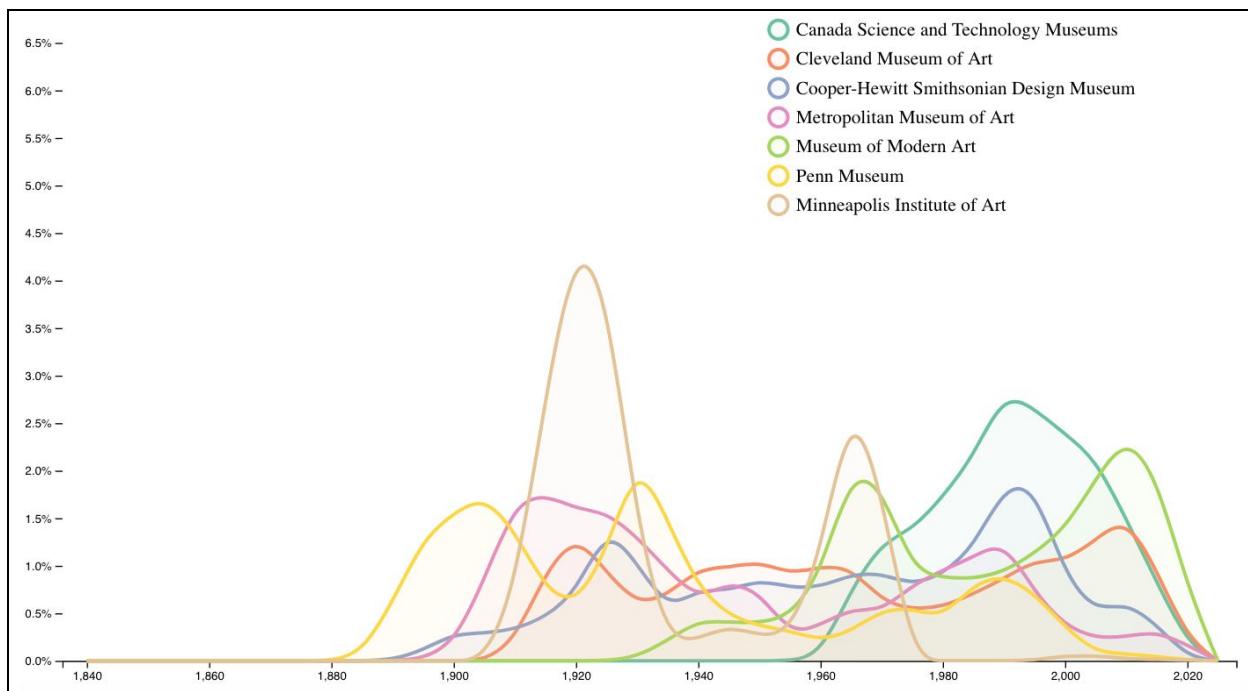
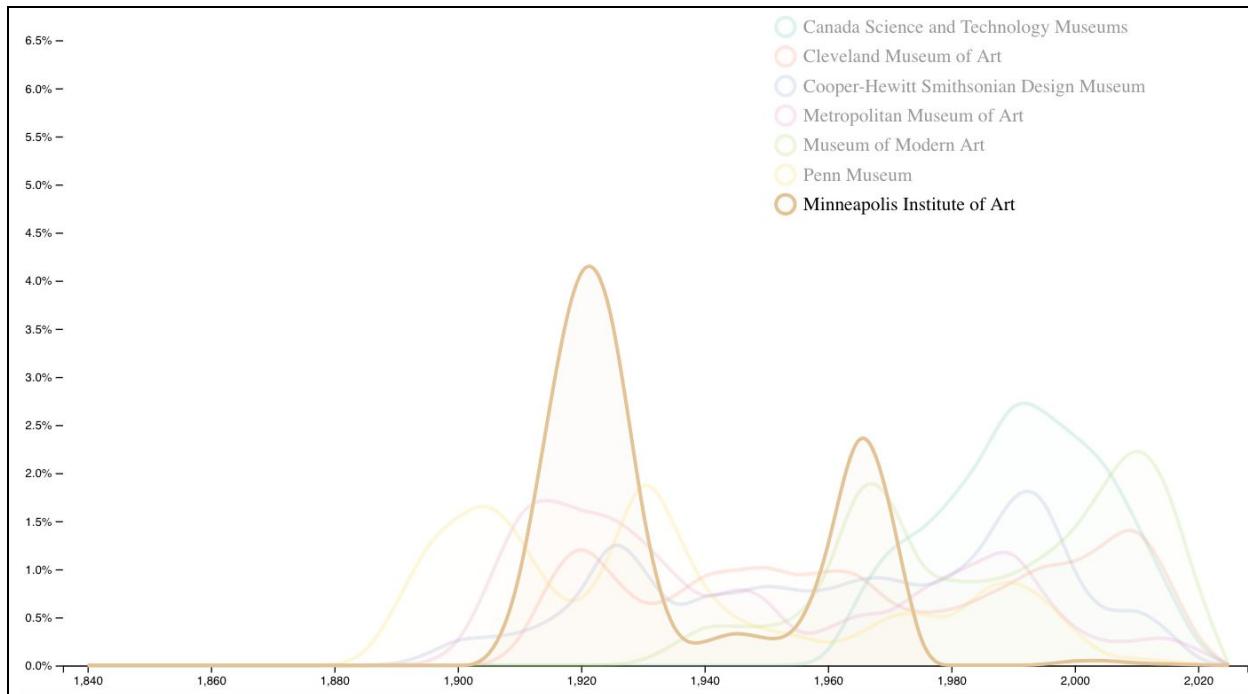
11.24.2019

User has the option to select a year range and choose whether to filter based on when artifacts were acquired or created.



11.27.2019

Finalized KDE plot with legends and proper styling.



11.21.2019

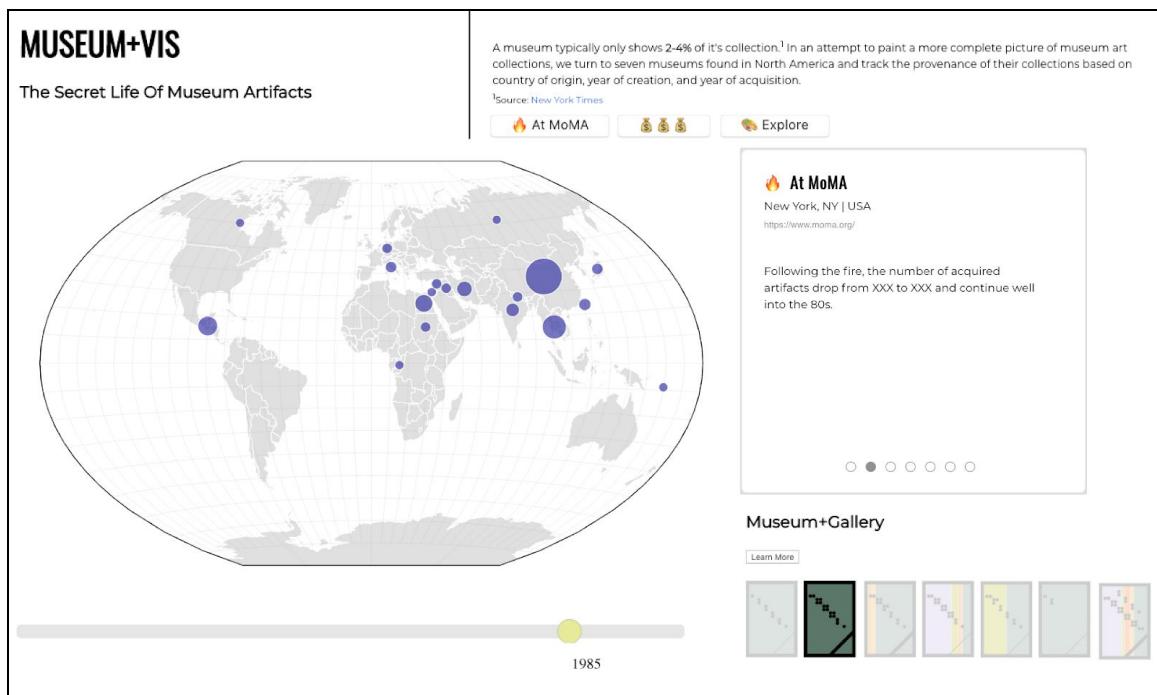
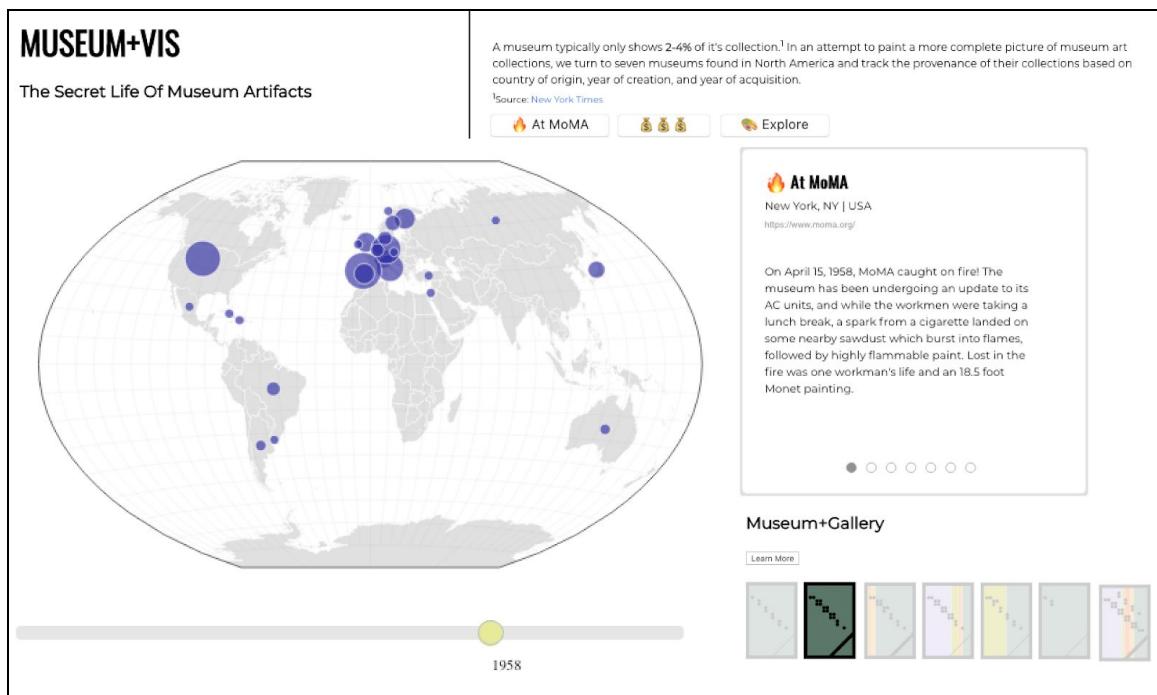
Finalized KDE plots constructed outside of the vis. Next step is to incorporate into the rest of the site.

DATA STORIES

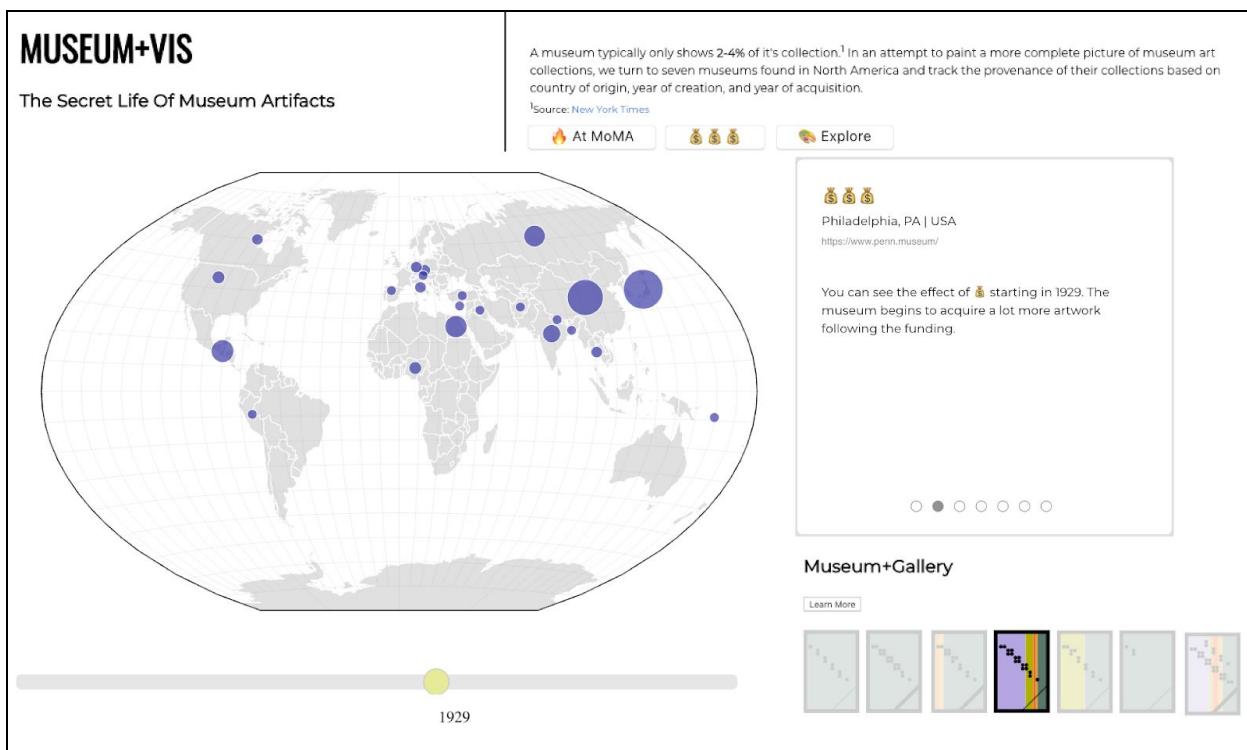
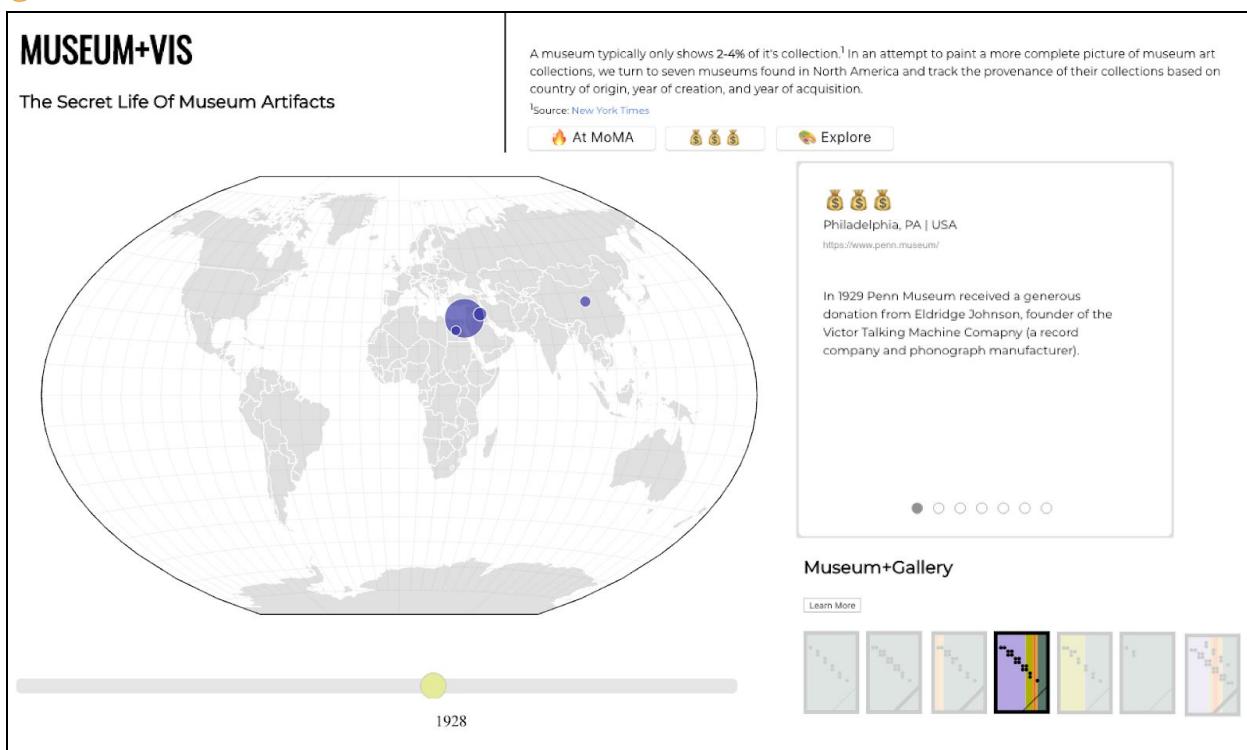
11.21.2019

Below are mock-ups for the different options we present the user. It curates some patterns that they can look at and also gives them a demo of how to use the features when they are ready to explore on their own.

🔥 at MoMA



\$ at Penn Museum



Explore

MUSEUM+VIS

The Secret Life Of Museum Artifacts

A museum typically only shows 2-4% of its collection.¹ In an attempt to paint a more complete picture of museum art collections, we turn to seven museums found in North America and track the provenance of their collections based on country of origin, year of creation, and year of acquisition.

¹Source: New York Times

At MoMA Explore

MAP VIEW + TIMELINE SLIDER

Explore when and where artifacts were acquired from.

PENN MUSEUM

Philadelphia, PA | USA

<https://www.penn.museum/>

The Penn Museum transforms understanding of the human experience.

Museum+Gallery

Learn More

MUSEUM+VIS

The Secret Life Of Museum Artifacts

A museum typically only shows 2-4% of its collection.¹ In an attempt to paint a more complete picture of museum art collections, we turn to seven museums found in North America and track the provenance of their collections based on country of origin, year of creation, and year of acquisition.

¹Source: New York Times

At MoMA Explore

DATA PORTRAITS

Use the museum galleries to navigate the different museum data.

PENN MUSEUM

Philadelphia, PA | USA

<https://www.penn.museum/>

The Penn Museum transforms understanding of the human experience.

Museum+Gallery

Learn More

+33

MUSEUM+VIS

The Secret Life Of Museum Artifacts

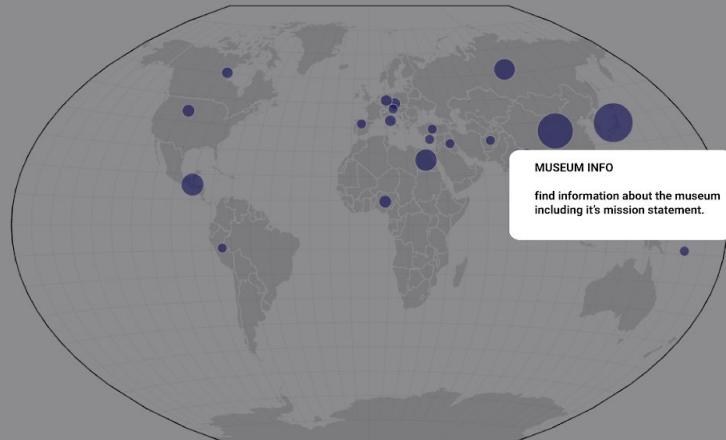
A museum typically only shows 2-4% of its collection.¹ In an attempt to paint a more complete picture of museum art collections, we turn to seven museums found in North America and track the provenance of their collections based on country of origin, year of creation, and year of acquisition.

¹Source: New York Times

At MoMA



Explore



1929

PENN MUSEUM

Philadelphia, PA | USA

<https://www.penn.museum/>

The Penn Museum transforms understanding of the human experience.



Museum+Gallery

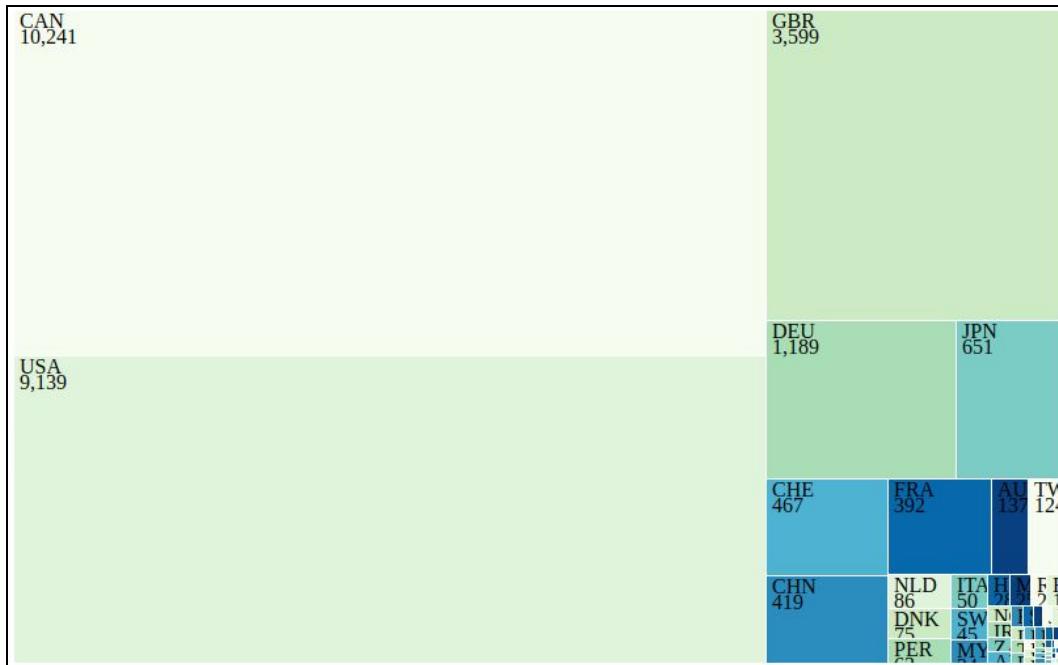
[Learn More](#)



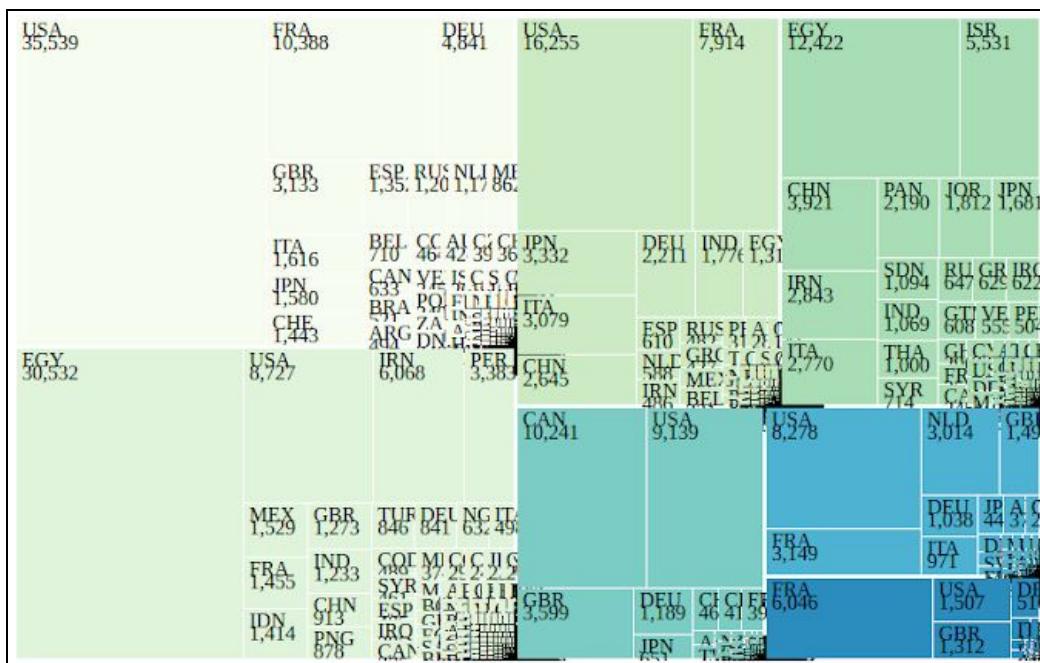
TREE MAP

11.21.2019

In the exploratory view, we wanted to show users the geographic distribution of acquired artifacts outside of the map view.

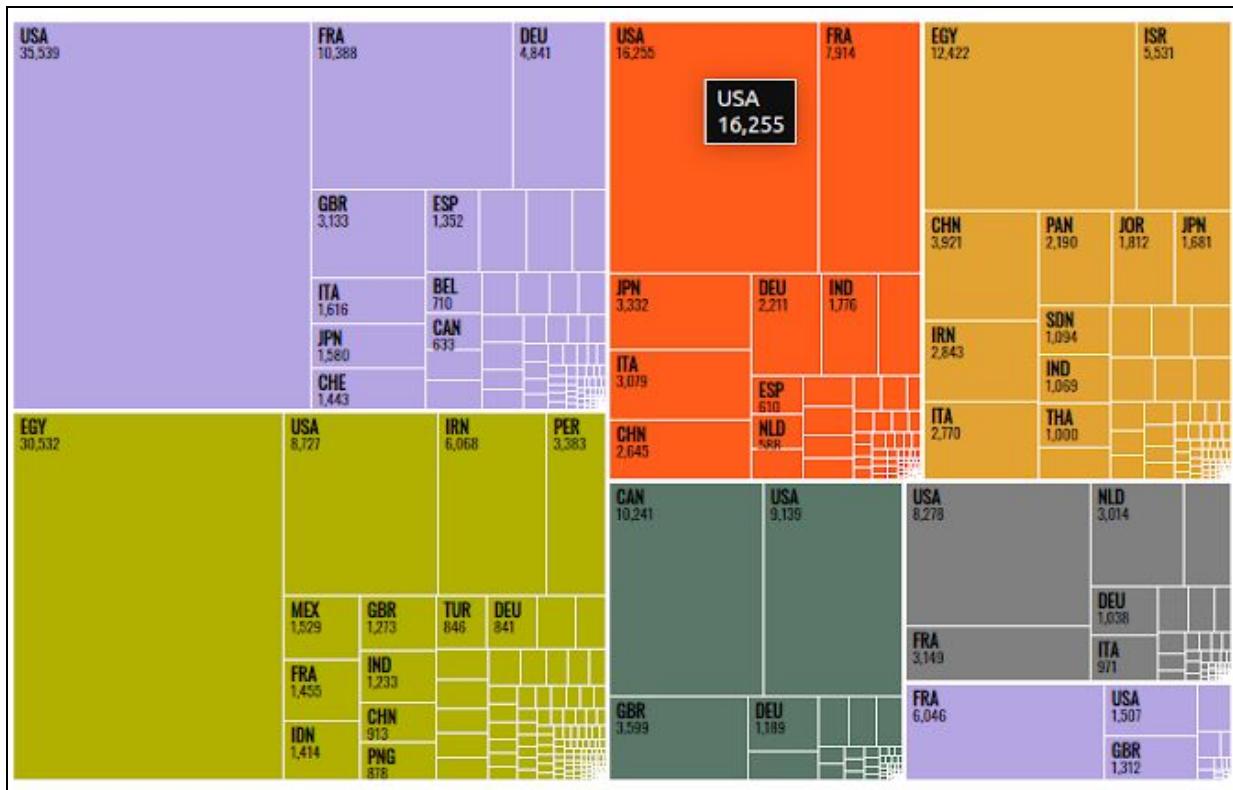


11.21.2019



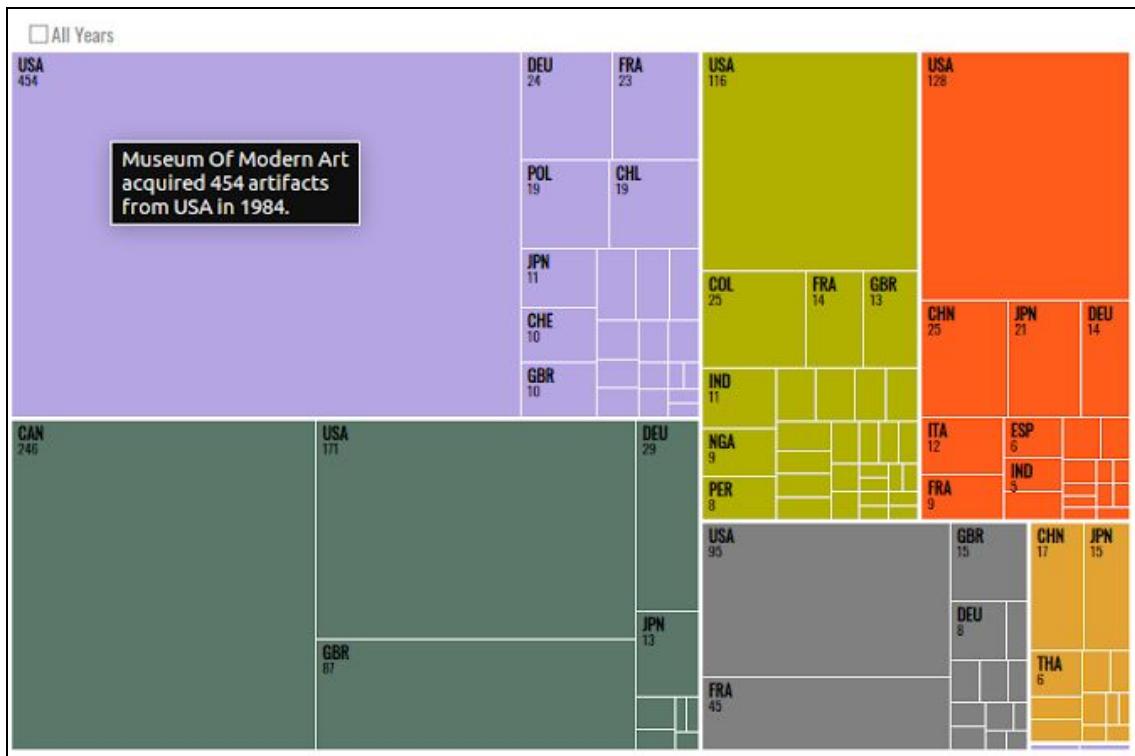
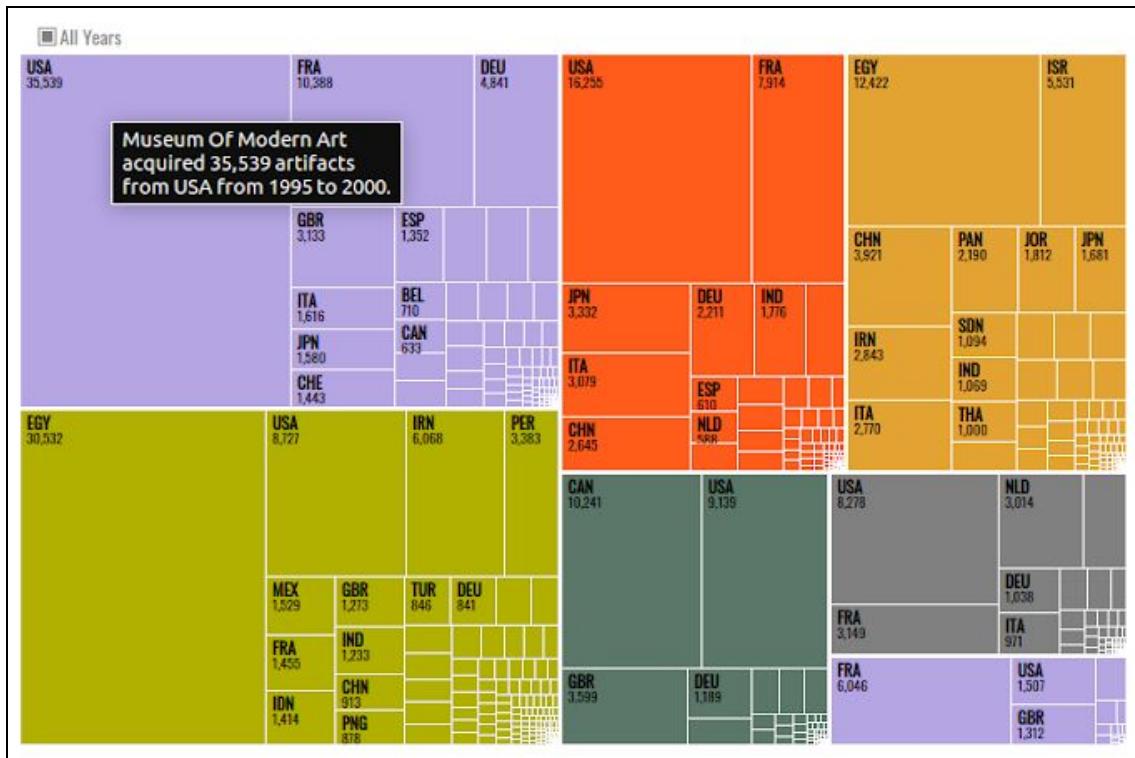
11.23.2019

Screenshot of basic treemap in progress after adding all museums to the treemap. Each color represents the data for each museum.



11.23.2019

Changed the color scheme to match the colors in the data portraits. Each color represents a different museum. Also fixed the fonts and the display of the labels as to declutter the visualization. A basic tooltip is implemented.



11.24.2019

Updated tooltip to show more information. Treemap now sorts for each year on update of the year slider underneath the globe. Added a button called “All Years” so the user can switch back to viewing the data across all years.

Implementation:

Describe the intent and functionality of the interactive visualizations you implemented. Provide clear and well-referenced images showing the key design and interaction elements.

In this first iteration, we have three separate elements, which can be seen in the screenshot on the previous page. The first is the map, which shows the countries from where the selected museum acquires their artifacts. The circles encode the number of artifacts acquired from that specific country, relative to the area. The museum tabs (middle element) show the name of the selected museum along with a description, location, and website. The third element is the data portraits on the right.



Each data portrait represents a museum, which on click, changes the map view and the tab view to the selected museum. Under the map, there is a year slider, which changes the data seen on the map to show the artifacts acquired by the chosen museum at the specific year.

Keeping Track of Everything

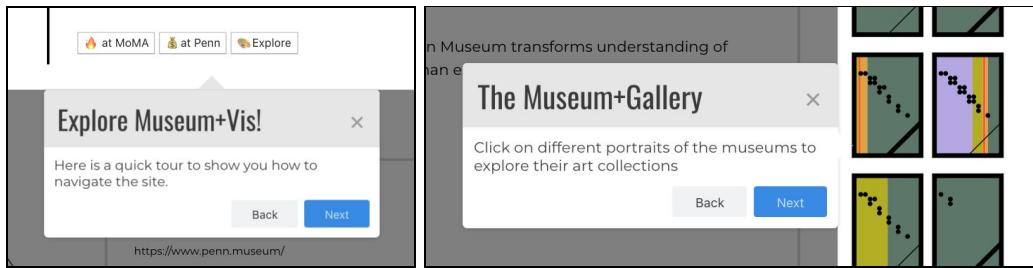
In the second iteration of our project, after the first release, we realized that with the amount of linked views that we were trying to implement, we needed to refactor our code so that there was a central location or object to contain all of the shared variables and references to functions to update all of the visualization. To this end, we implemented the VizCoordinator class. The VizCoordinator initializes all of the different visualizations and then keeps track of the variables that different classes need in order to render, such as the data itself, the currently selected museum, the selected range of years, and so on. Further, the VizCoordinator has references that allow it to update the visualizations whenever one of these shared variables is updated. This allowed us to simply pass VizCoordinator to each class, rather than passing a swathe of other visualizations to each class, which would have been messy and difficult to debug.

Storytime

After the milestone we focused on adding more storytelling to the site. We used three buttons at the top of the page to indicate importance and call to action.

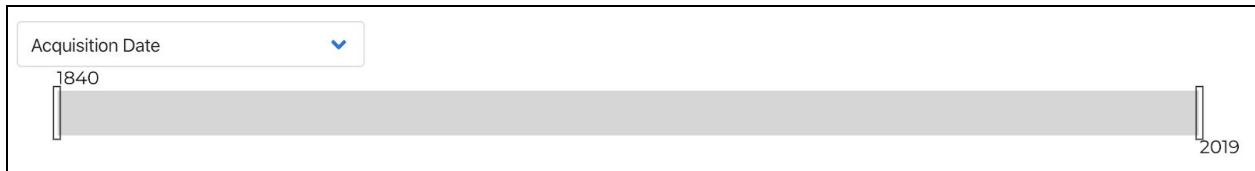


The buttons referencing MoMA and Penn offer two short stories about the museums' collection and the last button is a guided tutorial so that the user can start using the visualization on their own.



And The Years Go On

In the final implementation of the visualization, we linked all the different visuals with the year slider. We did this so that the views were linked and offered the user the ability to explore different aspects of the museum collection of the years.



Evaluation:

What did you learn about the data by using your visualizations? How did you answer your questions? How well does your visualization work, and how could you further improve it?

Pre-Milestone

From our visualizations, we were able to see that most museums collected a large number of artifacts from both Canada and the United States each year. Many of the artifacts also came from Europe. We did notice some exciting trends related to the artifacts collected in specific years, as in an interesting number of artifacts collected during historical events. These are outlined in the Exploratory Data Analysis section.

We have not been able to visualize these trends specifically yet, so that is something we would like to continue improving upon before the final deadline. To do this, we hope to point out a few significant historical events to emphasize these trends in artifact acquisition. We also hope to improve upon the museum specific data visualizations. We are planning on adding a stacked horizontal bar chart to show the continents in which each museum collected artifacts from, to easily compare all museums at once. We also will add a chart to visualize specific artifacts from each museum. So far though, our visualization works very well. The implementation is simple, conveys information about the trends in artifacts, and is visually appealing.

Post-Milestone

With the addition of the KDE plot and Tree Map we begin to see some interesting geographic and temporal patterns across museum acquisition decisions. For example, in the early 20th century most of the acquired artifacts for the two biggest museums are from Egypt. Post WWII however this trend shifts toward American and European art. Why is that the case? We could speculate when museums first begin their collections, it is expected of them to have a strong base of early civilization art. Or maybe it was trendier for philanthropists to dig up old Egyptian burial grounds and then donate their findings to the museums they sponsored? Like art, it is up for creative interpretation.

APPENDIX

Feedback (in class)

10.29.2019

Group: Lizzie Kumar, Bond Denhalter, John Lund

- Chord diagram may not be necessary, since they will always be going to NA
 - As it stands, what we have right now is not showing interesting data
 - Parallel coordinates might be a suitable replacement - see how they look
- Before we finalize everything, look at the numbers from the datasets to make sure it actually fills it out well
- Shift chord diagram to a nice to have feature, see if data is missing which chord diagram show
- Nice to have feature: overlay which shows important historical periods or civilization culture
- Parallel coordinates are misleading in our visualization, bar charts may be better, since there is no relation or correlation between different continents
 - Proportions should be shown, think about having proportion on parallel coordinate viz (if a museum had 20% from each category, it would look bad)
- Tree map could be an interesting way to show country and continent data, so this may be a suitable replacement for parallel coordinate
- Maybe move heatmap to a nice to have
- Overall, maybe spend more time on scroll-telling aspect and make it stand out
- Might need a way to drill down to individual artifacts - table that populates from clicking on a country

Feedback (TA)

11.02.2019

1. Chord Diagram + Map: The ribbons will add visual clutter which is not required, you can color code the countries as heatmap for number of artifacts with a legend. On hovering a country, a popup shows the exact number of artifacts + break down of artifact types. This is also easier to implement, less cluttered and encodes all the information from ribbons. You can use continents or geographic areas instead of countries. Maybe user decides the granularity?
2. PCP: This is perfect!
3. Heatmap: This is good. Maybe you should consider the number in the cells itself, possibly in shortened format when applicable. E.g. 1000 as 1k, this is easier to understand than referring a legend.
4. Data Portraits: This is a good idea in theory, however I agree radial area charts are better than actual portraits. Except for the visual appeal of using actual portraits, it's still hard to compare general attributes without spending time with the visualization, a comprehensive legend and memorizing.
5. I like the layout and your choice of scrolling through three examples before exploration! Add a button to directly skip to exploration so that user doesn't have to go through examples every time.

Feedback (TA)

11.11.2019

1. Interaction:
 - a. If most of the visualization is based on aggregates, don't show individual data pieces
 - b. Maybe filter and show a few, but our analysis is more interested in aggregate data
2. Annotating data manually - should be manageable
3. Map Visualization
 - a. Does not like the circles on the map
 - b. Could use mercator projection for choropleth, but probably not because it's a bad projection
 - c. Circles are fine, but making the map bigger might make color more reasonable
 - d. Need to check if map is rerendering every time - if so, fix this so that it renders once
 - e. The map could be interesting if we automatically step through time and
4. Storytelling
 - a. Want an example of aggregate storytelling and some museum specific ones
5. Data Exploration
 - a. Keep data exploration aggregate
 - b. Important to enable a range of years (with a brush)
6. For data acquisition:
 - a. Use kernel density estimates overlaid on same plot instead of stacked barcharts
 - b. On hover, bring you to the front and make it more opaque than the others (d3.raise)
 - c. Map probably shouldn't be a central part of the visualization unless you annotate it
 - d. Possibly replace it with the QDE plot